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Clusters as Geographically Bounded Organizational Fields: The Meaning of Proximity in the Basel Pharmaceutical Industry

Steffen Dörhöfer[1*] and Christoph Minnig[2]

[1]*Faculty of Economic and Social Sciences, University of Applied Sciences, Nordhausen, Germany*
[2] *School of Business, University of Applied Sciences, Northwestern Switzerland*

Multinational enterprises have to organize their economic activities on different spatial scales ranging from global to local contexts. Firm clusters are the localized spaces where companies assemble the management, working and innovation processes in a socially embedded environment. The aim of this article is to conceptualize exchange processes between companies and the firm cluster as an interdependent construction process, in which internationalized players structure their local relationships for the purpose of economic benefits. With the concept of organizational fields, the construction of regional clusters will be analyzed as stabilized relations, networks and "logics of interaction" among specific actors. Although neo-institutional theory conceptualizes socio-cultural underpinnings of inter-firm-relationships on a global scale, proximate interactions of local actors remain a blind spot in this perspective. Therefore, ideas of cluster concepts are taken into account to fill this gap. To further enhance the distinctiveness of proximate network ties and interactions, a case study of the Basel pharmaceutical cluster was conducted. Based on interviews, participant observation and document analysis the different production and innovation strategies of companies both within and beyond a geographically bounded field are investigated. The characteristic features of proximate network ties could be explained by the cultural underpinnings of interactions and the meaning of localized social capital.

Keywords: organizational field, cluster, social capital, culture, pharmaceutical industry, networks, innovation chain

Introduction

In the context of a knowledge-based economy, companies organize their activities within different spatial scales. As a result of new information and telecommunication technologies, companies are finding it much easier to restructure their processes on a global scale, taking into account the competitive factors associated with different locations, such as institutional frameworks, wages and taxes. The exploitation of comparative cost advantages among various locations is only one side of the globalization strategy because the knowledge and innovation intensity of many economic activities also requires the re-embedding and co-location of knowledge-intensive working interactions.

To conceptualize proximate interdependencies of differing organizations, it is necessary to bring together the logics of globalization and localization so that the nested structures of economic activities become manifest. Especially, the distinctiveness of proximate networks and interactions needs further theoretical and empirical explanation. In this article we develop a theoretically based and empirically grounded concept of the cluster economies to further our understanding of the exchange process between companies and the geographically bounded organizational field (and vice versa) as the basis for an interdependent restructuring process. The construction of firm clusters is explained within the concept of organizational fields as a tool for analyzing relations, networks and the "logics of interaction" among specific actors (Powell & DiMaggio, 1991; Scott, 2008; Wooten & Hoffman, 2008). It is argued that on one side the organizational field approach provides a conceptual lens to map the cultural underpinnings of inter-firm-relationships. On the other side, the ideas of cluster theories enable the integration of spatial aspects within the field theory; whereby a key "blind spot" in the neo-institutional theory can be elaborated (Whittington et al., 2009; Scott et al., 2000; Marquis & Battliana, 2009).

The article begins with the development of a theoretical framework for empirical research. Corresponding to our theoretical framework of studying the exchange between organizations and the geographically bounded organizational fields, research questions and methodology are outlined. In a qualitative case study of the Basel pharmaceutical cluster we investigate the significance of proximate relationships within the industry as one of the key success factors. Finally, the findings of the empirical study are discussed, and our theoretical arguments are further clarified.

[*]Corresponding author. Email: doerhoefer@fh-nordhausen.de

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Organizational Field, Networks and Proximity

The embeddedness of localized economic activities has been analyzed in the literature of varying concepts, such as "industrial districts" (Marshall, 1965; Markusen, 1996), "regional innovation systems" (Cooke, 1992, 2001) and "regional clusters" (Porter, 1998; Enright, 2003). The majority of these studies refer to the influence of geographical proximity on the cooperative and competitive relationships among various regional actors. Based on these findings an integrative theoretical framework of geographically bounded fields is developed to structure our empirical investigation. Hence, we make a clear recourse to the neo-institutional understanding of "organizational fields" as an analytical tool for investigating culturally embedded relationships and interactions among specific actors (Dörhöfer et al., 2011). Although many authors have recognized the significance of "proximity", or "propinquity", of actors as an important level of analysis in their empirical studies *implicitly* (Scott et al., 2000; Owen-Smith & Powell, 2004), the discussion still lacks further elaboration of the spatial dimension of the fields. Further elaboration on the spatial dimension of organizational field studies incorporating "spatial clustering" (Bathelt et al., 2004; Malmberg & Maskell, 2002) offer important insights.

