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Jonas, Michael

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On the Significance of Conflict for Development Processes in Regional High-Tech Cluster

Michael Jonas (in collaboration with Marion Berner)

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Contact:

Michael Jonas
☎: +43/1/599 91-212
email: jonas@ihs.ac.at

Founded in 1963 by two prominent Austrians living in exile – the sociologist Paul F. Lazarsfeld and the economist Oskar Morgenstern – with the financial support from the Ford Foundation, the Austrian Federal Ministry of Education, and the City of Vienna, the Institute for Advanced Studies (IHS) is the first institution for postgraduate education and research in economics and the social sciences in Austria. The **Sociological Series** presents research done at the Department of Sociology and aims to share "work in progress" in a timely way before formal publication. As usual, authors bear full responsibility for the content of their contributions.

Das Institut für Höhere Studien (IHS) wurde im Jahr 1963 von zwei prominenten Exilösterreichern – dem Soziologen Paul F. Lazarsfeld und dem Ökonomen Oskar Morgenstern – mit Hilfe der Ford-Stiftung, des Österreichischen Bundesministeriums für Unterricht und der Stadt Wien gegründet und ist somit die erste nachuniversitäre Lehr- und Forschungsstätte für die Sozial- und Wirtschafts-wissenschaften in Österreich. Die **Reihe Soziologie** bietet Einblick in die Forschungsarbeit der Abteilung für Soziologie und verfolgt das Ziel, abteilungsinterne Diskussionsbeiträge einer breiteren fachinternen Öffentlichkeit zugänglich zu machen. Die inhaltliche Verantwortung für die veröffentlichten Beiträge liegt bei den Autoren und Autorinnen.

Abstract

Various attempts to initiate and further the development of high-tech clusters have been made at regional levels within the European Union. These clusters are supposed to generate economic growth and create employment. Within the context of empirical sociological research, high-tech clusters are seen as regional economic agglomerations where actors from different institutional contexts (economics, politics, science etc) co-operate or step into competition with one another in a specific technological field. 'Competition', just like 'confrontation', is identified as a basic form of conflict. This framework of relevant sociological concepts forms the starting point of this contribution, which will use the example of a regional cluster to deal with three key questions: What is the nature of the forms of conflict found in a developing cluster? Which specific constellations of individuals engaged in conflict can be observed? And, what influence does conflict have on a cluster's development process? The example at hand draws on the long-term empirical research of an economic agglomeration in the field of microsystems technology which started to evolve in Dortmund (Germany).

Zusammenfassung

In der Europäischen Union gibt es auf regionaler Ebene vielfältige Anstrengungen, High-Tech-Cluster zu initiieren oder ihre Entwicklung zu unterstützen. Solche Cluster sollen wirtschaftliches Wachstum generieren und Arbeitsplätze schaffen. Wie in der sozialwissenschaftlichen Forschung betont wird, handelt es sich bei High-Tech-Clustern auf der empirischen Ebene um regionale Wirtschaftsagglomerationen, in denen in einem Technologiefeld heterogene Akteure aus unterschiedlichen institutionellen Kontexten (Wirtschaft, Politik, Wissenschaft usw.) miteinander kooperieren und konkurrieren. ,Konkurrenz' wird neben ,Konfrontation' als eine Grundform von Konflikt begriffen. Ausgehend von in diesem Zusammenhang relevanten soziologischen Konzepten wird in dem Beitrag am Beispiel eines regionalen Clusters den Fragen nachgegangen, in welchen Ausprägungen dieser Formen und in welchen spezifischen Akteurskonstellationen Konflikt in der Entwicklung des Clusters auftaucht sowie wie Konflikt diesen Entwicklungsprozess beeinflusst. Hierbei wird auf eine langjährige empirische Untersuchung der Entwicklung eines Wirtschaftsclusters im Feld der Mikrosystemtechnik Bezug genommen, welches seit etwa dem Jahr 2000 in Dortmund – einer Ruhrgebietsstadt in Deutschland – entsteht.

