

Research proposal: “Regional Learning in Multinational Companies”

Applicants: Professor Dr. Martin Heidenreich; PD Dr. Knut Koschatzky; Dr. Ch. Barmeyer

1. General Information

1.1 Applicants (institution, names and addresses of the intended recipients of the grant)

Martin Heidenreich
Professor of European Studies in Social Sciences

Dr. rer. nat. Knut Koschatzky
Fraunhofer-Institute for system technology and innovation research (ISI)

Dr. Christoph Barmeyer
Université R. Schuman

1.2 Summary of objectives, substantiation and implementation

The crucial actors of a global economy are multinational companies (MNC) which are on no account „footloose companies“. To a considerable extent they are dependent on an efficient institutional environment, since their competitive advantage in a world-wide competition depends also on the cross-border utilization of regional and national capabilities. Therefore, MNCs can be analyzed as international networks for the inner-organizational transfer of technological competences. Complementary to these transnational networks, the innovativeness of the economy is also based on regional innovation systems. Similar to MNCs, these innovation systems are also based on the existence of knowledge-based, learning networks. Multinational networks as well as regional networks can facilitate the emergence and utilization of innovations: The internationalization of companies facilitates cross-border processes of learning while the regional embeddedness of companies supports the emergence of close, trust-based relationships between different companies and between scientific, political and economic institutions.

In the project proposed here, the relationship between organizational, multinational and regional arenas of knowledge production and knowledge transfer will be examined taking the example of selected innovation projects in four French and four German subsidiaries of multinational enterprises. In order to analyze the interaction between organizational and regional arenas of knowledge creation, we will examine the regional economic and governance structures and regional cluster and network policies pursued in the home regions of these eight subsidiaries. In this way, the international and interdisciplinary project team will be able to analyze firstly the strategic utilization of regional institutions and networks by multinational companies, secondly the integration of multinational companies into regional networks and thirdly the effectiveness of political attempts to regionally embedding multinational companies. Complementary to these eight innovation, organizational, and regional case studies, fourthly the quantitative distribution of regional and organizational capabilities in Europe will be examined. Through the evaluation of selected records (REGIO, ISI-production-innovation enquiry, CIS3) the eight case studies are to be put into a wider framework. Hereby, the following hypotheses should be checked:

- *Regional bases of organizational capabilities (H1)*: An important foundation for the innovative capability of multinational companies is the ability to exploit the specific advantages of regionally concentrated suppliers, customers, competitors and institutions and the proximity to strategic markets. These regional advantages can play an essential role in the company-wide negotiation and exchange relationships of MNCs.
- *Organizational bases of regional capabilities (H2)*: At the same time multinational enterprises can considerably enhance the knowledge base of regional innovation systems. Regional institutions and companies can profit from the efforts of multinational enterprises and their local subsidiaries in recruiting, procurement, research, development, and education.
- *Political initiatives to facilitate regional learning processes (H3)*: The reciprocal learning processes of regional companies, regional institutions and multinational enterprises can be supported to a certain extent by cluster policies, i.e. through the systematic development of regional networks. In this way, multinational enterprises can be integrated in regional institutions and networks.
- *Concentration of regional and organizational capabilities in Europe (H4)*: scientific, technological, organizational and regional capabilities in Europe are spatially concentrated to a considerable extent in the classical European core region, the city belt from Southern England, Belgium, the Netherlands, Ile-de-France and Western Germany to Switzerland, Austria and Northern Italy.

The project will be carried out by an international and inter-disciplinary team (Bamberg University, Fraunhofer Institute for system technology and innovation research, Institut Européen d'Etudes Commerciales Supérieures of the Université R. Schuman, Strasbourg).

1.3 Zusammenfassung von Zielsetzung, Begründung und Durchführung

Die zentralen Akteure einer globalisierten Wirtschaft sind multinationale Unternehmen (MNU). Diese sind keinesfalls „footloose companies“; sondern sind in erheblichem Maße auf ein leistungsfähiges institutionelles Umfeld angewiesen. Ihr Vorsprung in einem weltweiten Wettbewerb erwächst auch auf der grenzüberschreitenden Nutzung regionaler und nationaler Vorteile. Deshalb können MNUs als grenzüberschreitende Netzwerke zum innerorganisatorischen Transfer wissenschaftlicher, technologischer, organisatorischer und wirtschaftlicher Kompetenzen verstanden werden. Komplementär hierzu beruht auch die Leistungsfähigkeit regionaler Innovationssysteme auf der Existenz wissensbasierter, lernender Netzwerke. Sowohl regionale als auch multinationale Netzwerke können somit die Hervorbringung und Nutzung von Innovationen unterstützen: Eine Internationalisierung von Unternehmen ermöglicht grenzüberschreitende Lernprozesse etwa bei der Entwicklung neuer Produkte und Dienstleistungen, bei der Koordinierung von Produktionsprozessen oder der Erschließung neuer Märkte. Eine stärkere regionale Einbettung hingegen ermöglicht dichtere, vertrauensvolle Beziehungen zwischen verschiedenen Unternehmen und zwischen Wissenschaft, Politik und Wirtschaft.

In dem hier vorgestellten Projekt soll das Verhältnis betrieblicher, multinationaler und regionaler Arenen der Wissenserzeugung und des Wissenstransfers am Beispiel ausgewählter Innovationsvorhaben in je vier französischen und deutschen Niederlassungen multinationaler Unternehmen untersucht werden. Gleichzeitig sollen die regionalen Wirtschafts- und Regulationsstrukturen und eventuell in der Region verfolgte Cluster- und Netzwerkpolitiken rekonstruiert werden. Hierdurch soll erstens die strategische Nutzung regionaler Institutionen und Netzwerke durch multinationale Unternehmen, zweitens die Einbindung multinationaler Unternehmen in regionale Netzwerke, und drittens die politischen Versuche zur regionalen Einbettung multinationaler Unternehmen rekonstruiert werden. Komplementär zu diesen acht Unternehmens-, Innovations- und Regionalfallstudien soll viertens die quantitative Verteilung regionaler und organisatorischer Fähigkeiten in Europa untersucht werden. Durch die Auswertung ausgewählter

Datensätze (REGIO, ISI-Produktionsinnovationserhebung, CIS3) sollen die acht Unternehmens-, Innovations- und Regionalfallstudien in einen breiteren Rahmen gestellt werden.

Hierdurch sollen die folgenden Hypothesen überprüft werden:

- *Regionale Grundlagen organisatorischer Fähigkeiten (H1)*: Eine wichtige Grundlage für die Innovationsfähigkeit multinationaler Unternehmen ist die Einbettung in regionale Innovationssysteme, um spezifische Wissensvorteile zu nutzen oder die Nähe zu strategischen Märkten zu realisieren. Hieraus erwachsen Kompetenz- und Innovationsvorteile, die in konzernweiten Aushandlungs- und Austauschbeziehungen zur Geltung gebracht werden.
- *Organisatorische Grundlagen regionaler Fähigkeiten (H2)*: Gleichzeitig können multinationale Unternehmen einen erheblichen Beitrag zur Leistungsfähigkeit regionaler Innovationssysteme leisten. Regionale Institutionen und Unternehmen können von den Rekrutierungs-, Beschaffungs-, Forschungs-, Entwicklungs- und Ausbildungsanstrengungen multinationaler Unternehmen und ihrer ortsansässigen Niederlassungen profitieren.
- *Politische Gestaltbarkeit regionaler Lernprozesse (H3)*: Diese wechselseitigen Lernprozesse von regionalen Unternehmen, regionalen Institutionen und multinationalen Unternehmen können in gewissem Umfang durch Clusterpolitiken, d.h. durch die systematische Entwicklung regionaler Netzwerke, unterstützt werden. Hierdurch können multinationale Unternehmen gezielt in regionale Institutionen und Netzwerke einbezogen werden.
- *Konzentration regionaler und organisatorischer Fähigkeiten in Europa (H4)*: Wissenschaftliche, technologische und wirtschaftliche Fähigkeiten sind in Europa in erheblichem Maße räumlich konzentriert.