The conceptual framework: Organizational fields

According to Scott et al. (2000), the field concept is defined as an "intermediate unit connecting the study of individual organization structure and functioning on the one hand and societal level processes on the other" (Scott et al., 2000, p. 17). Thus, the organizational field is influenced by wider "societal forces" (Scott, 1995, p. 112), most notably by the direct influence of global and national governmental systems as well as industry logics. That said, the organizational field must be understood as an analytical tool used to investigate relationships among organizations around a specific common domain. Field boundaries emerge through stabilized interactions among the different actors. And through this process fields are constantly being constructed and reconstructed. Consequently, field theorists refer to Bourdieu's theory of social fields (Bourdieu & Wacquant, 1992) to emphasize the dynamic of contested field boundaries: *"We can see, in passing, that economic fields, as in all other categories of fields, the boundaries of the field are at stake in the struggles within the field itself (most notably, through the question of possible substitutes and the competition they introduce); and that, in each case, empirical analysis alone can determine these"* (Bourdieu & Wacquant, 1992, p. 204).

Organizational fields focus "attention on [the] collection of diverse types of organizations engaged in competitive and cooperative relations" (Scott & Davis, 2007, p. 117). The encompassing character of the field framework enables us to distinguish three (associated) study perspectives of organizational relationships (Scott et al., 2000, p. 13). These three perspectives are helpful to investigate clusters as geographically bounded organizational fields and to integrate the findings of cluster research. An *organizational set* directs the research to "a focal organization with its relations to other organizations that are critical to its functioning and survival" (Scott et al., 2000, p. 13). By doing so, the whole value or innovation chain of a focal firm gains greater attention. The level of *organizational population* is composed of the relationship and the exchange processes among similar organizations in an industry. Finally, the level of *organizational fields* incorporates both organizational sets and organizational populations through the inclusion of other organizational forms.

DiMaggio and Powell (1983) define organizational fields as: *"those organizations that, in the aggregate, constitute a recognized area of institutional life: key suppliers, resource and product consumers, regulatory agencies, and other organizations that produce similar services or products"* (DiMaggio & Powell, 1983, p. 148).

Accordingly, W. Richard Scott (1995) emphasizes the cultural-cognitive perspective, and describes fields as "common meaning systems". Therefore, the produced and reproduced institutions of organizational fields include three distinct pillars. The first is the regulative pillar that constrains and regularizes aspects of institutions with the emphasis on rule setting, monitoring and sanctioning activities. The second is the normative pillar, which consists of "normative rules that introduce a prescriptive, evaluative, and obligatory dimension into social life. Normative systems include both values and norms" (Scott, 1995, p. 37). The third is the cultural-cognitive pillar where social practices and shared understandings between the field actors are taken for granted.

Based on Scott's (1995) 'enlargement' of the institutional concept, both institutional and cultural discussions are becoming increasingly intertwined. Introducing culture helps to understand "socialization processes" as they have been described within the concept of organizational fields. In the neo-institutional discussion, the understanding of culture as a "belief system and associated practices that predominate in an organizational field" (Scott et al., 2000, p. 170) is denoted as "institutional logics" and encompasses the interdependency of cognitive and normative elements.

Organizational fields provide actors with normative, regulative and cultural-cognitive patterns or categories that guide their strategies and actions; i.e. relationships among field actors are institutionally embedded. Therefore, organizational fields cannot be reduced to networks. Owen-Smith

and Powell underline the "idea that networks and institutions are co-constitutive" (Owen-Smith & Powell, 2008, p. 605) and put forward that the analysis of organizational fields must more actively consider the intermediate character of networks, e.g. the network structures as the "skeletons of fields" (Owen-Smith & Powell, 2008, p. 596). Or more general, "networks and institutions mutually shape one another. Over time, this co-evolutionary process creates, sustains, and transforms social worlds" (Owen-Smith & Powell, 2008, p. 596). Owen-Smith and Powell speak about a key duality "between relationships (the building blocks of networks) and categories (the building blocks of institutions)" (Owen-Smith & Powell, 2008, p. 618). Thus, the network relationships are embedded in institutional structures and the interactions of the networked organizations re-shape the institutional frames. Undoubtedly, organizations within organizational fields do not have the same access to the resources incorporated in network relationships. The literature refers to these types of resources as "social capital" (Lin, 2001; Burt, 2005).

What implications does the institutional framework of organizational fields have on the strategies and types of organizations? The classic concepts of an organizational field (Meyer & Rowan, 1977; DiMaggio & Powell, 1983) overemphasized the "isomorphic" behavior of organizations inside these fields. This overemphasis has led to the reciprocal adoption of organizational structures and the development of similar cognitive maps. Although the company strategies are influenced by the field structures, the organizations have tremendous leeway with regard to the interpretation and the implementation of these hegemonic structural properties.

In his discussion of fields, Bourdieu quite often relies on the metaphor of games to explain organizational fields. The players of the games are restricted by rules and regulations, but at the same time, they have experiences, opportunities and alternatives within the game. This is especially true when one is analyzing the game of experienced players. They are not just following the prescribed rules, but they also create and follow their own strategies or game plans.

For Bourdieu, the players in a game represent the actors in the field who create and exploit possibilities and alternatives within a given framework (Bourdieu, 1992). Based on this metaphor, Bourdieu does not portray fields as restricted, but rather as a restricting and an enabling concept. According to Giddens (1984) "Theory of Structuration", the existing structures of such an organizational field are the medium and the outcome of the field actions.