Contents

I.   The Case: Dortmund's Microsystems Cluster

In North Rhine-Westphalia, regional and local governments are spending vast amounts of money to foster the set-up of techno-economic clusters in Dortmund. With a population of roughly 600,000, Dortmund is one of Germany's larger towns. Two of its characteristics are the old industrial tradition and the rather high unemployment rates, which lie between 12 and – for example in 2006 – 16%. Public spending is therefore largely aimed at tackling unemployment and creating new apprenticeship opportunities, two problems which have been troubling the region since the collapse of large parts of the local beer, coal and steel industries at the end of the last century.[1] Apart from logistics, information and communication technologies, microsystems technology plays a vital role in the new regional development process. One success story of a cluster development process in this high-technology field in Dortmund is described by the official statements of the so-called ‚dortmund-project' – a ten-year project initiative concerned with regional development, which started in 2000. The last ten years have seen an efficient infrastructure being developed, including an international association of businesses and institutes, training schemes for skilled workers and university students, and the establishment of intermediary 'foundries'. This infrastructure is accessible to about 40 small and medium sized enterprises. While Dortmund's microsystems enterprises employed around 600 people in 1996, this number rose to 1,850 in 2005. Most of the companies, among them also the majority of the most relevant companies in terms of employment, are based in three streets in the Technology Park next to the University of Dortmund. Hardly any of the companies are members of employer associations. Employees are not particularly organised either – union involvement or membership are the exception rather than the rule.

There are three basic types of companies in the field (cf. Jonas/Berner 2007): The first type, called *‘newcomer’*, includes very small companies such as recently founded spin-offs or start-ups. As a rule, they are located in one of the intermediary foundries for example in the MST.factory. In most cases they orientate their work towards research and development projects and typically employ up to nine people, most of whom are highly skilled academics. Business strategies are focused mainly on survival in the market. The second type can be described as an *‘invention company’*. Companies of this type were often founded in the middle of the 1990s and concentrate their activities on the invention and development of microsystems components at specific steps of the supply chain. It is quite common for them to engage in collaboration with other SMEs to build up 'innovation networks'. Interestingly, these other SMEs are rarely found within the cluster but rather outside of it. In this case, the number of employees varies between 10 and 50. Hierarchies are flat – as a rule, a project or

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[1] This collapse is clearly visible on 'google earth': The demise of the heavy industry has left behind brown patches where industrial plants once used to be.

department level can be found between the management and workforce level. Because of the relevance of R&D, workforces are mainly composed of academics and qualified workers. The third type of SMEs can be described as the *'all-round company'*. Companies of this type have begun or at least planned to build up cost intensive production capacities over the last years. These capacities are aimed at everything from the low-level to the mass production of components for international markets. Here, production involves shift work. However, all of these businesses still maintain a strong R&D orientation. Further, they have organised cost or profit centres with a relatively high degree of hierarchisation and have reorganised communication channels and decision-making procedures within the company. In this company type, staffs consist of three general groups: academics, skilled and unskilled workers. Because such SMEs normally employ between 51 and 600 people, they also have the biggest impact on the present job growth in the cluster building process.

The microsystems cluster in Dortmund can thus be conceptualised as an heterogeneous constellation of groups and individuals who are following different logics, strategies and interests in various sectors and at different steps of the supply chain, but are nonetheless unified in their effort to develop and enlarge the cluster. While hands-on collaboration, for example in terms of research or production, within the cluster itself may not be too widespread, willingness to share and support infrastructure certainly is. This harmonious and trustful atmosphere – and one reason for this may as well be the heterogeneous character of the field, is expressed in official statements, for example by the association for economic development, as well as in interviews which have been conducted in this field since 1999. 'There is no competition', as one manager put it, seems to be the bottom line on this issue – and this also seems to imply that if there is no local competition then neither is there going to be conflict between the cluster participants.

