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## The role of associations in regional innovation systems

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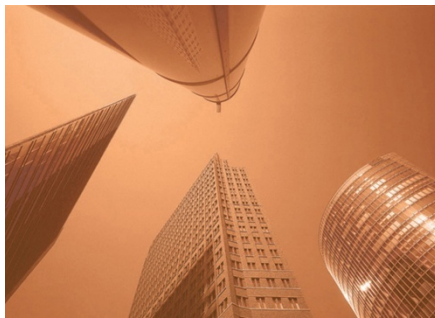
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The Role of Associations in Regional  
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## 1 Introduction

The last years have seen the establishment of numerous initiatives such as clusters, clubs or entrepreneur networks which are now playing a role in the stimulation of regional innovation activities. While their specific objectives differ, the common goal is that actors from different backgrounds with different interests join forces in order to articulate common interests. In a very broad sense, the term 'actor' here refers to individuals within their organisational background, i.e., among others, firms, universities, public or private bodies. These different actors affiliate in order to pursue joint interests and objectives. While some initiatives are loosely coupled, others draw up contracts or form new organisations. Irrespective of the degree of institutionalisation, in the following we use the term 'association' for this mix of initiatives in order to stress the aspect of joining forces. In the systemic perspective of innovation (Edquist 2005), associations fulfil intermediary functions. Or, to put it differently, associations constitute a central form of pursuing objectives or fulfilling tasks related to different functions in the innovation process.

With regard to the generation of innovative outputs, the concept of innovation systems constitutes a well accepted heuristically basis. Starting with the national perspective by studies of Freeman (1987) and an enlargement of the concept by Dosi et al. (1988), the regional dimension was included only a few years later (Cooke 1992). Although at the regional, i.e. sub-national level, not all factors and institutions necessary for the generation of innovations are available, both the national and the regional model follow the same characteristics. The main constituents of an innovation system are its components and the relations among them (Edquist 2005: 187). Major components are the institutional rules and different organisational actors and actor groups. While the enterprise sector, the research sector or the political system are well researched units within the innovation process, initiatives, clubs or entrepreneur networks are a fairly recent phenomenon and thus not analysed in detail so far.

Therefore, apart from studies of specific associations like cluster initiatives, little is known about associations from the perspective of innovation systems. The objective of this paper is to propose a research agenda which goes beyond established and well-known players in innovation systems and specifically focuses on studying actors who join forces to express common interests and the associations they establish.

To this end, associations are viewed from the macro perspective of innovation systems which is described in the following chapter. However, in order to understand the establishment of associations, the individual motivations of the actors involved need to be considered. Furthermore, external factors also play a role in the establishment of asso-

ciations and their further evolution. These aspects are discussed in section 3. Section 4 focuses on the types of associations found in regional innovation systems and their functions. Based on this discussion, section 5 derives a set of hypotheses to analyse the role of associations in innovation systems. To test these hypotheses, an empirical approach is then proposed in section 6, which includes all the relevant levels – from the micro to the macro.<sup>1</sup>

## **2 Actors and associations in the innovation system perspective**

The analysis of actors and associations is embedded in the concept of innovation systems. Innovation systems can be defined as "... all important economic, social, political, organisational, institutional, and other factors that influence the development, diffusion, and use of innovation" (Edquist 2005: 182). Innovation systems can have a national, regional, sectoral or technological dimension. They might also be related and interwoven in the form of supra-national and interregional as well as combinations of spatial, sectoral and technological innovation systems (Fromhold-Eisebith 2007; Markard/Truffer 2008). According to Edquist (2005: 187), the most important function of an innovation system is the generation and diffusion of knowledge and a related innovative output. The components of an innovation system consist of a bundle of actors as well as institutional rules defining the "rules of the game". They are defined by the institutional structures of the system (be it a country, a region, a sector or a technology), its incentive system, the skills and creativity of the innovation and economic actors, and the cultural peculiarities of the specific area or field (Nelson 1993: 517-520; Patel/Pavitt 1994). The added value of an innovation system lies in the relations among the different components. Therefore, the content, intensity and quality of interactions and networks are important. Relations can be strong or weak, hierarchical or heterarchical, open or closed, and they can carry knowledge in different forms and for different purposes (tacit and codified knowledge, knowledge about facts ('know-what'), about natural laws and social principles ('know-why'), about abilities ('know-how'), and knowledge about those who know how to do things ('know-who'), synthetic knowledge related to engineering know-how, or analytical knowledge related to scientific know-why) (Asheim/Coenen 2005; Foray/Lundvall 1996; Nonaka 1994).