Geographically bounded organizational fields: Proximity and culture

The global scale is well conceptualized in organizational field approaches. However, other spatial scales, most notably, the level of proximity or "physical space", are still somewhat of a blind spot within neo-institutional argumentation. Whilst the literature concerning organizational fields has begun to recognize the specific character of local proximity within the complex intersection of spatial scales (Whittington et al., 2009, p. 91), there is still a need for a further development. Marquis and Battilana (2009) for example, suggested that organizations are simultaneously embedded in organizational fields and geographical communities. Communities are defined as "a local level of analysis corresponding to the populations, organizations and markets located in a geographic territory and sharing, as a result of their common location, elements of local culture, norms, identity, and laws" (Marquis & Battilana, 2009, p. 286).

Although the conceptualization of a simultaneous embeddedness of organizations in global and communal spatial scales is an important step towards understanding the uniqueness of proximate economic interactions, taking cluster study findings into account, allows a more in-depth elaboration of the intersection between organizational and geographically bounded fields (clusters). While more traditional approaches focus on the surplus value of geographical proximity, "hard" economic facts such as administrative support, taxes, lower transaction costs (co-located suppliers), well-developed infrastructures, and specialized labor markets (workforces), more recent approaches refer to economic exchanges among actors in knowledge transfer and interactional innovation processes. Thus, relational approaches in cluster studies could be linked to the organizational field approach, as the main foci of both theories are economic exchanges and relationships. In contrast to neo-institutionalist organization theory, relational cluster studies propose that "economic action and interaction must take place somewhere" and "look for explanations of localized economic processes and their consequences" (Bathelt & Glückler, 2011, p. 27).

In line with this approach, Malmberg and Maskell (2002) and Bathelt et al. (2004) contend that successful innovation networks depend on the interaction between local and non-local sources of knowledge. "Cultural factors", such as trust, common values and shared norms, are the necessary "common ground" for the successful coordination of the innovation and knowledge transfer processes. It is argued that only face-to-face interaction can produce the "common ground" that is necessary for the transfer of the crucial resource—tacit knowledge—among the actors. In distinguishing between relational proximity and geographical proximity, Amin and Cohendet (2004) criticize the overemphasis of geographical proximity. The socio-cultural relations for the exchange of tacit

knowledge can also be realized through specific management and working practices as well as virtual and occupational communities of practice.

Following Asheim and Gertler (2005), the relevance of geographical proximity also depends on the knowledge bases of companies, specifically whether a company has a synthetic or an analytic knowledge base. A synthetic knowledge base "prevails in industrial settings where innovation takes place mainly through the application or novel combination of existing knowledge" (Asheim & Gertler, 2005, p. 295) and is strongly dependent on a culture of local interaction. The regional embeddedness of companies with a synthetic knowledge base is of primary importance. In contrast to a synthetic knowledge base, an analytic knowledge base consists of scientific knowledge, such as basic research, applied research and systemic development of products and processes. Although the analytic knowledge base appears to be organized within the construct of organizational proximity, Asheim and Gertler (2005) emphasize that knowledge spillover ("buzz"), path-dependencies in the labor market of highly qualified workers and the quality of life to attract talent are also solid arguments for geographical proximity. The co-location of different companies, knowledge institutions and political actors leads to knowledge spillovers, regular observation of competitors and the possibility to compare and to benchmark with one another (Malmberg & Maskell, 2002, p. 439).

In the following sections, the cluster as geographically bounded organizational field will be applied as a framework for our empirical analysis of the Basel pharmaceutical cluster and as a foundation for relevant research questions. An organizational field approach supplemented by a local unit of analysis (cluster) provides an analytical framework to empirically investigate the localization of organizational interactions within interdependent spatial scales.

Methodology

The pharmaceutical industry can be characterized as a knowledge-intensive and highly competitive sector. Major developments in the field of pharmaceutical research, such as biotechnological advancements and the human genome project, have supported new evolving industry segments. As a result, the composition of the pharmaceutical industry has changed and now consists of the following branches (Fischer & Breitenbach, 2010): i) Research-based pharmaceutical industry; ii) Biotechnology firms iii) Generic manufacturers; iv) Contract research organizations and drug delivery firms; v) Medical technology enterprises and medical technology.

The production and innovation model of many pharmaceutical companies has simultaneously shifted (since the 1990s) from a vertically integrated "end-to-end" to a more network-oriented strategy. Varying types of companies play increasingly different roles within the pharmaceutical value chain and therefore possess specific competencies. Although markets and value chains are highly globalized, the long-term development and evolution of well-known research clusters as Boston, Singapore and Basel plays a pivotal role in organizing innovations.

For the empirical investigation the Basel pharmaceutical cluster was selected for several reasons: Firstly, Basel is one of the world's most important pharmaceutical clusters. Secondly, companies at all stages of the pharmaceutical value and innovation chain are located in the region; i.e leading pharmaceutical companies, biotechnology firms and suppliers. Thirdly, leading pharmaceutical companies have concentrated their R&D capabilities in the regional cluster in order to built knowledge hubs and foster relationships with other regional organizations. Lastly, the companies in the region have successfully adapted their cluster organization to the changing environment.