II.   No competiton and no rivalry: Results of the regional cluster research

The established discourse in the empirical economic and geographic cluster research confirms the assessment quoted above. It seems that competition and even more so rivalry – a fundamental aspect in clusters according to Porter (1990) – play no role in the interactions of cluster participants. These two concepts are rarely found in articles published on the topic of regional clusters. One exception is a comparative study of five European and US-American regional optoelectronic clusters which was conducted by the team around Chris Hendry (Hendry et al. 2000). They found one case of competition and rivalry in a cluster in Munich in the form of competition between firms to become agents to foreign suppliers. Another form of competition identified by Hendry et al. are cases of dissatisfied employees who quit their jobs to set up their own businesses in identical or related market segments.

A team around Simmie reached similar results with a study of innovative agglomerations in several European cities including for example Amsterdam and London. They state that "access to international competitors […] appears to make a more significant contribution to innovation than local rivalries and competitors" (Simmie et al. 2001: 61). Simmie et al. come to the conclusion that, concerning the regional clusters in their study, mutual exchange and co-operations are more important and far more widespread than competition- and rivalry-based processes.

On the one hand, these studies clearly seem to hint at the fact that competition and rivalry are not relevant in cluster-internal relationships and interactions. On the other hand, they lack theoretical argumentations about the nature and different forms of competition and rivalry. It is therefore hard to tell whether these two concepts have been properly considered – or whether they may have been reduced to merely resemble, for example, economic competition. This leads us to the discussion of sociological approaches.

III.   Conflict and Competition in Simmel's Sociology

Georg Simmel's essay "The Sociology of Conflict" (Simmel 1903) is often used as a starting point for the sociological analysis of conflict.[2] The essay takes a look at the concepts of 'struggle' or 'conflict' as a central form of sociation. One of the most commonly known sentences from this essay is the following: "A group which was entirely centripetal and harmonious – that is, 'unification' merely – is not only impossible empirically, but it would also display no essential life-process and no stable structure." (Simmel 1903: 491) This means that sociation is based on positive as well as negative social forces which can therefore both be seen as essential – or even positive according to Simmel - which therefore "both act in a completely positive way" (ibid.).

Conflict is however not seen as something 'good' as such, but only in correlation with unifying forces (Simmel [1908] 1992: 291) or a common ground, to wit: a mutually understood cause of conflict and a perspective on the situation which is shared by the opponents. For Simmel, competition is a singular form of unity or synthesis. Starting by differentiating between struggle and competition, Simmel defines competition as "indirect struggle" (ibid.: 323). The term competition does not cover activities by which an opponent is directly damaged or eliminated, rather it covers activities by which at least two individuals are concurrently trying to offer a "competitive price". By introducing prices, something independent of the individuals, competition is conceived as "struggle by everybody *for* everybody else" (ibid.: 328) – and not as 'struggle by everybody against everybody else'.

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[2] The essay later became chapter 4 of his 'Sociology' (Simmel [1908] 1992).

IV.   From Simmel to Grabher: Not Competition but Rivalry

Diverging from the mainstream discourse in regional science research, Grabher has developed the concept of 'ecologies' or 'project ecologies', which implicitly follows Porter's cluster concept and Simmel's sociology of struggle. This cluster concept analyses cross- and intra-organisational interaction processes on the basis of central groups of individuals, like private businesses. This can be problematic if these groups can no longer be assumed to be homogenous, that is, if work is organised in projects. Not only does this determine the work processes of individuals, it dissolves the boundaries of their respective groups. This was the case in the study of a London advertising cluster which was conducted by Grabher in 2000 and 2001. Analysis was therefore based at the project level, which was combined with an organisation level, the dimension of personal relationships, and the dimension of proximity. This creates a virtual space of overlapping levels, which Grabher differentiates using respective sets of specifications (see table 1).