Das Projekt wird von einem internationalen und interdisziplinären Team (Universität Bamberg, Fraunhofer-Institut für Systemtechnik und Innovationsforschung, Institut Européen d'Etudes Commerciales Supérieures der Université R. Schuman, Strasbourg) durchgeführt.

2. Assessment of the topic and object of research within the international state of the art

The proposed project focuses on the strategic use of regionally concentrated innovative competences by multinational enterprises and on the regional integration of multinational companies. Therefore, in the following we will discuss briefly the current research on the regional prerequisites and consequences of organizational innovations in a globalized knowledge society. In order to analyze the relationship of regional and multinational arenas of knowledge creation, it is necessary to reconstruct and if possible to link two different debates, which, up to now have proceeded independently - on the one hand the debate concerning regional cluster or innovation systems (2.1), on the other hand, the debate about learning in multinational enterprises (2.2.).

2.1 Regional innovation systems as arenas of networked learning processes

The debate concerning the social prerequisites of innovations is focused above all on the *process* of creation of new products, services and procedures and not primarily on the results of this process. Therefore, the prerequisites for the continuous emergence of innovations in a

knowledge-based society become the centre of attention (Powell 2004).¹ Furthermore, innovation processes can be organized less and less as linear sequences of basic research, applied research and realization, since the uncertainties associated with innovations increase considerably through the accelerated change processes and the globalization of the economy. Innovation processes can therefore no longer be sequentially ordered (Metcalf 1995: 461). They are increasingly characterized by feedback loops, interactive and recursive learning processes, and power and exchange processes (Koschatzky 2001: 38-62, Krohn 1997). This has been described as a transition from linear to systemic innovation processes, as a change from „Mode 1“ to „Mode 2“ types of knowledge production (Gibbons et al. 1994, Nowotny et al. 2001) or as a change from industrially-driven to university-driven innovation processes (Etzkowitz/Leydesdorff 1997, 2000).

This increasing openness and uncertainty of innovation processes is connected with an increasing significance of innovation networks: Inter-organizational networks have been analyzed as arenas for systemic innovation and learning processes (Rammert 2000, Freeman 1991, Saxenian 1994, Powell et al. 1996). On the other hand, Freeman (1997) has already drawn attention to the fact that the increasing significance of networks is accompanied by the increasing importance of innovation systems (Edquist 1997, 2001). Such systems have been defined as „*set of distinct institutions which jointly and individually contribute to the development and diffusion of new technologies... it is a system of interconnected institutions to create, store and transfer the knowledge, skills and artifacts which define new technologies.*“ (Metcalf 1995: 462-3) Regional (Cooke et al. 2004, Asheim/Isaksen 2002) and national innovation systems (Lundvall 1992, Nelson 1993, Lundvall 2002) are the centre of attention. Different types of regional innovation systems are analysed as industrial districts (Pyke et al. 1990), innovative milieus (Camagni 1991; Crevoisier 2004) and clusters (Porter 1998, Maskell 2001b, Cooke 2002). The general assumption is, that innovation processes are still regionally concentrated to a considerable extent: „*Microregions are increasingly becoming one of the leading motors of economic development, and gateways of countries to the global market place*“ (Dunning 2000: 29). Economic regions are not outdated ways of organizing economic activities which are condemned to be overthrown in a globally integrated economy. Rather, they will still play an important role for the accumulation, development and preservation of technical, economic and scientific knowledge. The reasons for these agglomeration effects are seen in transaction cost savings, in learning advantages of regional proximity, in the chance to establish interaction-based trust relationships, in which information can be easily shared simply by being present in the region („buzz“) and in the provision of products, services and qualifications that are adjusted to the needs of the respective companies.

The central strengths of clusters are learning and innovation advantages (Malmberg/Maskell 2002). On the one hand, these innovation advantages are a result of interorganizational regional networks, i.e. durable, trust-based relationships between regional companies and their suppliers, clients and competitors (Weyer et al. 1997). On the other hand, they are a result of regional institutions, which provide specific collective competition goods tailored to the needs of the respective cluster (cf. Crouch et al. 2001) thus stabilizing interorganizational patterns of cooperation. Regional capabilities, therefore, are the result of institutionally-stabilized and trust-based networks of regional companies, education, technology transfer, research and development facilities and political actors. These networks facilitate the reciprocal irritation of technological, scientific, political and economic perspectives, thus promoting the capabilities of regional companies. These capabilities have been defined as „*the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly-changing environments.*“ (Teece et al. 1997: 516)

¹ The EU defines innovations as the „*transformation of an idea into a marketable product or service, a new or improved manufacturing or distribution process, or a new method of social service. The term thus refers to the process.*“ (European Commission 1995: 4)

Regional communication and cooperation networks have a two-fold advantage: On the one hand, direct and more frequent contacts as well as regional identities and traditional forms of socializing increase the chances for the development of trust relationships and common views on the world. On the other hand, the possibility for the transfer of implicit, context-specific, non-negotiable knowledge increases - a genuine advantage of networks. The more easily and faster explicit, scientifically-systematized knowledge is globally available, the more important context-specific, implicit knowledge becomes. Context-specific knowledge is a crucial factor for the development of new technologies and procedures: *„a significant amount of innovations and improvements are originated through 'learning-by-doing' and learning-by-using“* (Dosi 1988: 223). Through spatial proximity, the chances for direct interactions and intensive, trust-based cooperation relationships increase (Scott 1995: 54). Such learning effects Krugman (1991: 52) designates as „technological spill-over“ or „knowledge spill-over“; they refer on the experiences and the implicit store of knowledge, which companies and employees collect during the intensive use of a specific product or a technology.

However, regions are not closed containers, whose economic strengths exist independently of their international environment (Löw 2001, Pries 1997). More and more, regional innovation systems are open, world-wide connected spaces, which must assert themselves in global competition (Koschatzky 2005). The central actors of the actual globalization process are multinational enterprises (Held 1999, Pries 2003). However, in the current debate about regional learning, the relationship between multinational enterprises and regional innovation systems was barely discussed. Rightly, Rugman/Verbeek therefore emphasize (2003: 151) *„the traditional focus on domestic clusters (...) largely neglects the value of trans-border multinational enterprise activity.“* This is a serious omission, since the innovativeness and the investment decisions of multinational enterprises are strongly dependent on the regional environment of their subsidiaries and the possibility of using the corresponding innovative advantages. This will be discussed in the following.

2.2 Organizational learning in multinational companies

Multinational enterprises are the crucial actors of the global economy. The currently 61,000 multinational enterprises control approximately three quarters of the commercial technical knowledge. Their turnover is 50 % higher than the reported foreign trade - and it is also increasing faster. In the last decade, direct investments in foreign countries have grown twice as fast as global exports and have risen approximately three times as fast as global production (cf. Scaperlanda 1993, UNCTAD 2004).