The empirical investigation was conducted in the context of the project "Corporate Culture and Regional Embeddedness"(CURE, financed by the 6th framework of the European Commission). Based on our analytical framework of regional fields, that emphasizes culture and incorporates the meaning of proximity, our empirical investigation was guided by two principle research questions: i) Which function has a "shared culture" among field actors in clustered innovation and production processes? ii) What role does "proximity" play in cluster innovation processes?

We have used a qualitative research design, subdivided into three parts. Each part aimed at the exploration and further development of the research questions. Part one of the research process included explorative interviews with regional key actors from different economic, scientific, political and educational organizations; document analyses of cluster studies, regional initiatives and media analyses of central regional newspapers. The second and main part of the research consisted of conducting 30 qualitative interviews with representatives from various pharmaceutical companies, knowledge institutions, support organization and other organizations (i.e., financial organizations). Referring to the CURE-project the investigated companies were selected on the base of specific criteria (see Table 1).

Table 1. Data about investigated companies.

1. Ownership	Geographical dimension / Ownership structure	Majority owner from the region	Majority owner from Switzerland	Majority owner from another country
	Listed on the stock exchange	11	2	7
	Not listed on the stock exchange	6		
	Governmental involvement	4		
2. Time-dimension		Old company (>20 yrs.)	Medium age company (10-20 yrs.)	Young companies (<10yrs.)
		16	8	6
3. Size		Micro (<10 employees)	SME (10-250 employees)	Large (>250 employees)
		5	12	13
4. Market-Orientation		Regional	National	International
		4	5	21
5.Cluster		Yes	No	
		22	8	
6. Knowledge-intensity		Yes	No	
Knowledge-intensive		30	0	
Innovation-intensive		20	10	

Finally, further interviews were conducted with significant innovation partners in order to gain special insight into the complex (e.g. cultural) exchange processes and to gather further information about the knowledge sharing process beyond organizational boundaries. The empirical findings were then summarized and an explanatory case study centered on the Basel regional field was produced. The research was conducted between 2007 and 2011.

The Basel Pharmaceutical Cluster

Characteristics of the cluster – boundaries and actors

The metropolitan region of Basel has a long and extensive history in the chemical and pharmaceutical industry. Over the past two decades, the pharmaceutical industry in Basel has been transformed into a knowledge, research and development-intensive firm-cluster. Not only have many companies increasingly invested in "research & development", but at the same time, many national and regional authorities have additionally invested in education, research and support (e.g. exchange networks) facilities. The success of the geographically bounded field, in general, and the innovation capabilities of local companies, in particular, can be explained by the Triple Helix concept of government-industry-university relations (Etzkowitz, 2003).[1] Although the cooperation between government, the companies and the knowledge institutions takes place at a very high level of reflexivity, the actual state of affairs is more of a "work in progress" than an emergent and fully established interplay. In addition, regional (cantonal) governments advance the cluster development with requisite support, participate in and are part of the various regional development initiatives such as the "Life Sciences Commission" of the Chambers of Commerce of both Basel-City and Basel-Country and a regional economic promotion project called Basel Area. All of these activities and developments are reflected in the great effort currently being made by both governmental and corporate field actors to ensure the region's ability to remain competitive in the future as an important research and development region of the pharmaceutical industry.

The most powerful actors of the cluster are large pharmaceutical companies that have their headquarters, some of their R&D facilities and a smaller fraction of their production capacity in Basel (Novartis, Hoffmann-La Roche, Actelion, Syntes and many start-up Biotech companies). In view of the fact that the large pharmaceutical and chemical companies have many plants and research facilities around the world in different regional clusters, the idea of a central "home base" for these companies is perhaps, too simple. A better term to describe the strategy of these international companies would be "multiple citizenship". Companies act in different regions as engaged citizens and regard themselves as responsible for the development of these regional clusters. Therefore, the research-intensive pharmaceutical companies have the option to locate their R&D facilities and innovation activities in various regions throughout the world, regions with specialized knowledge clusters within the identified domain.

Being international – at least for some companies' – means, not only being involved in many different national markets but also being rooted in more than one regional cluster or nested in more than one socio-geographic space. They

must be recognized as being allied to several firm clusters, developing a certain "belongingness" and multiple institutional citizenships. These different cluster citizenships are not independent, but influence each other and as one result, the interaction among those different fields may reduce the risk of 'lock-ins', described in some literature (e.g., Visser & Boschma, 2004). It also underlines the global embeddednes of the Basel cluster.

Over the years the pharmaceutical cluster of Basel has attracted international companies, workers, managers, and scientists from other clusters. And now also serves as a breeding ground for new local companies relying on local expertise.

- As far as we understand, this community is an important basis not only for the development of its own international culture in Basel but also as a platform for professional exchange.
- Interactions between local and international actors within the region (individuals and institutions) are creating an increased international sensibility, greater international know-how and expanded international potential.
- The region is not only able to attract international actors, both individuals and institutions but also, to a certain extent, is able to function as a launch pad for international activities at individual and institutional levels.