In order to understand the social dynamics in project ecologies, Grabher does not use the concept of competition but rivalry. Rivalry "represents a 'mixed game' in which opponents aim at exploiting the rival, rather than at annihilation. Yet, both share a vital interest in the reproduction of the organizational ecology of which they are part" (Grabher 2002: 259). Furthermore, there are dimensions of rivalry "that challenge the boundaries of the individual networks, agencies, and other organisational units involved" (Grabher 2001: 357). The London advertising cluster is not solely determined by rivalry but also by a high degree of tolerance for cluster-internal diversity at both the cross- and intra-organisational level. This tolerance is strongly connected to the effects of rivalry. The combination of both, tolerance and rivalry, is the foundation for the development and reproduction of the variety of businesses and organisations found within the ecology. This description of rivalry as a 'positive and creative force' clearly corresponds with Simmel's definition of the term.

Grabher further analyses the process of project-like work within companies by using the perspective of sociology of professions. Three types of professional groups were identified at project level: 'creatives', 'account managers', and 'account planners'. The 'account manager' mainly follows a business logic. 'Account planners' are predominantly involved in actions determined by the primacy of scientific logic. Basically, they are responsible for synchronising products and services with customer needs. The third type, the 'creatives', pursue an artistic logic in which novel and singular ideas matter most. There are also the 'technicians', who are however placed at company level rather than the project level. The wide organisational diversity among advertising firms facilitates a range of mutual learning processes. But, this diversity also generates a space for power struggles and rivalry through the inevitable confrontation of the different work logics, the effect of which mainly concerns account planners and creatives.

Since projects tend to cross organisational boundaries, focusing on social relationships within organisations alone is not sufficient. Grabher therefore pursues the question of how individuals use personal networks. He differentiates between client networks and creative networks. Client networks are based on strong ties between the marketing boards of the client companies and the project teams' account managers and are regulated by contracts. Grabher describes their mode of operation as a sort of 'translation'. Creative networks, on the other hand, revolve around individual work experiences, which are used as social capital. The design, frequency and form of the co-operations with external individuals is either steered by company-internal, project-participating creatives or by company-internal technicians. The teams of creatives are regrouped – more or less well-matched – from project to project. While the work relations of the creatives can be described as improvised, Grabher describes the relationships between the technicians, who are responsible for the implementation of project-specific ideas, as 'orchestrated', as "connot[ing] pre-scripted scores and" and lead by a "single conductor" (ibid: 252).

Table 1: Levels of analysis in the ecology concept under the primacy of the project level (Grabher 2001, 2002)

Levels/ Differentiations	Organisational (agencies)	Personal relationships (client networks)	Personal relationships II (creative networks)	Space (localities)
	Diversity	Contracts	‚human and social capital'	Pool
	Rivalry	‚Translation'	Improvisation	Tempo
			Orchestration	‚Noise'
				‚Hanging out'
				Permeability
				Rivalry

Grabher thus explains how individuals of different professions use their networks to cross company boundaries. Still missing, however, is the answer to the question of how the analysed networks are linked to the geographical agglomeration itself. Sticking with occupational sociology, Grabher argues that geographic proximity is only relevant to the network mobility of specific professions, namely the creatives and technicians.

V. Combining Grabher with Simmel and Porter or ‚The Dortmund case'

Grabher provides some helpful concepts for the analysis of the conflict-prone processes in the Dortmund cluster. Of course, his approach need to be adapted to fit the Dortmund case. Contrary to the predominant project logic in London's advertising industry, projects as such only play a minor role in Dortmund's cluster. The work-related identity orientation of individuals is almost exclusively determined by their affiliation with a particular company and most employees are indeed very loyal to their companies. In turn, managements make an effort to keep loyalty up. Knowledge workers and core staffs are considered to be key resources and need intensive – and therefore expensive – vocational adjustment. This means, that they are to be kept within the company as long as possible. Since this asset is not readily shared with others, Grabher's central project level is negligible. It is also plausible to substitute Grabher's preferred interpretation perspective, taken from the sociology of professions, by one that places more emphasis on the regulation of exchange and participatory relationships between managements and staffs.