From a theoretical point of view, the central position of multinational companies (MNC) raises the question, why do companies in their geographical diversification strategies opt for inner-organizational forms of control and coordination and not for market-based forms of coordination such as, for example, exports or franchising (Dunning 1988). In a static perspective, the answer lies in transaction cost advantages of organizations; in a dynamic perspective, the major advantages of MNCs are the greater flexibility (Buckley/Casson 1998) and the cross-border utilization of technological and organizational competences (cf. Granstrand et al. 1992; Scaperlanda 1993; Howells 1990; Zander 1998): *„In our view, firms are efficient means by which knowledge is created and transferred“* (Kogut/Zander 1993: 631). Multinational enterprises are therefore *„essentially a mechanism of the internationalization of the transfer of knowledge and technologies“* (Stichweh 1999). Through internationalization, enterprises attempt to use their specific competences in several markets (Chandler 1992). The question of the convergence or divergence of business and regional cultures and the ways and means of a culturally-adequate transfer of information and knowledge therefore plays an outstanding role. For example, MNCs can use product, production, distribution and development competences,

which they accumulated in the homeland, in other sociocultural and institutional contexts. The existence of such international inner-organizational learning and synergy effects distinguishes multinational enterprises from market-based exchange relationships and national companies.

Two different advantages of inner-organizational forms of transnational learning have to be distinguished: The first advantage can be termed “globalization advantage” because it is based on concern-wide uniform procedures, standards and projects. The second advantage is based on the utilization of the competences of foreign subsidiaries (for these “localization advantages“ cf. Perlmutter 1969, Ghoshal/Nohria 1993, Osterloh/Waibel 1996). In an ideal situation, companies could combine the advantages of globally-coordinated product and production strategies with the advantages of local proximity. Such a transnational strategy is based on the autonomy of foreign subsidiaries on the one hand (in the sense of self-organizing, loosely-connected network structures), on the other hand it attempts to integrate the companies distributed throughout the world into a common group strategy. Transnational enterprises can therefore be characterized by a reciprocal exchange between different national subsidiaries. They are polycentric networks of knowledge creation and diffusion combining globalization and location advantages (cf. Pries 2000).

A particularly interesting field in this respect are entrepreneurial research and development activities (R&D). Until recently most companies still favoured domestic research and development capacities (cf. Patel/Pavitt 1998). The production of new knowledge was - as far as this can be measured by patent activities - still concentrated in the homeland of the companies (Archibugi/Michie 1995). But since the 1990s, it seems that MNCs are gradually turning away from the previous ethnocentric orientation and are developing polycentric R&D patterns. The share of foreign research departments clearly increases. The internationalization of research seems to be a consequence of the internationalization of production (Edler et al. 2003). Polycentric R&D structures develop (cf. Patel/Vega 1999), and heterarchical organizational structures rely directly on various national competences (Sölvell/Zander 1995). Instead of a one-way street, in which the technical, economic and scientific knowledge of an advanced country is transferred to a less-developed country, reciprocal exchange relationships between complementarily specialized countries are emerging: *„The largest leading European firms are moving towards international strategies for technological development to generate geographically dispersed but complementary streams of innovation through the construction of international research networks in Europe.“* (Cantwell/Janne 1999: 137) In part, the corresponding location decisions can be influenced by state subsidies (Cantwell/Mudambi 2000). But in general, the decision between different locations will also reflect the innovativeness of these locations. Also the internal competition between different subsidiaries of a MNC will reflect the capabilities of these subsidiaries - and therefore the capabilities of the regional environment (Birkinshaw/Fey 2000; Birkinshaw 1996). The consequence of such a competition between different subsidiaries and locations may well be concentrated on only a few locations worldwide (Meyer-Krahmer/Reger 1999).

Mergers and acquisitions are frequently the source of these polycentric innovation patterns with internationalised research and development structures. Many of the research centres, that are now in foreign possession, were created and developed in the national context (cf. Patel 1995: 149f.). Up to now, hardly anything is known about the actual functions of such heterarchical learning innovation networks (Sölvell/Zander 1995).

In conclusion: Through mergers, some multinational enterprises are developing transnational innovation networks, which are no longer primarily anchored in one country. This transforms the type of the organizational knowledge transfers changes within multinational companies: In the past, companies were embedded much more within one country and concentrated on the one-way transfer of organizational and technological competences (Ghoshal/Bartlett 1990): Competences developed in the homeland were transferred abroad with minor adjustments by foreign marketing and production facilities. Due to the liberalization and

globalization of especially European markets, international learning and innovation processes are increasingly characterized by the reciprocal exchange of competences. This does not undermine the crucial role of regional and national innovation regimes. However, regional advantages can increasingly be selected in a global context. Companies are no longer dependent exclusively on the innovativeness and institutional infrastructure of their home regions. Alternative locations can be taken into consideration. In a knowledge society, these advantages are no longer confined to transaction cost advantages or access to closed national markets, but also and increasingly the utilization of regional learning and innovation advantages.

Given this potential impact of regional innovation systems for multinational enterprises and their innovativeness, surprisingly little is known on the relationship between multinational and regional arenas of knowledge creation. Up to now the two formerly-mentioned debates have proceeded largely independently of one another. Caniels/Romijn (2003: 1253) for instance note: *„The regional agglomeration studies emphasize the favourable impact of geographical proximity on regional economic performance; but the firms that constitute those agglomerations largely remain black boxes. In contrast, studies dealing with technological learning explain economic performance at the firm level without systematically taking account of the effects of geographical proximity.“* Only a few studies analyze the relationship of regional and interorganizational learning from a empirical (cf. however Phelps/Fuller 2000; Phelps et al. 2003, Sternberg/Arndt 2001) or theoretical point of view (cf. Dunning 2000, Storper 1997 and Dicken/Malmberg 2001 and the special edition of the journal *„International Studies of Management & Organisation“* edited by Birkinshaw/Sölvell 2000). A reason for this surprising decoupling of the debates on regional innovation systems and MNCs may be the different groups concerned (politicians, management): Whilst the major lessons of the debates on cluster policies and regional innovation systems concern the type of regional governance structures, the analysis of multinational enterprises focuses above all on the cross-border coordination of production, distribution, and innovation processes.

3. Goals and hypotheses: The analysis of regionally-embedded learning in multinational enterprises

The project proposed hereby focuses on the strategic use of regional economies by multinational enterprises taking the example of organizational innovation processes. Therefore, the debates on multinational enterprises and regional innovation systems, which, up to now have been conducted independently, must be brought together. There are several possibilities to integrate these different approaches: We could concentrate on the question of the regional embeddedness of global value chains (Gereffi 1999, Eichhorn et al. 2003) or the type of transnational spaces created by MNEs (Pries 1997, 2000, 2003). But in the context of this project proposal it seems to be more useful to conceptualize multinational enterprises and regions as two different arenas for technological, economic and organizational learning. In the following we will concentrate on regional and company-wide processes of learning. On this basis of these concepts, we will be able to propose four hypotheses on the interdependencies between regional and company-wide learning processes.