"Whole-Chain-Culture" – Existence of a common ground between the actors

In addition to Novartis and Hoffmann-LaRoche (Roche) – two big international players with their head quarters in Basel –, the regional cluster enfolds approximately 900 companies located in the region. An important precondition for the evolution of the regional pharmaceutical cluster is the interdependence with other sectors such as chemistry, engineering, green technology, IT, logistic, trade, financial and insurance services (BaselArea, 2010, p. 26ff.).

Today, the entire process – from invention to market – including all necessary support functions (e.g., financing services, laboratory infrastructure, packaging design and suppliers) can be carried out within the Basel region and those activities and the actors (the different organizations) became closely linked over time. This should not only be understood as technical potential (a value-chain), but additionally as a cultural medium and/or a common, inter-organizational and locally embedded development ground. Therefore we do not label this phenomenon as a regional value chain, but as a local 'whole-chain-culture'. Of course, global value chains are also underpinned by shared cultural frames, but the local whole chain culture should be understood as an analytical instrument for elaborating the distinctiveness and specialty of proximate relationships.

The whole-chain-culture is grounded on the local innovation chains of leading pharmaceutical and chemical concerns as well as the implicit learning processes of all the actors engaged in these cooperative activities. The evolution of the innovation chain is based on a shared cultural framework that facilitates bridging the different innovation cultures, the contrasting steps of innovation and their divergent actors. At the same time, it also creates the opportunity for the various actors within the whole-chain-culture to interact in a constructive and focused market orientation. This whole-chain-culture, which represents an interesting case of a diverse organizational field, is thus able to create an intense connectedness and an ability to interact and learn from one another (Powell et al., 1996). For knowledge and information transfer, these settings serve as the place for regional "buzz", the discussion of different innovation strategies and the foundation for new start-up companies.

Leading regional companies support the further development of innovation networks while they recognize the necessity of organizing these complex interactions in close proximity to each other. This means that in all parts of the "whole chain", the different actors speak the same professional language or are able to successfully translate and interpret other practices. In their interactions, the various actors build relationships based on common ground and a common understanding of feedback processes. Almost certainly, new organizations entering the chain will be culturally socialized by a strong common understanding within the existing innovation chain.

The dense and versatile institutional framework is one of the key elements in the production and innovation potential of the region and its players. From the initial research stage through to the final product or service, every step in this complex process can be completed with co-located partners. The cluster, therefore, can be seen as a broad and comprehensive competence network. While the whole-chain-culture underpins many inter- and intra-organizational relationships, an in-depth description of open innovation processes in the pharmaceutical industry could further explain the development and impact of a common cultural ground among different local organizations. Moreover, the intersection between global and proximate activities will be enhanced.

Open innovation: Global pipelines and proximity

Divergent companies play varying roles within the pharmaceutical value chain and therefore own specific competencies. Regarding the innovation chain, the research-based pharmaceutical companies, the biotechnological firms, the contract research organizations and the drug delivery companies are pivotal. Whereas the big

pharmaceutical companies previously pursued an end-to-end strategy incorporating all the main activities of the innovation chain, nowadays they organize and monitor innovation networks comprising of different actors. In other words, the vertically integrated innovation chain has dissolved into a collaboration of specialized firms where the large pharmaceutical concerns are responsible for the overreaching and boundary-spanning organization of the various phases of the innovation chain.

Gassman et al. (2008) distinguish three different forms of collaboration between large pharmaceutical companies and smaller companies within the innovation processes: outsourcing, collaboration and integration (Gassmann et al., 2008, p. 70). Satisfactory and final form of collaboration depends on the closeness of the reciprocal relationship and the specific character of the knowledge transfer as well as learning processes between the actors.

In order to manage an innovation pipeline from start to finish, pharmaceutical companies must monitor and organize the entire innovation process, beginning with the identification of drug candidates and deciding on the advancement of the drug candidate to bring the drug to market. In addition, pharmaceutical companies must cooperate and collaborate with different partners for a successful complementation of the drug discovery. Due to the difficulty in finding promising new drug candidates, and the complexity of managing an innovation pipeline, the strategy of pharmaceutical companies has shifted from closed to open innovation processes (Chesbrough, 2003).[2]

The pharmaceutical innovation chain consists of five main stages (Figure 1). First, an appropriate drug candidate that has the potential for further development must be identified.