Table 2: Levels of analysis in the Dortmund case study

Levels/Individuals	Intra-organisational relationships (cultures of participation)	Personal relationships (personal networks)	Cross-organisational relationships
	Managements/staffs	Individual actors	Firms

Further, in order to match the diversity of the empirical forms of conflict, it seems advisable to refer to both concepts, rivalry and competition, when analysing cluster-internal forms of conflict at the conceptual level. According to Veit Michael Bader's 'Pro-theory of Social Action' (1991), concepts like conflict, competition, rivalry, confrontation, struggle, quarrel, dispute etc, denote an antagonism between two or more parties (Bader 1991: 337). 'Conflict' can be conceived as a general, comprehensive term opposed to 'co-operation', covering all shapes and dimensions of contradictory collectiveness or societal integration (cf. Bader 1991: 338). The two basic types of conflict are competition and confrontation, the latter is often a result of rivalry-based relationships. This establishes the link with Simmel's concept of competition as 'indirect struggle' and Grabher's concept of rivalry.

On the basis of this argumentation, three levels can be differentiated: an intra-organisational level, a level of personal networks and a level of cross-organisational relationships, which entails the co-operational and conflicting relationships between respective companies.

VI. Co-operation and conflict in intra-organisational relationships: Employee participation in the private sector

A participatory relationship can be defined as "formal and informal social practices of interaction through which the members of complex and differentiated output processes take part in everyday decision making concerning the production and company strategies" (Abel et al. 2005: 32, translation by the authors). Our empirical data shows that participatory relationships between managements and staffs can be differentiated in three participation cultures: an 'open communication culture', a 'culture of no participation' and a 'culture of co-determination' (cf. Jonas/Berner 2007). These cultures differ primarily with regard to how practices and rules concerning collaboration and conflict handling are established and updated.

The 'open communication culture' can be described by three characteristics: an open information policy, an information flow across hierarchy levels and the explanation or legitimisation of decisions. An important part of practices of information is the rule of relative transparency. A relatively easy access to company figures keeps employees informed about costs and winnings. It thus becomes easier to understand the need for certain actions. But it also enables employees to see where the profits are ending up – whether they are working to secure jobs or for their managements' bonuses. One manager stated that detailed questions about the company's finances were welcome as long as they did not concern confidential information like individual salaries. A free information flow is easily established and maintained in smaller companies where employees are in close physical proximity. The chance to engage in this specific direct communication declines when companies grow. While some forms of direct communication may still be functional, they need to be complemented with other forms of direct participation like round tables or project team meetings. Some larger companies use 'multipliers' or 'group structures' to purposefully channel information throughout the company. Acting against the will of the staff is sometimes perceived as a necessary evil but usually avoided. Even if employees do not take an active role in decision-making processes, it is still important to legitimise decisions before their implementation if this open culture is to be maintained. If legitimisation fails, a decision may even have to be changed or dropped altogether. This process can only work if vertical information flow in both directions is sufficient. This is also a prerequisite for practices of legitimisation.

Some of the companies in our study are not enforcing an open information policy. Here, company founders especially oppose legitimisation processes and prefer a 'culture of non-participation'. They fall into an orientation pattern which could be labelled as a 'hierarchic authoritarian pattern'. In these cases, a rapid increase in turnovers and staff numbers can cause communication channels to collapse. In one case of extreme growth, the company

had only just undergone a transformation from R&D to production, an interviewee noted growing dissatisfaction among employees: superiors literally no longer knew their employees and vice versa and people were relocated from one department to another by the CEO without the departments heads' consent or knowledge. This situation lasted for two years in which the company lacked any organisational structures that would have allowed employees to make themselves heard, with dismissals turning into a form of solution to various problems.