In order to examine regionally-embedded organizational learning processes in multinational enterprises, a theoretical framework is required, that clarifies the relationship of regional and concern-wide learning and coordination processes. The interactions between regional and organizational learning can be best grasped, if both the regions as well as the multinational enterprises are understood as social fields (DiMaggio/Powell 1991, Fligstein 2001a). These social fields are first of all characterized by interorganisational networks. Both clusters as well as multinational companies can be analyzed as networks, whose strengths lie in the creation and recombination of knowledge. Whilst clusters can be conceptualized as spatially

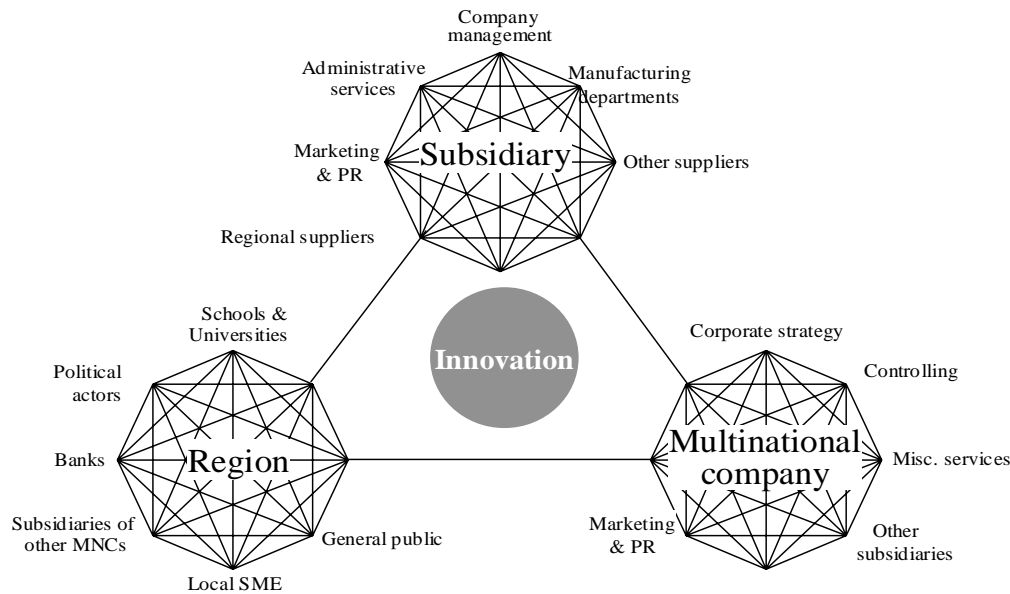
concentrated, inter-organizational relationships, stabilized by personal interactions and common institutions, multinational companies can be described as cross-border interorganizational networks (Ghoshal/Bartlett 1990) coordinated by corporate headquarters. These „organizations of organizations“ or „second-order-companies“ (Pries 2000) contribute to the creation of new, transnational spaces (Dicken/Malmberg 2001: 359). This indicates a crucial difference between MNCs and clusters: MNCs are inner-organizational networks, while clusters are market networks (Teubner 1992).

Secondly, MNCs and cluster are arenas of collective learning. In the first case, learning is the result of international, company-wide patterns of knowledge creation and transfer (for example by company-wide methods, development efforts and controlling procedures). In the second case, interorganizational learning is facilitated by spatial proximity and the corresponding patterns of interaction, by institutionally stabilized cooperation relationships (for example in business associations), by the provision of collective goods (research and development, training facilities, technology transfer) and by an intensified competition in spatially concentrated agglomerations of firms (Maskell/Malmberg 1999, Koschatzky 1998). In the first case, learning takes place within the framework of hierarchically-ordered power and exchange relationships, in the second case, learning is facilitated by trust and social proximity (Malmberg/Maskell 2002).

This raises the question of the connection between these two different networks and learning processes. One possibility is the reciprocal stabilization of regional and multinational networks: On the one hand, multi-national corporations are dependent on the quality of the regional innovation systems surrounding their subsidiaries - and these subsidiaries also use this institutional and interorganizational context in order to increase their own innovativeness and to improve their position within the multinational corporation. This involves, above all, a regional environment, that offers strategic advantages for companies; for example due to specific knowledge of regional suppliers, customers or competitors (Reger 1997, Edler et al. 2003). In addition, subsidiaries do not only rely on their own regional environment but at least manage to access the respective national innovation system (Meyer-Krahmer 2003). In general, the use of regional and national capabilities is the responsibility of the individual works and subsidiaries. In this way, subsidiaries can try to improve their position in the corporate system (cf. Kristensen/Zeitlin 2004). However, regional innovation potentials also play a crucial role for the company-wide distribution of responsibilities and resources because the corporate headquarters has to evaluate the comparative advantages of their operating units – and in a knowledge-based society this refers also to the innovativeness of the different national units.

On the other hand, the integration of a region into global information, trade, and investment flows is a central prerequisite for the preservation of the regional capabilities and technological vitality. Multinational enterprises are the most important path for the integration of a region into global networks. The success of regional networks depends on whether a region will become a “Neo-Marshallian node” in national and global information, communication, investment and production networks (Amin/Thrift 1992). Taking the example of the Silicon Valley, Gordon (1995: 195) analyzes such network nodes and concludes: „*(I)ndustrial districts or innovative milieux are compelled to integrate extra-regional contributions as an essential component of the regional innovation process itself*“ (cf. also Voskamp/Wittke 1994). Such „extra-regional“ linkages are coordinated to a considerable extent by international or global corporations: „*MNE as one of the critical channels for organizing cross-border asset-seeking and asset-exploiting activities not only between different nation states, but also between micro-regions within different states.*“ (Dunning 2000: 29) In overview 1, these reciprocal interactions between organizational, corporate and regional networks are graphically illustrated.

Overview 1: The social embeddedness of innovations: Between organizational, multinational and regional networks



Ghoshal/Bartlett (1990) demonstrate why regional innovativeness becomes an ever more important decision criterion for multinational enterprises. They distinguish two different „worlds“: a world of relatively autonomous, even if economically interconnected nation states and a world that is politically and economically largely integrated (cf. Hirst/Thompson 1996, who analyze the corresponding patterns of globalization as „international“ and „transnational“). In the first case, a relatively low specialization of different national subsidiaries and a relatively even distribution of the development, production and marketing capacities can be expected - especially in such socially embedded economies as the Japanese, German or French. Decisive for this are „*strong needs for legitimacy and local isomorphism in each host country*“ (Ibid p. 612). In an economically more strongly integrated world, however, the specialization within a multinational group will increase. Multinational enterprises will concentrate an over proportional share of their resources in more innovative regions. More innovative subsidiaries can even partially escape the control of the corporate headquarters, as Ghoshal/Bartlett (1990: 616) illustrate by an example: „*extensive cross-licensing arrangements among all of the producers, and the resulting close relationships among equipment suppliers, customers, and regulators, was a main reason... that impeded closer control of the local subsidiary... and allowed the subsidiary to build up the high level of research and other resources.*“ The organizational strategies described by Fligstein (2001b) to reach a relatively autonomous market position („conceptions of control“) are pursued analogously also by subsidiaries within a multinational group. This refers to the social construction of corporate networks.

In conclusion: Regional capabilities are based essentially on the utilization and advancement of context-specific, tacit knowledge in regional, institutionally-stabilized communication and cooperation networks. Such regional innovation capabilities are an important resource also within a globally integrated economy – especially for multinational companies. With the transformation from an internationally integrated to a transnational economy, the role of these capabilities changes: The degree of freedom enjoyed by MNCs in the company-wide distribution of tasks increases - and with it also the possibilities of subsidiaries to emphasize their respective strengths in internal power and exchange relationships. Multinational enterprises therefore can be interpreted as arenas of an international learning. In this case, an efficient regional infrastructure and innovative suppliers, buyers, customers and competitors can be a considerable advantage in company-wide learning processes and in struggles for the com-

pany-wide distribution of resources and responsibilities. This implies that the innovativeness of multinational enterprises therefore also depends on the locations of their subsidiaries, while the capabilities of regional innovation systems depend on the successful embedding of multinational enterprises.