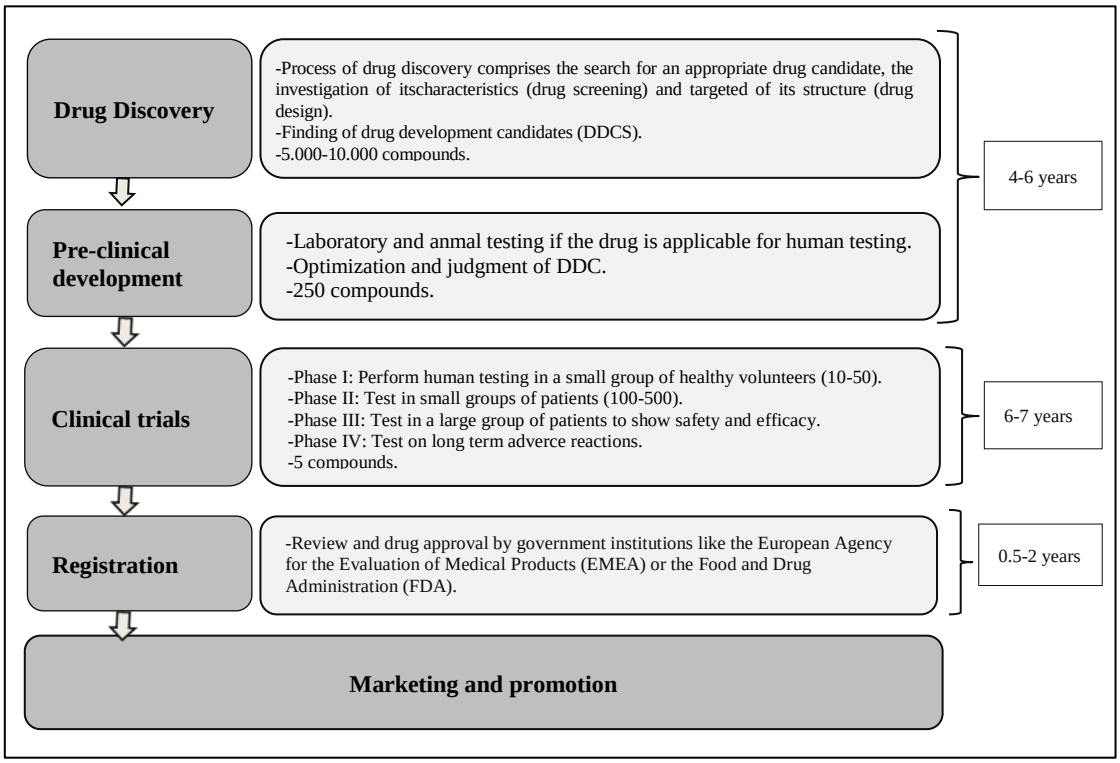

Figure 1. The pharmaceutical innovation chain, Sources: Innovation.org (2007); Fischer & Breitenbach (2010, p. 36).

The significance of geographically-bounded fields and proximity of different actors underpinned by specific cultural frames for the innovation strategies of leading pharmaceutical and biotech companies manifests itself through their execution of open innovation strategies. At the same time, this interaction may have a global and regional perspective: "The discovery of a drug can happen everywhere, but the further development of a drug depends on pharmaceutical experience […]. It is important to be located in a region where we have all of these experiences." (Senior research manager of a big pharmaceutical company). As a result, the search for drug discoveries beyond the boundaries of the focal organization becomes increasingly important. In a leading Basel pharmaceutical company, the screening process for discoveries is part of a so-called "partnering" concept:

"Then as a large firm, we have to consider two different tracks: On the one side, we have the scouting, and we look at what is done worldwide, what we are interested in. Vice versa, we have on the

other side to monitor our image as a company so that other companies would like to collaborate with us. […] And then we have contracts. For example, if a biotech company has invented an interesting substance, then we could collaborate or we could further develop the substance within our company depending on whether the substance succeeds and then we could finally buy the company. These are the alternatives for us to get innovation potential from outside" (A senior research manager of a big pharmaceutical company).

The main commonalities of the open innovation strategies of leading pharmaceutical companies (Novartis and Roche) are the following (cf. Mumenthaler, 2009; Gassmann et al., 2008):

• In-out licensing of pharmaceutical products, particularly the support of spin-off companies with venture capital funds, including the support by management knowledge
• Targeted mergers and acquisitions, such as the well-known merger between Roche and Genetech
• External collaborations

In conclusion, this initial part of the innovation chain could be organized almost anywhere in the world, resulting in the establishment of potential partnerships with companies from around the globe (global pipelines).

The next step in the innovation process seems to become more local and proximity is understood as being an important and helpful asset. At the beginning of the development process, which consists of labor and animal testing to determine the drug's suitability for human testing. The companies in our study have outsourced many of these activities and work together with so-called "contract research organizations". Although proximity seems to play a minor role for many testing activities, a regular information exchange regarding the results of animal testing is necessary. Additionally, it is important that informal relationships among managers and employees of both partners are maintained.

Then, the second stage of the innovation process, which is the clinical trials, comprises of testing groups of people in hospitals. Due to the importance of this stage in the innovation process, the experts of pharmaceutical companies are directly involved with these testing activities, and proximity becomes an ever more important value. To increase and to establish regular, formal/informal, and in particular, proximate interaction between the various partners, so called "clinical hubs" or "translational hubs" have been established. Subsequent to successful tests, the phase of review and approval by governmental agencies is triggered. During this process, well-attuned practices of involved actors are an important locational advantage.

Finally, only the large pharmaceutical companies have the financial resources and infrastructure to take on the marketing and promotion of the drugs. Small, innovative biotech companies with promising findings are not able to carry out these practices, and are therefore compelled to enter into partnerships.

Our in-depth analysis of the different stages of the innovation process shows that, even though the invention of a drug candidate can occur almost anywhere in the world, the following and constitutive steps in the innovation process depend on an established close formal and informal interaction processes and crucially, on established common ground between a number actors.