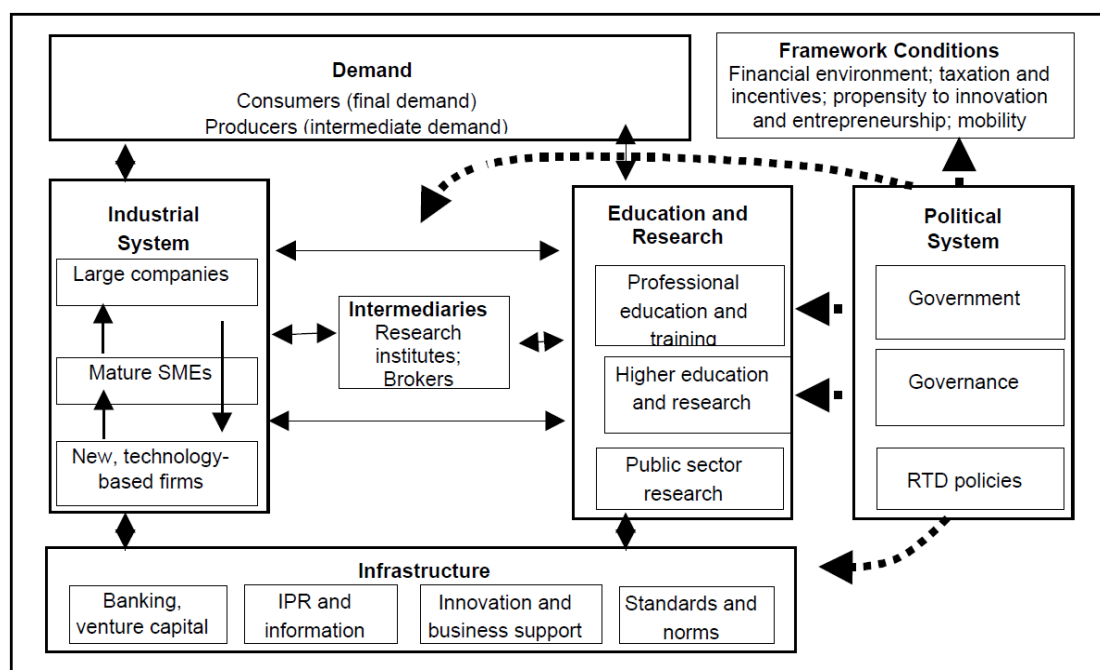
Heuristic innovation system models like the one developed by Kuhlmann and Arnold (2001; cf. Figure 1) provide a more detailed breakdown of actors. At the macro per-

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<sup>1</sup> We thank our colleague Mirja Meyborg for her valuable conceptual contributions to the development of this paper.

spective, the industrial sector, the education and research sector, the intermediaries and the political system are the major constituents. These are influenced by and themselves influence the infrastructure, the demand and several framework conditions like the relevant institutions. At the meso perspective, the industrial sector comprises small and large manufacturing and service firms among others, the research sector consists of higher education organisations and non-university research institutes, the intermediaries of technology transfer organisations (TTOs) and chambers of industry and commerce, and the political system of the parliament, government and its ministries. As emphasised in Figure 1 by the dotted arrow lines, the political system is attributed a special role in shaping most of the other subsystems.