On the basis of these considerations, four hypotheses can be formulated (cf. the concept of organizational and regional capabilities Teece et al. 1997 and Cooke 2004):

- *Regional bases of organizational capabilities (H1)*: An important foundation for the innovative capability of multinational companies is the ability to exploit the specific advantages of regionally concentrated suppliers, customers, competitors and institutions and the proximity to strategic markets. This is demonstrated on the one hand by the internationalization of research and development activities and on the other hand by the utilization of regional competences, resources, information and cooperation chances through the respective branches and subsidiaries of a multinational group. These regional advantages can play an essential role in the company-wide negotiation and exchange relationships of MNCs (for example for the distribution of resources or the construction of new locations).
- *Organisational bases of regional capabilities (H2)*: At the same time multinational enterprises can considerably enhance the knowledge base of regional innovation systems. Regional institutions and companies can profit from the efforts of multinational enterprises and their local subsidiaries in recruiting, procurement, research, development, and education. Therefore the regional networks, in which multinational enterprises are embedded, are a decisive factor for regional capabilities.
- *Political initiatives to facilitate regional learning processes (H3)*: The reciprocal learning processes of regional companies, regional institutions and multinational enterprises can be supported to a certain extent by cluster policies, i.e. through the systematic development of regional networks (Porter 1998, OECD 1999, 2001). In this way, multinational enterprises can be integrated in regional institutions and networks.
- *Concentration of regional and organizational capabilities in Europe (H4)*: scientific, technological, organizational and regional capabilities in Europe are spatially concentrated to a considerable extent in the classical European core region, the city belt from Southern England, Belgium, the Netherlands, Ile-de-France and Western Germany to Switzerland, Austria and Northern Italy.

4. The Research Design

In order to test these four hypotheses, we will propose in the following a research design, that will permit us to examine firstly the strategic utilization of regional institutions and networks by multinational enterprises, secondly the integration of multinational enterprises in regional networks, thirdly the political attempts to embed multinational enterprises in regional clusters and governance structures and fourthly the quantitative distribution of regional and organizational capabilities in Europe.

.....

References

- Amin, Ash, and Nigel Thrift, 1992: Neo-Marshallian nodes in global networks, *International Journal of Urban and Regional Research* 16: 571-587.
- Archibugi, Daniele, and Jonathan Michie, 1995: The globalization of technology: a new taxonomy, *Cambridge Journal of Economics* 19: 121-140.
- Asheim, Bjørn T., and Arne Isaksen, 2002: Regional Innovation Systems: The Integration of Local 'Sticky' and Global 'Ubiquitous' Knowledge. *Journal of Technology Transfer*: 27, 77 –86, 2002

- Barmeyer, Christoph, 2003: Interkulturelles Personalmanagement in internationalen Fusionen: Von Konflikten zu Komplementarität. In: Markus-Oliver Schwaab, Dieter Frey and Jörg Hesse (eds.): *Fusionen. Herausforderungen für das Personalmanagement*. Heidelberg, Verlag Recht und Wirtschaft, pp. 169-191.
- Barmeyer, Christoph, and Eric Davoine, 2004: Chartes de valeur et culture(s) de l'entreprise internationale: les limites du transfert de valeurs globaux aux filiales locaux. In: *IAS: Audit Social, Responsabilité Sociale et Développement Durable: Vers une Convergence Européenne?*, Luxembourg, pp. 102-111.
- Barmeyer, Christoph, and Ulrike Mayrhofer, 2001: EADS et l'intégration des différences culturelles. *Regards sur l'économie allemande*: 52-53, pp. 39-46.
- Barmeyer, Christian, and Ulrike Mayrhofer, 2002: Le management interculturel: facteur de réussite des fusions-acquisitions internationales? *Gérer et Comprendre. Annales des Mines*: 70: 24-33.
- Barmeyer, Christoph, 2000: *Interkulturelles Management und Lernstile*. Frankfurt a.M.; New York: Campus.
- Barmeyer, Christoph, and Ulrike Mayrhofer, 2004: Le changement organisationnel dans les fusions internationales: le cas EADS. In: Thomas Fröhlicher and Björn Walliser (eds.): *La métamorphose des organisations. Design organisationnel: créer, innover, relier*. Paris, L'Harmattan, pp. 11-32.
- Barmeyer, Christoph; Bolten, Jürgen, 1998 (eds.): *Interkulturelle Personalorganisation*. Sternenfels/Berlin : Wissenschaft & Praxis.
- Bathelt, Harald, Anders Malmberg, and Peter Maskell, 2004: Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation. *Progress in Human Geography* 28: 31-56.
- Behr, Michael, Martin Heidenreich, Gert Schmidt and Hans-Alexander Graf von Schwerin, 1991: *Neue Technologien in der Industrierwaltung. Optionen veränderten Arbeitskräfteeinsatzes*. Opladen: Westdeutscher Verlag.
- Birkinshaw, Julian, and Carl F. Fey, 2000: Building and Internal Market System: Insights from Five R. & D. Organizations. In: Julian Birkinshaw (ed.): *The Flexible Firm: Capability Management in Network Organizations*. Oxford: Oxford University Press.
- Birkinshaw, Julian, and Örjan Sölvell. 2000: Leading-Edge Multinationals and Leading-Edge Clusters. *International Studies of Management & Organization* 30: 3-9.
- Birkinshaw, Julian. 1996: How subsidiary mandates are gained and lost. *Journal of International Business Studies*: 27: 467-496.
- Buckley, Peter J., and Mark C. Casson, 1998: Models of the multinational enterprise. *Journal of International Business Studies* 29: 21-44.
- Camagni, Roberto (ed.), 1991: *Innovation networks: spatial perspectives*. London: Belhaven
- Caniels, Marjolein CJ, and Henny A. Romijn, 2003: Firm-level knowledge accumulation and regional dynamics, *Industrial and Corporate Change* 12: 1253-1278.
- Cantwell, John, and Odile Janne, 1999: Technological globalisation and innovative centres: the role of corporate technological leadership and locational hierarchy. *Research Policy* 28: 119-144.
- Cantwell, John, and Ram Mudambi, 2000: The location of MNE R&D activity: The role of investment incentives. *Management International Review* 40: 127-148.
- Chandler, Aalfred D., 1992: Organizational Capabilities and the Economic History of the Industrial Enterprise. *Journal of Economic Perspectives* 6: 79-100.
- Cooke, Phil, 2002: *Knowledge Economies. Clusters, learning and cooperative advantage*. London/New York: Routledge.
- Cooke, Phil, 2004: Systemic Innovation: Triple Helix, Scalar Envelopes, or Regional Knowledge Capabilities, an Overview. Cardiff: Paper prepared for International Conference on Regionalisation of Innovation Policy – Options & Experiences, Berlin, June 4-5, 2004.
- Cooke, Philip, Martin Heidenreich, and Hans-Joachim Braczyk, (eds.), 2004: *Regional Innovation Systems: The role of governance in a globalized world*. 2nd edition. London/New York: Routledge.
- Crevoisier, Olivier, 2004: The Innovative Milieus Approach: Toward a Territorialized Understanding of the Economy? *Economic Geography* 80: 367-379.
- Crouch, Colin, Patrick Le Galès, Carlo Trigilia, and Helmut Voelzkow, 2001: *Local Production Systems in Europe. Rise or Demise?* Oxford: Oxford University Press.
- Den Hertog, Pim, Edward M. Bergman, and David Charles, 2001: Creating and sustaining innovative clusters: Towards a synthesis. 405-419. In: OECD (ed.): *Innovative Clusters: Drivers of National Innovation Systems*, Paris: Organization for Economic Cooperation and Development.
- Dicken, Peter, and Anders Malmberg, 2001: Firms in Territories: A Relational Perspective. *Economic Geography* 77: 345-363.
- DiMaggio, Paul J. and Walther W. Powell, 1991: The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality. In: Walther W. Powell and Paul J. DiMaggio (eds.): *The New Institutionalism in Organizational Analysis*. Chicago/London: University of Chicago Press. pp. 63-82.
- Dosi, Giovanni, 1988: The nature of the innovative process. In: Giovanni Dosi, Chris Freeman, Richard Nelson, Gerald Silverberg, and Luc Soete (eds.): *Technical Change and Economic Theory*. London/New York: Pinter, pp. 221-238.