Reasons and characteristics of the "whole chain culture"

How can the development and maintenance of this "whole-chain-culture" be explained in the Basel region? Firstly, many informal networks and communities in Basel underpin the interactions among individual organizations. Often, the informal networks are emphasized by the phrase "people know each other". The foundation for these informal networks is the continuing exchange of scientists and employees between local organizations. The principal exchange activities are as follows:

• Exchange of employees and managers between the large pharmaceutical companies;
• Exchange of staff between large pharmaceutical companies and biotech companies;
• Exchange between former research institute scientists and university/regional companies, particularly the large pharmaceutical companies. Therefore, many employees not only meet and regularly share knowledge with their former colleagues, but also the exchange of staff between regional organizations leads to a broader cultural base of local interactions. Through informal networks and experiences of employees from other sectors, such as in organizations positioned within another stage of the innovation chain, the shared culture also implies an understanding of the entire innovation chain from differing perspectives. For example, the director of a research institute that has strong links to large pharmaceutical companies states,

"I would say [a large pharmaceutical company] likes to hire from the [research institute] because we already have a relationship with [the large pharmaceutical company]. The people here know people within [the large pharmaceutical company], and they also know what it means to do goal-oriented drug development. Even though we mainly do very basic research, people in our institute anyway have contact with [large pharmaceutical company] people and have a broader understanding of development and product-oriented work."

To increase the interaction and common understanding among disparate groups of people working on separate stages of product development, regional organizations in general, and

especially large pharmaceutical and biotech companies, make huge efforts to organize their cooperation activities proximate to the other actors. Regional proximity also appears to be important for many smaller service organizations, interacting in supporting processes with both large and small pharmaceutical companies:

"Proximity and short distances are an important selling argument. In contracts, not only is the price important, but also the possibilities for direct communication and quick reactions. The challenge is often to solve problems in close cooperation and interaction. […] Those relationships have been built up over years; often, they build on the relation from the time studying at the university or the time working in those companies after finishing their education" (CEO of a supplier company).

Those service organizations do not produce their own products; rather, they are the (outsourcing) partners for small process steps that enable the leading companies to focus on their core competence and to maintain or gain flexibility. For those service companies, reliability and good relations with the research departments of their customers are of great importance.

In short, the cultural pre-conditions of a successful drug candidate development process are based on the local proximity of the actors involved and regular exchanges among individuals. Thus, a "whole-chain-culture" has evolved which underpins the bridging of the various stages and respective cultures of the innovation process.

Findings and Discussion: A Further Exploration of the Organizational Field Concept

The Basel pharmaceutical cluster can be described as an organizational field, where the interplay between different companies, education and research organizations as well as governmental organizations has increased and developed over time. Over the past couple of years the region has undergone a dramatic metamorphosis, transforming itself from a traditional chemical cluster into one of the leading pharmaceutical areas. This transformation was made possible by exploiting traditional competencies and by exploring new fields of activities. Our empirical findings in the wider Basel region show that well established interactions within an organizational field are producing an increased understanding among the regional actors. Regional fields are embedded in a nested institutional structure comprising the wider societal and governmental institutions as well as the relation to different spatial scales within the hosting organizational field. On one hand the geographically bounded field is part of the globalized organizational field, i.e. the regional actors have (dense and weak) relationships with actors from other (field) regions. On the other hand, the social and economical relations in the regional field have, according to the definition of organizational fields, certain autonomy. The theory of spatial clustering argues that global organizations have a specific interest in constructing proximate space relations because the regional fields provide a nutrient medium for innovation and knowledge transfer. For the Basel case study, the field concept has to be sharpened by a further elaboration of cultural underpinning in local relationships and the introduction of the importance of regional "social capital" (Cohen & Fields, 2000; Maskell, 2000). A further elaboration of the distinctiveness of proximate relations and interactions in geographically bounded organizational fields should emphasize the interdependence of culture, the concept of social capital and proximity.

Culture matters ...

Within the pharmaceutical cluster of Basel many different cultural traits are encountered both within the different organizations and the regional cluster as a whole. Following Swidler (1986), culture provides a " 'tool kit' of symbols, stories, rituals, and world views, which people may use in varying configurations to solve different problems" (Swidler, 1986, p. 273) and that "are used to construct strategies of action" (Swidler, 1986, p. 273).

Despite the concepts of Schein (1991) or Martin (1992, 2002) being mostly used on a more organizational level, they can also be transferred to the regional field level. Thus, common patterns of action and shared basic assumptions as well as the subculture discussion help to explain the developed common ground among diverse actors on the cluster level. Culture comprises, according to Martin (2002), of three different perspectives: integration, differentiation and fragmentation. The integration perspective investigates the cultural consensus within a social unit, whereas the differentiation perspective assumes that a social entity is an accumulation of subcultures with different associations to each other (enhancing, conflicting or independent).