Figure 1: An innovation system model



Source: Kuhlmann and Arnold (2001: 2)

These are helpful analytical categories, and the innovation system literature of the past decades has contributed greatly to a deeper understanding of how innovation systems work. Particular attention has been paid in various studies to the industrial system, education and research and the political system (cf. Fraunhofer ISI 2012).

When focusing on intermediaries, it becomes clear that this category is much broader than the chambers of industry and commerce, the technology transfer organisations or scientific foundations often referred to when discussing intermediary functions in innovation systems. Intermediary functions can be regarded as services that aim to provide a bridge between actors. These functions represent a dynamic and flexible field which



responds to changing environments with new constellations. While these changes may be caused by extrinsic factors, their effect is that a demand is perceived in the innovation system to which associations react.

With regard to the bridging functions of associations, the perspective of this actor group in innovation systems has to be enlarged, and also the interests of this group have to be examined in greater detail than in previous studies. In a general definition, an intermediate organisation (here: an association) is an organisation that functions in the midst of the users and producers of knowledge. It can be an organisation by its own, a role or a mission of any organisation, but also a programme or a specific project (Smedlund 2006). Intermediary functions are possible between the state (governments at different levels), markets and private households (Knieling 1994). Intermediaries can act as collective bodies between individual and state action (Bennett 1998a) and be regarded as an outcome to the need of collective action. Their range of activities is quite broad and includes collective bargaining (e.g. trade unions), self-regulation (e.g. development and protection of standards), representation and lobbying, as well as forum or club activities (e.g. social exchange and informal networking) (Bennett 1998b). In this respect, intermediaries can be related to social as well as relational capital. Social capital "...consists of the stock of active connections among people: the trust, mutual understanding, and shared values and behaviours that bind members of human networks and communities and make cooperative action possible" (Cohen/Prusak 2001: 4). Relational capital, on the other hand, is defined as "...the set of all relationships - market relationships, power relationships and cooperation - established between firms, institutions and people that stem from a strong sense of belonging and a highly developed capacity of cooperation, typical of culturally similar people and institutions (Capello/Faggian 2005: 77). Relational capital is closely associated with social capital, because it is "...the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships (Nahapiet/Goshal 1998: 243). In this respect, social capital can be regarded as public good, while relational capital can be classified as club good. Social capital exists as unintended by-product of activities in a spatial entity, relational capital implies a capability for interaction and collective learning, and is therefore an important input and outcome of innovative activities (Capello/Faggian 2005; Maskell 2000). When it comes to the question of intermediary functions in innovation systems, relational capital and thus the underlying amount and quality of relations among relational actors is a key factor for successful innovative activities.

Relational and social capital are closely related to social interaction and thus to social proximity and embeddedness. Proximity is an important factor in innovation processes, especially regarding the exchange of tacit, locally-bound knowledge and expertise

(Carrincazeaux/Coris 2011). Embeddedness, which was introduced by Granovetter (1973; 1985) into the scholarly debate, is especially similar to social proximity. Among the five different forms of proximity (cognitive, organizational, social, institutional, geographical), social proximity reflects "...economic relations (that) are ... embedded in a social context" (Boschma 2005: 66). Halinen and Törnross (1998: 195-196) define six types of embeddedness: temporal embeddedness refers to the fact that organizations are bound to different histories which evolve and change over time; social embeddedness describes the interactions of individuals within and with other organizations; political embeddedness describes the interactions of organizations with the political systems at different levels (supranational, national, regional, and local); market embeddedness reflects the core economic involvement of organizations with regard to their different markets; technological embeddedness describes the dependence on specific technologies, producers of technology and the related infrastructure; spatial embeddedness, finally, highlights the role space and geography plays for economic and innovation business activities.