- Dunning, John H., 1988: *Multinationals, technology and competitiveness*. London u.a.: Unwin Hyman.
- Dunning, John H., 2000: *Regions, Globalization, and the Knowledge Economy: The Issue Stated*. In: John H. Dunning (ed.): *Regions, Globalization and the Knowledge-Based Economy*. Oxford u.a.: Oxford University Press. pp. 7-41.
- Edler, Jakob, Roland Döhrn, and Michael Rothgang, 2003: *Internationalisierung industrieller Forschung und grenzüberschreitendes Wissensmanagement. Eine empirische Analyse aus der Perspektive des Standortes Deutschland*. Heidelberg: Physica-Verlag.
- Edquist, Charles (ed.), 1997: *Systems of innovation: technologies, institutions and organizations*. London: Pinter.
- Edquist, Charles, 2001. *Innovation Policy - A Systemic Approach*. In: Bengt-Åke Lundvall and Daniele Archibugi (eds.): *Major Socio-Economic Trends and European Innovation Policy*. Oxford: Oxford University Press. pp. 25.
- Eichhorn; Friedhelm, Philipp Hessinger; Michael Finke, and Jürgen Feldhoff, 2003: *Regionale Knoten in globalen Warenketten. Industriedistrikte im Spannungsfeld von Global Players und lokalen Akteuren: Medizintechnik in Tuttlingen und maritime Industrie in Rostock*. München/Mehring: Rainer Hampp.
- Etzkowitz, Henry H. and Loet Leydesdorff (eds.), 1997. *Universities in the Global Economy: A Triple Helix of University-Industry-Government Relations*. Cassell Academic, London.
- Etzkowitz, Henry, and Loet Leydesdorff, 2000: *The dynamics of innovation: from National Systems and „Mode 2“ to a Triple Helix of university industry government relations*. *Research Policy* 29: 109-123.
- European Commission, 1995: *Green Paper on innovation*. Brussels: COM(95)688; http://www.europa.eu.int/en/record/green/gp9512/ind_inn.htm (Stand 27.11.2004)
- European Commission, 2003: *2003 European Innovation Scoreboard: Technical Paper No. 3, Regional innovation performances*. Brussels: European Commission.
- European Commission/Eurostat, 2004: *Innovation in Europe. Results for the EU, Iceland and Norway*. Luxembourg: Office for Official Publications of the European Communities.
- Fligstein, Neil, 2001a: *Social Skill and the Theory of Fields*. *Sociological Theory* 19: 105-125
- Fligstein, Neil, 2001b: *The Architecture of Markets: An Economic Sociology of Twenty-First-Century Capitalist Societies*. Princeton University Press, Princeton.
- Freeman, Chris, 1987: *Technology Policy & Economic Performance: Lessons From Japan*, London, Pinter.
- Freeman, Chris, 1991: *Network of innovators: A synthesis of research issues*, *Research Policy* 20: 499-514.
- Gereffi, Gary, 1999: *International trade and industrial upgrading in the apparel commodity chain*. *Journal of International Economics* 48: 37-70.
- Ghoshal, Sumantra, and Christopher A. Bartlett, 1990: *The Multinational Corporation as an Interorganizational Network*. *Academy of Management Review* 15: 603-625
- Ghoshal, Sumantra, and Nitin Nohria, 1993: *Horses for Courses: Organizational Forms for Multinational Corporations*. *Sloan Management Review* 34: 23-35.
- Gibbons, Michael, Camille Limoges, Helga Nowotny, Simon Schwartzman, Peter Scott, and Martin Trow, 1994: *The new production of knowledge. The dynamics of science and research in contemporary societies*. London/Thousand Oaks/New Dehli: Sage.
- Gordon, Richard, 1995: *Globalisation, New Production Systems and the Spatial Division of Labour*. In: Wolfgang Littek and Tony Charles (eds.): *The New Division of Labour. Emerging Forms of Work Organisation in International Perspective*. Berlin/New York: De Gruyter. pp. 161-207
- Granstrand, Ove, and Sören Sjölander, 1992: *Internationalization and diversification of Multi-technology corporations*. In: Ove Granstrand, Lars Hakanson, Sören Sjölander (eds.): *Technology Management and International Business, Internationalization of R&D and Technology*. Chichester: John Wiley & Sons. pp. 181-207
- Hage, Jerald, 2004: *A contingency theory of innovation regime and appropriate institutional concept. A revision of the keynote address prepared for the conference on Innoversity Innovation and Diversity in a Knowledge Society: Towards a New Regime of Distributed Innovation?* Berlin.
- Hage, Jerald, and Roger Hollingsworth, 2000: *A strategy for analysis of idea innovation networks and institutions*. *Organization Studies* 21: 971-1004.
- Hall, Peter A., and David Soskice, 2001: *An Introduction to Varieties of Capitalism*. In: Peter A. Hall and David Soskice (eds.): *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*. Oxford: Oxford University Press. pp. 1-68
- Heidenreich, Martin, 1990: *Nationale Muster betrieblichen Strukturwandels. Am Beispiel der französischen und bundesdeutschen Bekleidungsindustrie*. Frankfurt a.M/New York: Campus.
- Heidenreich, Martin, 1995: *Informatisierung und Kultur. Eine vergleichende Analyse der Einführung und Nutzung von Informationssystemen in italienischen, französischen und westdeutschen Unternehmen*. Opladen: Westdeutscher Verlag.
- Heidenreich, Martin, 1997a: *Arbeit und nationale Produktionsregime in Europa*. In: Stefan Hradil and Stefan Immerfall (eds.): *Die westeuropäischen Gesellschaften im Vergleich*. Opladen: Leske + Budrich. pp. 289-331.