In contrast to this, an open communication culture' can also involve social practices of direct employee involvement in decision-making processes. These integrative practices increase direct participation opportunities. The respective corporate culture can then be characterised as a 'culture of co-determination'. In some companies fostering this culture, individuals' arguments are taken into account regardless of their position or status. This is especially true for the smaller companies with their less routinised processes, who will often not differentiate between, for example, technicians and academics. Thus, participation is based on the rule of mutual respect and the rule of the predominance of competence. Direct participation can then be implemented in projects where, for example, decisions regarding the finances of work stages are negotiated, including aspects concerning individual employees. This culture also entails notable conflict resolution methods: conflicts are not concealed but intervention from third parties only happens if no bilateral solution to the problem can be found. In this case, others get a chance to present their opinions. In this culture, staffs are also involved in re-organisation processes. Even though direct participation is somewhat limited for larger companies, production-oriented companies are not excluded from implementing this form of participation. Some examples for direct participation in this area include involvement in the planning and design of new production lines and the assessment of the middle management in a company-wide employee survey.

Table 3: Different Practices and Cultures of Participation

Culture of / Practices of	'Open Communication'	'Non-Participation'	'Co-determination'
Information	+	-	+
Legitimation	+	-	+
Responsivness	+	-	+
Decisional Involvement	-	-	+

Different types of participation practices and cultures are not automatically linked to smaller or larger firms, as can be seen from our empirical data. But, there are better prospects of advancing an open communication culture or an culture of co-determination for smaller firms than for larger. With the loss of the close physical proximity and the chance to talk to people

reduced by large numbers of employees, large companies' capabilities to maintain direct participation practices and cultures are limited. Even if further forms of direct participation are implemented, the loss of this capability has to be substituted by the introduction of other, indirect forms of co-determination, to wit: something like a workers' representation. One obstacle is that the issue of alternative forms of co-determination is usually not discussed in time, that is, before growth takes places and future structures to support participation can be discussed and prepared more easily. At worst, this can result in a culture of non-participation until new structures to support the previous or other cultures are established. One of the cases in our study demonstrates that managements should be proactive on this issue. In this example, the discussion about participation was brought up by a small group of union sympathisers among the staff. What followed were power struggles and confrontations between the management and part of the workforce. The union sympathisers were in danger of being shunted while the staff as a whole was at risk of being divided over the subject. Finally, the management was at risk of losing the trust needed in order to have an open communication culture or a culture of co-determination.

VII. Co-operation and conflict in personal networks

Personal networks have been established in Dortmund despite the lack of an overall organisational project logic. These networks mostly consist of managerial staff members and CEOs or they are in the areas of sales and distribution or R&D. Connections between the staffs or staff representatives of different companies hardly exist at all.

Personal relationships between the managers of different companies are important in different respects, especially in a cluster. Even before the dortmund project started, co-operation-oriented managers founded the regional intermediary organisation IVAM as a platform for intensifying personal relationships. The dortmund project now also organises numerous official events, which attract quite a bit of media attention. In addition to this, a group of CEOs has established a loosely-knit but sufficient private network. They meet in restaurants, the VIP lounge of the local football club, Borussia Dortmund, or at various cultural events to exchange information and gossip – and sometimes business contacts and contracts are passed on as well. These networks are only partly characterised by harmonious interactions and trust-based transfer practices. They are not free from conflict which surfaces, for example, in the form of derogatory remarks. As one manager said with regard to another company's product development: "If you consider how much money was poured into this place to get a product like that. 50 million euro were hardly enough. And they practically got nothing out of it. They'd buttered each other up so much, there was no way of getting out again. So, basically it had to be a success story."

Partly due to the transfer activities of IVAM and the dortmund project, and partly also due to the geographic proximity, networks of individuals from different sales and distribution departments or the area of product development have developed. These networks were sometimes formed because different companies shared an exhibition stand at the Hannover Fair or employees met on similar occasions. They facilitate contacts as well as mutual exchanges on work processes and business-related aspects. Loose information exchanges prevail among network members. One employee commented that for reasons of confidentiality, company-internal and innovation-related knowledge was mostly out of bounds. Networks like these do however create a structure which is accessible to these persons if needed. This structure can in some cases provide an opportunity to solve problems with outside help at an informal level. Networking is based on mutual trust in the integrity of the other person and therefore on the practice of sporadic exchange. This practice is determined by a rule of mutual reciprocity. Here, competition, rivalry and other forms of conflict generally do not play a role.