These embeddedness dimensions together with the notion of social and relational capital define the context of associations in innovation systems. This context can best be described by the regional innovation system approach. It specifically emphasizes the relevance of proximity relations between innovation actors, e.g. through non-transferable person-embodied knowledge (Asheim/Coenen 2005; Asheim/Gertler 2005). Innovation as such is nowadays widely understood as a complex, uncertain, selective, interactive and distributed process, including contributions and feedback loops from different sources (Boschma/Martin 2010; Kline/Rosenberg 1986; Lamboy/Boschma 2001). Due to the fact that innovation activities strongly rely on the creation of new, so far unknown knowledge, the context specificity plays an important role in innovation processes. Most innovation processes depend on the immediate framework in which they take place (Coombs et al. 2003; Singh 2008). Territorial, cultural and social contextuality results from the endowment of regions with institutions, organisations and networks which all influence the generation and diffusion of innovations in specific ways (Doloreux/Parto 2005). These ways are related to the knowledge generation and diffusion function (e.g. through research and development, higher education, further qualification) and the knowledge application and exploitation function (e.g. through customer-supplier relationships and networks) (Cooke 2002). The localized character of tacit, non-codified knowledge (Polanyi 1997) makes it necessary for firms which need to get access to this knowledge to closely locate to relevant knowledge sources (for example research labs or other creative enterprises) and for intermediaries and associations to be part of this regional knowledge generation and innovation system in order to pursue the common interests of their members.

This contextuality of innovation is also highlighted by the more recent advancements of the innovation system approach. According to the multi-level conceptual frameworks for the analysis of socio-technical regimes and thus sectoral and technological innovation systems, which were developed by Geels (2004), Hekkert et al. (2007), Bergek et al. (2008), and Hekkert and Negro (2009), innovation takes place in niches. These are "...protected spaces or incubation rooms, in which new technologies or socio-technical practices emerge and develop isolated from the selection pressures of 'normal' markets or regimes" (Markard/Truffer 2008: 605). Niches provide a specific context in which specific innovations can be generated. Mediators or system builders are able to influence and change these socio-technical systems and regimes (Wihlborg/Söderholm 2013). This again highlights the role of intermediaries in innovation systems and the need for respective associations to be integrated and involved in these niches. The regional innovation system approach therefore proposes an appropriate heuristic environment for the discussion of the specific roles associations can play in supporting and promoting innovation activities by mediation and the pursuit of collective interests.

### **3 Conceptual approaches for studying the emergence and evolution of associations**

We can assume that the activities of associations in innovation systems depend on internal and external factors. Intrinsic factors specifically relate to the motivations of individuals and associations that lead them to behave in the way they do. Since they are part of a system – the innovation system – their activities are also influenced by the wider framework conditions of the system and the resulting specific incentives (extrinsic factors).

#### **3.1 Internal factors and intrinsic motivations for association**

Generally speaking, "[m]otivation is the study of why people think and behave as they do" (Graham/Weiner 1996: 63). Studying motivations helps us to understand – among other aspects - which behaviour individuals choose, or more precisely what they are doing (ibid.). Economic theory – rooted in the *homo oeconomicus* rationale - postulates that economic actions pursue the goal of maximising profits or benefits under given

constraints, the latter represented by an individual utility function.<sup>2</sup> Economic theory has a clear answer to the question whether an economic actor (e.g., a company) will offer a certain product or service, or whether another way of producing and offering this good is preferred. Transaction costs economics tells us that a firm will provide a product as soon as the internal coordination of transactions is cheaper than coordination over the market (Coase 1991). It is therefore in the interest of a firm to keep internal transaction costs low or to interact with other firms only in those cases when internal coordination is either not possible (due to missing resources or capabilities) or too costly.

Transferred to our specific research topic, rational behaviour in the sense of economic theory implies three options for actors to express a certain need or goal: (i) to develop a service internally that meets the given need, (ii) to mandate another company to generate this service, or (iii) to join forces with other actors who have similar goals. If the specific demand is considered to be of high relevance for the majority of actors in an innovation system, political decision-makers may decide to offer this service as a public good via a public agency. In this case, legislation or regulation creates the framework and type of service to be provided by a public actor (such as an agency) to all interested parties. The next imaginable case is the opposite: a service offered by an individual company due to a client's request. In this case, the company conceives and sells the service to its client who then has the exclusive right to use it.<sup>3</sup> Between these two possibilities we place a service offered by an association, i.e. actors with a common interest who are prepared to join forces. The service is then neither private nor public, since its use is (i) not restricted to the individual client, (ii) nor made available to the general public. The good thus fulfils the conditions of a club good, i.e. a good that can be used by those actors engaged in producing it (either by paying for its production or by personal engagement in conceiving it). Generally, club goods follow the logic of voluntary production.