- Heidenreich, Martin, 1997b: Wirtschaftsregionen im weltweiten Innovationswettbewerb. *Kölner Zeitschrift für Soziologie und Sozialpsychologie* 49: 500-527.
- Heidenreich, Martin, 1999: Gibt es einen europäischen Weg in die Wissensgesellschaft? In: Gert Schmidt and Rainer Trinczek (eds.): *Globalisierung. Ökonomische und soziale Herausforderungen am Ende des zwanzigsten Jahrhunderts. Sonderband 13 der "Sozialen Welt"*. Baden-Baden: Nomos. pp. 293-323.
- Heidenreich, Martin, 2000: Regionale Netzwerke. In: Johannes Weyer u.a.: *Soziale Netzwerke. Konzepte und Methoden der sozialwissenschaftlichen Netzwerkforschung*. München/Wien: Oldenbourg. pp. 87-110.
- Heidenreich, Martin, and Vedrana Miljak, 2005. The renewal of regional capabilities. Cluster policies in Germany (zur Veröffentlichung bei einer Zeitschrift eingereicht).
- Heidenreich, Martin, Christian Kerst and Irmtraud Munder 1997: Innovationsstrategien im deutschen Maschinen- und Anlagenbau. In Hans-Joachim Braczyk (ed.): *Innovationsstrategien im deutschen Maschinenbau. Bestandsaufnahme und neue Herausforderungen. Arbeitsbericht Nr. 83 der Akademie für Technikfolgenabschätzung in Baden-Württemberg*. Stuttgart, pp. 106-195.
- Heidenreich, Martin, and Gerhard Krauss, 2004: The Baden-Württemberg production and innovation regime - between past successes and new challenges. In: Philip Cooke, Martin Heidenreich and Hans-Joachim Braczyk, (eds.): *Regional Innovation Systems*. London; New York: Routledge. pp. 186-213.
- Heidenreich, Martin, and Gert Schmidt (eds.), 1991: *International vergleichende Organisationsforschung. Fragestellungen, Methoden und Ergebnisse ausgewählter Untersuchungen*. Opladen: Westdeutscher Verlag.
- Held, David, Anthony McGrew, David Goldblatt, and Jonathan Perraton, 1999: *Global Transformations*. Cambridge: Polity Press.
- Hirst, Paul, and Grahame Thompson, 1996: *Globalization in Question. The International Economy and the Possibility of Governance*. Cambridge: Polity Press.
- Howells, Jeremy, 1990: The globalisation of research and development: A new era of change? *Science and Public Policy* 17: 273-285.
- Kogut, Bruce, and Udo Zander, 1993: Knowledge of the firm and the evolutionary theory of the multinational corporation. *Journal of international business studies* 24: 625-645
- Koschatzky, Knut, 1998: Firm Innovation and Region: The Role of Space in Innovation Processes. *International Journal of Innovation Management* 2: 383-408
- Koschatzky, Knut, 2001: Räumliche Aspekte im Innovationsprozess. Ein Beitrag zur neuen Wirtschaftsgeographie aus Sicht der regionalen Innovationsforschung. Münster: Lit-Verlag.
- Koschatzky, Knut, 2005: The Regionalization of Innovation Policy: New Options for Regional Change? In: Gerhard Fuchs and Philip Shapira (eds.): *Rethinking Regional Innovation and Change: Path Dependency or Regional Breakthrough*. New York: Springer.
- Koschatzky, Knut, Arlette Jappe, Joachim Hemer, and Björn Wolf, 2004: Technologietrends und regionale Entwicklungspotenziale in den bremschen Innovationsfeldern. Handlungsorientierter Endbericht. Karlsruhe: Fraunhofer ISI.
- Koschatzky, Knut, Rainer Frietsch, Arlette Jappe, Vivien Lo, Thomas Stahlecker, and Andrea Zenker, 2004: Innovations- und Zukunftspotenziale Nordrhein-Westfalens. Struktur und Dynamik von Wirtschaft, Wissenschaft und Bildung. Endbericht für die Landtagsfraktion der CDU in Nordrhein-Westfalen. Karlsruhe: Fraunhofer ISI.
- Koschatzky, Knut, and Arlette Jappe, 2003: Analyse regionaler Wissens- und Technologieprofile. In: Koschatzky, Knut (ed.): *Innovative Impulse für die Region – Aktuelle Tendenzen und Entwicklungsstrategien*. Stuttgart: Fraunhofer IRB Verlag. pp. 57-66.
- Koschatzky, Knut, and Rolf Sternberg, 2000: R&D Cooperation in Innovation Systems - Some Lessons from the European Regional Innovation Survey (ERIS). *European Planning Studies* 8: 487 – 501.
- Koschatzky, Knut; Michael Reinhard, and Christoph Grenzmann, 2003: Forschungs- und Entwicklungsdienstleistungen in Deutschland. Struktur und Perspektiven eines Wachstumsmarktes. Stuttgart: Fraunhofer IRB Verlag.
- Kristensen, Peer Hull, and Jonathan Zeitlin, 2004: *Local Players in Global Games: The Strategic Constitution of a Multinational Corporation*. Oxford: Oxford University Press.
- Krohn, Wolfgang, 1997: Rekursive Lernprozesse: Experimentelle Praktiken in der Gesellschaft. Das Beispiel der Abfallwirtschaft. In: Werner Rammert and Gotthard Bechmann (eds.): *Technik und Gesellschaft. Jahrbuch 9: Innovation – Prozesse, Produkte, Politik*. Frankfurt a.M.; New York. pp. 65-89.
- Krugman, Paul, 1991: *Geography and Trade*, Cambridge/MA:MIT-Press
- Lamnek, Siegfried, 1989: *Qualitative Sozialforschung. Bd. 2: Methoden und Techniken*. München: Psychologie Verlags Union.
- Lay, Gunter, Philip Shapiro and Jürgen Wengel (eds.), 1999: *Innovation in Production. The Adoption and Impacts of New Manufacturing Concepts in German Industry*. Heidelberg: Physica-Verlag.
- Lay, Gunter, and Spomenka Maloca, 2004: Dokumentation der Umfrage Innovationen in der Produktion 2003. Karlsruhe: Fraunhofer ISI. (www.isi.fhg.de/pi/projekte/erhebung_pi.htm).

- Lindqvist, Maria, Örjan Sölvell, and Ivo Zander, 2000: Technological Advantage in the International Firm - Local and Global Perspectives on the Innovation Process. *Management International Review*. Special issue 2000/1: 95-126.
- Löw, Martina: *Raumsoziologie*. Frankfurt/M: Suhrkamp 2001.
- Lundvall, Bengt-Ake, 1992: National systems of innovation: towards theory of innovation and interactive learning. London: Pinter.
- Lundvall, Bengt-Åke, and Maskell, Peter, 2000: Nation states and economic development - From national systems of production to national systems of knowledge creation and learning. In: Gordon L. Clark, Maryann P. Feldman and Meric S. Gertler (eds.): *The Oxford Handbook of Economic Geography*. Oxford: Oxford University Press. pp. 353-372.
- Lundvall, Bengt-Åke, Björn Johnson, Esben Sloth, Andersen, Bent Dalum, 2002: National systems of production, innovation and competence building. *Research Policy* 31: 213-231.
- Lutz, Burkart, and Gert Schmidt, 1977: *Industriesoziologie*. In: René König (ed.): *Handbuch der empirischen Sozialforschung*. Band 8 (2., völlig neu bearbeitete Auflage). Stuttgart: Enke. pp. 101-262.
- Maindok, Herlinde, 1992: Die Fallstudie - Überlegungen zur Methode des Projektes „Kontrollsysteme und integrierte Produktionsverantwortung“. Bochum: Ruhr-Universität Sonderforschungsbereich 187.
- Malmberg, Anders, and Peter Maskell, 2002: The Elusive Concept of Localization Economies – Towards a Knowledge-based Theory of Spatial Clustering. *Environment and Planning* 34: 429-449.
- Maskell, Peter, 2001a: The Firm in Economic Geography. *Economic Geography* 77: 329-344.
- Maskell, Peter, 2001b: Towards a knowledge-based theory of the geographical cluster. *Industrial and Corporate Change* 10: 921.
- Maskell, Peter, and Anders Malmberg, 1999: Localised learning and industrial competitiveness. *Journal of Economics* 23:167-185.
- Metcalfe, Stan, 1995: The Economic Foundations of Technology Policy: Equilibrium and Evolutionary Perspectives. In: Paul Stoneman (ed.): *Handbook of the Economics of Innovation and Technological Change*. Oxford (UK)/Cambridge (US): Blackwell Publishers. pp. 409-512.
- Meyer-Krahnmer, Frieder, 2003: Lead-Märkte und Innovationsstandorte. In: Hans-Jürgen Warnecke, and Hans-Jörg Bullinger (eds.): *Kunststück Innovation. Praxisbeispiele aus der Fraunhofer-Gesellschaft*. Heidelberg: Springer. pp. 23-28.
- Meyer-Krahnmer, Frieder, and Guido Reger, 1999: New perspectives on the innovation strategies of multinational enterprises: lessons for technology policy in Europe. *Research Policy* 28: 751-776.
- Nauwelaers, Claire, 2001: Path Dependency and the role of Institutions in cluster policy generation. *Nordregio Series R2001: 2*.
- Nelson, Richard R. (ed.), 1993: *National Systems of Innovation. A comparative analysis*. Oxford: Oxford University Press.
- Nowotny, Helga, Peter Scott, and Michael Gibbons, 2001: *Re-Thinking Science*. Cambridge, Polity Press.
- Noyons, Ed C.M., Renald K. Buter, Anthony F.J. van Raan, Ulrich Schmoch, Thomas Heinze, Sybille Hinze, and Rebecca Rangnow, 2003: *Mapping Excellence in Science and Technology across Europe, Life Sciences*, Brussels (EC-PPLS CT-2002-0001)
- Noyons, Ed C.M., Renald K. Buter, Anthony F.J. van Raan, Ulrich Schmoch, Thomas Heinze, Sybille Hinze, and Rebecca Rangnow, 2003: *Mapping Excellence in Science and Technology across Europe, Nanoscience and Nanotechnology*, Brussels (EC-PPN CT-2002-0001)
- OECD (1999) *Boosting Innovation: The Cluster Approach*. Paris: OECD.
- OECD (2001) *Innovative Clusters*, Paris: OECD.
- Osterloh, Margit, and Antoinette Waibel, 1996: Handlungsspielräume eines multinationalen Unternehmens. Das Beispiel ABB. In: Pamela Meil (ed.): *Globalisierung industrieller Produktion*. Frankfurt am Main/New York: Campus Verlag. pp. 123-148.
- Patel, Pari, and Keith Pavitt, 1998: National systems of innovation under strain: The internationalisation of corporate R & D. *Electronic Working Papers Series Paper No 22*. Sussex: Science Policy Research Unit.
- Patel, Pari, and Modesto Vega, 1999: Patterns of Internationalisation of Corporate Technology: Location versus Home Country Advantages. *Research Policy* 28: 145-155.
- Patel, Pari, 1995: The Localised Production of Global Technology. *Cambridge Journal of Economics* 19: 141-153.
- Perlmutter, Howard V., 1969: The Tortuous Evolution of the Multinational Corporation. *Columbia Journal of World Business* 2: 9-19.
- Phelps, N. A.; MacKinnon, D.; Stone, I.; and Braidford, P. 2003. Embedding the multinationals? Institutions and the development of overseas manufacturing affiliates in Wales and North East England. *Regional Studies* 37:27-40.
- Phelps, Nicholas A., and C. Fuller, 2000: Multinationals, Intracorporate Competition, and Regional Development. *Economic Geography* 76: 224-243.