Martin (1992) describes the differentiation perspective as follows: *"[W]hen two cultural members agree (or disagree) on a particular interpretation of, say, a ritual, this is likely to be a temporary and issue-specific congruence (or incongruence). It may well not reflect agreement or disagreement on other issues, at other times. Subcultures, then, are reconceptualized as fleeting, issue-specific coalitions that may or may not have a similar configuration in the future"* (Martin, 1992, p. 138).

The integration and the differentiation perspective treat culture as relatively stable social configurations, Martin adds the fragmentation view which refers to the dynamic character of cultural processes (Martin, 2002, p. 152). Consequently,

cultural boundaries are seen as uncertain, fluctuating, overlapping and nested or as Peter Hawkins puts it: "culture is seen as an ongoing process of organizing and negotiating meaning" (Hawkins, 1997). Moreover not only sub-cultural differences but also particularized habits and individual mental frames have an important impact on the development of organizational cultures.

The cultural setting within our empirical field could be described as heterogeneous, due to its diversity at the organizational level, the individual, basic orientation, the level of company size and stage of the company development. Despite this heterogeneity, the many actors within the field have learned to co-exist, to interact and to co-create with each other. The heterogeneity in our Basel field seems to produce a creative and productive potential within the organizations and the regional cluster as discussed with the concept of a whole-chain-culture.

… and proximity matters

Organizational fields not only comprise of cultural interactions, but they also function as a medium for the development and use of social capital. Therefore we understand social capital as embedded in the social networks that is accessible for regional actors, thus becoming a so-called 'locational advantage'. According to Lin the concept of social capital seems to have just two components (Lin, 2001, p. 43f.): i) a resource which is embedded in social interactions; ii) use of these resources, by the involved actors.

In their work on the Silicon Valley region, Cohen and Fields (2000) have built upon these ideas, whilst differentiating their understanding – especially in the differentiation of Putnam's (2002) social capital approach of civic engagement.

"In Silicon Valley, social capital can be understood in terms of the collaborative partnerships that emerged in the region, owing to the pursuit by economic and institutional actors of objectives related specifically to innovation and competitiveness. It is the networks resulting from these collaborations that form the threads of social capital as it exists in Silicon Valley" (Cohen & Fields, 2000, p. 180).

Actors within an organizational field – e.g. the Basel pharmaceutical cluster – have to (a) recognize the existence of this social capital, (b) understand the importance of this capital stock and (c) are willing to use and (d) to reproduce these resources. Social capital is seen more as a potential 'currency', which could be transferred into an economically valuable asset. In Basel – as in many other research driven organizational fields – not so much the creation of the social capital, but more the creation of the intellectual capital seems to be the main challenge. Nahapiet and Ghoshal's (1998) work, is trying to correlate the development of social capital with the development of intellectual capital, or the more general underlying relation between the creation of social capital and the so called 'organizational advantage' to present a theory addressing this interaction Nahapiet and Ghoshal split social capital into three components: the structural, the relational and the social capital. As a consequence they define social capital as;

"the sum of the actual and potential resources embedded within, available through, and derived from the network of relationship possessed by an individual or social unit. Social capital thus comprises both the network and the assets that may be mobilized through that network" (Nahapiet & Ghoshal, 1998, p. 243).

Understanding social capital mainly as a potential phenomenon therefore requires us to ask ourselves, not only how social capital is produced or accumulated, but also how this 'potential' could be transferred or transformed into real organizational advantages impacting on the economic results of an organization.

In our understanding of the transformational process – the transformation of social capital into an organizational advantage –its combination capability and in addition the concept of trust, are seen to be the key elements. Combination capability it is not only vital to identify or recognize new information or knowledge as important, valuable, or promising. More importantly, we should actually be able to assimilate and use those new aspects and integrate them into our discussions and actions.

Combination ability could (or should) therefore also be described as a learning ability, representing a systemic type of learning, where system elements are able to access and/or to relate to each other in myriad ways. New and innovative methods of interaction are possible at any time, and empirical evidence has to show which interactions will be successful over time (Schreyögg, 2003). In sum, the recursive interaction between social capital and a shared cluster culture could explain the distinctive feature of proximate interactions.

In our research we were able to investigate the pharmaceutical cluster in the Basel region. The case study shows that local social capital and culture are important innovation or more general success factors. Even though we have analyzed the interaction within the core cluster and additionally included many additional companies the findings could not be transferred to other industries or firm clusters. Moreover, we do not have enough evidence to generalize our finding beyond the regional boundaries and give evidence for other pharmaceutical clusters. For both perspectives – the generalization within the region and beyond the region – further research would be needed. Especially, comparative analyses with other leading pharmaceutical research clusters (i.e. Boston and Singapore) offer a viable research design to test our previous findings.

Notes

1. The Triple Helix concept focuses on a "transformation of innovation from an internal process within individual firms to one that takes place among firms and between firms and knowledge-producing institutions" (Etzkowitz, 2003, p. 294), which includes a supportive role of the national and regional governments.
2. Lichtenthaler defines open innovation "as systematically performing knowledge exploration, retention, and exploitation inside and outside an organization's boundaries throughout the innovation process. The concept of open innovation explicitly considers the trend toward interorganizational innovation processes" (Lichtenthaler, 2011, p. 77).

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