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<sup>2</sup> Cf. also Frey's (2000) arguments on motivation and human behaviour in the economic perspective: Assuming that preferences are constant, individuals act according to the given constraints. Consequently, if constraints change *ceteris paribus*, actors have an incentive to change their behaviour. However, while economic analyses focus on prices as the basic mechanism forming motivation and action, social sciences put forward the argument of intrinsic motivation, understood as an activity undertaken "...for its own sake" (Deci/Ryan 1985: 331). If an individual actor is intrinsically motivated, she or he is prepared to offer a certain amount of an activity without being paid for it (Frey 2003: 32).

<sup>3</sup> Bennett (1998a) proposed the main distinction between *services with a specific orientation*, i.e. services tailored to the needs of one particular group member and *services with a collective orientation*. The dimension of 'excludability' which supports the conceptual differentiation of those categories needs be considered (Bennett/Ramsden 2007; Bennett/Robson 2011).

These considerations are discussed in the collective action framework literature in a similar way, according to which associations emerge as a response to the need for joint action (i.e. collective interests) and the supply of collective goods (Olson 1992). Or, to put it differently, the structure and objectives of associations are determined by the strength of two competing forces: the logic of membership (or logic of service) and the logic of influence (Bennett 2000; Bennett/Ramsden 2007; May et al. 1998). Membership is related to the mode of governance and the responsiveness to the interests and demands of the members of certain spheres. Logics of influence (Lane/Bachmann 1997) are related to the roles associations play on their members' behalf in collective negotiation with either the public or the private sector. In this respect, these associations can act as interest groups and pursue distributive objectives by seeking unproductive rents rather than common or public interests (Olson 1985).

Olson (1992) considers club goods<sup>4</sup> to be crucial for analysing the logic of collective action. As soon as individual interests are concerned, individual action appears to be the most sensible. Thus, associations are formed to foster the interest of their members. Olson further argues that the size of the group influences to what extent an optimum can be reached in the provision of the club good. Following his argumentation, small groups are more likely to reach a situation in which the costs and benefits of providing the club good are shared fairly. Big groups, on the other hand, are more likely to provide a sub-optimal amount of the club good. However, if groups are comprised of different sized actors and diverging interests regarding the club good, the problems of a sub-optimal supply and inefficiency are less critical. In such a situation, big members with a high interest in providing the club good will contribute more. The size of the group also influences whether informal coordination or a formal organisation is more appropriate. No coordination or organisation is required in a small group in which one member benefits from the club good in such a way that he/she may be willing to bear all the costs. In every other situation, an agreement within the group is compulsory. In larger groups, the degree of organisation and agreement required rises, so that the associated costs also rise. These transaction costs must be differentiated from costs of providing the club good.

The economic argumentation for the appearance of associations can be supplemented by findings from the social sciences. In addition to the behavioural aspects evoked above, Ostrom (2000: 5), for example, pleads for the consideration of human behaviour, i.e. individual incentives, among others, when explaining collective actions. For example, intrinsic preferences are one aspect to consider with regard to individual be-