- Phelps, Nicholas A., and Peter Waley, 2004: Capital versus the districts: a tale of one multinational company's attempt to disembed itself. *Economic Geography* 80: 191-215.
- Porter, Michael E., 1998: Clusters and the New Economics of Competition. *Harvard Business Review* 76: 77-90.
- Powell, Walter W., Kenneth Koput, and Laurel Smith-Doerr, 1996: Interorganizational Collaboration and the Locus of Innovation: Networks of Learning in Biotechnology. *Administrative Science Quarterly* 41: 116-145.
- Powell, Walter W., and Kaisa Snellman, 2004: The Knowledge economy. *Annual Review of Sociology* 30: 199-220.
- Pries, Ludger, 1997: Neue Migration im transnationalen Raum. In: Ludger Pries (ed.): *Transnationale Migration. Sonderband 12 der Sozialen Welt*. Baden-Baden: Nomos. pp. 15-44.
- Pries, Ludger, 2000: Globalisierung und Wandel internationaler Unternehmen konzeptionelle Überlegungen am Beispiel der deutschen Automobilkonzerne. *Kölner Zeitschrift für Soziologie und Sozialpsychologie* 52: 670-695.
- Pries, Ludger, 2003: Emerging production systems in the transnationalisation of German car manufacturers: adaptation, application or innovation? *New Technology, Work and Employment* 18: 82-100.
- Prognos, 2004: *Zukunftsatlas 2004 - Deutschlands Regionen im Zukunftswettbewerb*. Berlin: Prognos AG
- Pyke, Frank, Giacomo Becattini, and Werner Sengenberger (eds.), 1990: *Industrial districts and inter-firm cooperation in Italy*. Geneva: ILO.
- Rammert, Werner, 2000: Ritardando and Accelerando in Reflexive Innovation, or How Networks Synchronise the Tempi of Technological Innovation. *Technical University Technology Studies Working Papers No. WP-7-2000*.
- Reger, Guido, 1997: *Koordination und strategisches Management internationaler Innovationsprozesse*. Heidelberg: Physica-Verlag.
- Rugman, Alan, and Alain Verbeke, 2003: Extending the theory of the multinational Enterprise: internalization and strategic management perspectives. *Journal of International Business Studies* 34: 125-137
- Saxenian, AnnaLee, 1994: *Regional Advantage. Culture and Competition in Silicon Valley and Route 128*. Cambridge/Mass./London: Harvard University Press.
- Scaperlanda, Anthony, 1993: Multinational enterprises and the global market. *Journal of economic issues* 27: 605-616.
- Scott, Allan J., 1995: The Geographic Foundations of Industrial Performance. *Competition & Change* 1: 51-66.
- Sölvell, Orjan, and Ivo Zander, 1995: Organization of the dynamic multinational enterprise: The home-based and the heterarchical MNE. *International Studies of Management & Organization* 25: 17-38.
- Sternberg, Rolf, and Olaf Arndt, 2001: The Firm or the Region: What determines the Innovation Behavior of European Firms? *Economic Geography* 77: 364-382.
- Stichweh, Rudolf, 1999: Globalisierung der Wissenschaft und die Region Europa. In: Gert Schmidt and Rainer Trinczek (eds.): *Globalisierung. Ökonomische und soziale Herausforderungen am Ende des zwanzigsten Jahrhunderts. Sonderband 13 der „Sozialen Welt“*. Baden-Baden: Nomos. pp. 275-292.
- Storper, Michael, 1995: The Resurgence of Regional Economies, Ten Years After: the Region as a Nexus of Untraded Interdependencies. *European Urban and Regional Studies* 2: 191-221.
- Storper, Michael, and Robert Salais, 1997: *The regional world : territorial development in a global economy*. New York [u.a.] : Guilford Press.
- Taylor, Mike, and Bjørn Asheim, 2001: The Concept of the Firm in Economic Geography. *Economic Geography* 77: 315-328.
- Teece, David J., Gary Pisano, and Amy Shuen, 1997: Dynamic Capabilities and Strategic Management. *Strategic Management Journal*, 18: 509-533.
- Teubner, Gunther, 1992: Die vielköpfige Hydra: Netzwerke als kollektive Akteure höherer Ordnung. In: Wolfgang Krohn and Günter Küppers (eds.): *Emergenz: Die Entstehung von Ordnung, Organisation und Bedeutung*. Frankfurt a.M.: Suhrkamp. pp. 189-216.
- Unctad, 2004: *World Investment Report*, New York and Geneva: United Nations.
- Voskamp, Ulrich, and Volker Wittke, 1994: Von Silicon Valley zur virtuellen Integration. In: Jörg v. Sydow and Arnold Windeler (eds.): *Management interorganisationaler Beziehungen: Vertrauen, Kontrolle und Informationstechnik*. Opladen: Westdeutscher Verlag. pp. 212-243.
- Weyer, Johannes, Ulrich Kirchner, Lars Riedl, Johannes F.K. Schmidt, 1997: *Technik, die Gesellschaft schafft. Soziale Netzwerke als Ort der Technikgenese*, Berlin: Sigma.
- Whitley, Richard, 2000: The Institutional Structuring of Innovation Strategies. *Organization Studies* 21: 855-886.
- Zander, Ivo, 1998: The evolution of technological capabilities in the multinational corporation – dispersion, duplication and potential advantages from multinationality. *Research Policy* 27: 17-35.
- Zander, Ivo, 1999: How do you mean 'global'? An empirical investigation of innovation networks in the multinational corporation. *Research Policy* 28: 195-213.