In contrast to the good performance of regional networks at management level, there are only few informal contact networks for employees. The number of joined-up employees is very small compared to the number of joined-up managements. This is intensified by the low probability of contact taking place between employees of different companies. Workers' representations also display a lack of exchange activities. Still, first approaches are being made to initiate cross-company exchange processes at this level, for example by having joint first aid classes.

Table 4: Personal based relationships in networks

Level/networks	Managements	Experts	Staffs
Institution-based	+	+	-
Friendship-based	+	-	-

At the level of interpersonal relationships, management networks are without doubt dominating the inner life of this regional cluster. The prevailing practices of mutual exchange and aid, as well as the existing rivalries, also have an effect on the networking opportunities of the workforces. Because of the high degree of employee loyalty regarding 'their' company and 'their' management, employees will only, if at all, establish contacts to someone from another company if the relationship between the companies' managements suggests that this is going to be perceived favourably.

VIII. Cross-organisational co-operations and conflicts

The exchange processes among the Dortmund companies generally relate to the first steps of different supply chains. They are also part of a wide range of microsystems technology branches. This considerably reduces the co-operation opportunities among the companies. In spite of this, co-operations and competition have started to develop at the cross-organisational level over the past years. And this will help to bring the analysis of the cluster's inner life nearer to completion.

Existing co-operations, like rare joint development projects, purchasing pools or technical aids, are mainly based on the positive effects of managerial networks, as mentioned above. Still, they are also based on the positive effects of geographic accessibility, as is the case in the Technology Park. Co-operation opportunities were also facilitated by the public funding of foundries. Employees from several co-operation-friendly companies are placed right next to each other in foundry buildings. This type of geographic proximity helps to establish collaboration between selected groups of employees. Joint qualification and apprenticeship schemes round off the co-operation at the cross-organisational level.

The potential for competition and conflict, on the other hand, becomes apparent in the case of the private company and university offshoots. Part of these offshoots have broken away from companies because of differing interests or conflicts between management and developers. In these cases, the offshoots prefer to avoid competition with their parent company by serving different market niches. Other offshoots are university spin-offs which were founded over the last years. These companies create a considerable potential for competition and conflict because they have easy and cheap access to the infrastructure of their academic parent organisations. Basically, they also hamper co-operation between their former university departments and other companies, as can be seen from one manager's statement: "This [man] is at the Polytechnic. He is 'married' to his own company and would only co-operate with me if his company said 'no'. Let me tell you this: He can shove it up his arse! I don't need him."

Further, there is a relatively large number of companies in the fields of sensor technology and measurement and control engineering compared to other technological fields. These companies partly serve the same or similar market niches. This leads to a very high degree of market competition, which is sometimes exacerbated by personal rivalry and notably by the otherwise unusual enticement of employees. The loss of an employee to a rival is a painful experience for the respective company. If it is a developer, the rival may even gain expert knowledge which has been accumulated over several years.

Table 5: Cross-organisational relationships: Between co-operation and conflict

	Co-operation oriented	Conflict oriented
Forms	Informal co-operations Qualification projects Joint apprenticeship schemes Technical assistance	Spin-offs/Spin-outs (partially) Exclusive access to academic knowledge Shared market niches Competition for qualified employees (enticement of employees)

IX.   Final remarks

There are some differences between the case of the advertising cluster in London and the microsystems cluster in Dortmund, like the predominance of a project logic in London and a business logic in Dortmund. The empirical data in the Dortmund case also shows, that conflict forms and practices exist at all levels of observation, and not only at some like in the advertising cluster. Despite people claiming that there was no competition, the same data also shows that both competition and rivalry, as well as other forms of conflict, not only exist but are virulent in the cluster. Still, apart from these differences, both cases demonstrate that beneath or in combination with good co-operation (Jonas 2006) conflict, competition, rivalry and struggle play a pivotal role in cluster-internal social processes, regardless of how crippling or stimulating their effects may be.

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