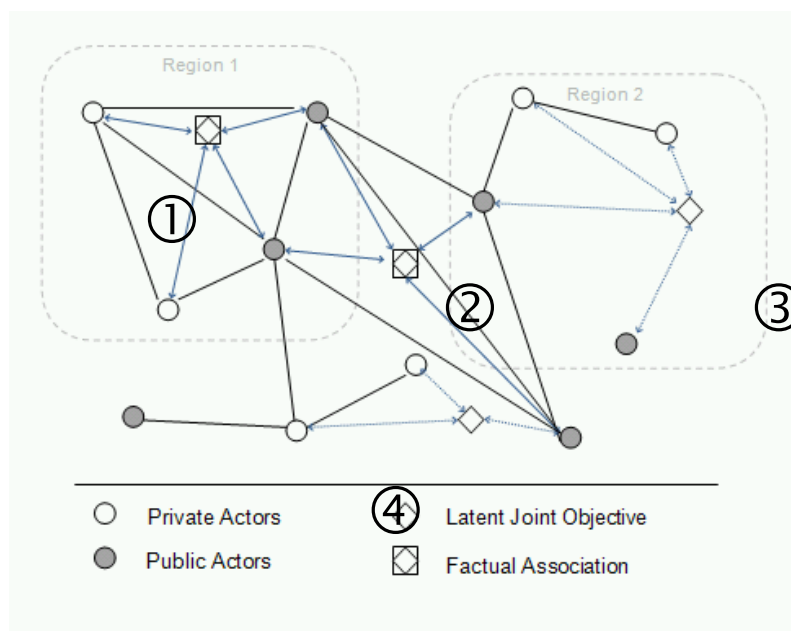
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<sup>4</sup> Olson (1992) uses the term public goods; however, as these public goods are only available to group members, the term 'club good' is utilized here.

haviour, i.e. those preferences associated with the behaviour individuals would expect from themselves or others in a certain situation. Rather than aiming to maximise individual profit, these preferences may influence actors to become conditional cooperators – as long as other actors cooperate in the same way. The integration of the above-mentioned aspects implies that there is no single explanation for why collective action takes place.

This is further exemplified when looking at the connection between associations and networks. Conceptually, this can best be expressed by illustrating association in a two dimensional network graph. Firstly, all innovation systems are made up of actors and, inevitably, some of these actors share certain objectives, whether they are aware of this or not. Each actor, therefore, not only has certain links to other actors, but also a number of latent relationships regarding sets of joint objectives. As Bennett (1998) pointed out, networks are thus both the precondition for and the result of association. On the one hand, Figure 2 illustrates that associations tend to emerge when actors already know about their shared interest through prior contacts (1, 2), whereas in other cases the potential may remain unknown (3, 4). On the other hand, it also illustrates that the potential set of linkages between, e.g. the four actors coming together in (1), goes beyond the linkages that are already present. In that sense, associations are important multipliers of linkages in innovation systems. Additionally, the cases 3 and 4 illustrate that third parties might be able to initiate a self-sustaining development where there is currently none.

Figure 2: Conceptual approach to association



Source: own figure

Thus, associations can be expected to emerge around joint fields of interest between different actors. Sometimes these joint perceptions of challenges and opportunities can be triggered by regional co-location, sometimes by sectoral or technological relatedness (Bennett 1998b).

To sum up, actors in innovation systems sometimes face situations in which they may want to attain similar goals, feel similar needs or wish to develop a joint strategy. It can happen that these actors do not have enough power or resources to accomplish these goals on their own, or that they have the impression of being more powerful when acting together with others. Thus, it can be assumed that collective action is based on the engagement of individuals.

### **3.2 Extrinsic factors**

Having described the intrinsic incentives and motivations of actors and associations, we now focus on the extrinsic factors shaping action. Economic circumstances can be such an extrinsic motivation for joint action, but social or cultural conditions also need to be mentioned.

Extrinsic factors like crises, structural or technological changes within innovation systems may provoke the need to take action so that individuals or organisations might join forces in order to survive. These reflections imply that the type and characteristics of associations vary according to the regime they are embedded in – in addition to the distinct structural and cyclical conditions.

With regard to socio-cultural conditions, habits, routines, norms, rules and laws also play a role in governing the behaviour of individual actors and their interaction as the institutional perspective shows (Stamboulis 2008: 2, referring to Lundvall 1992). Since rules and habits characterise social contexts, it can be assumed that they are comparatively homogenous within regional innovation systems (and can be considered as one factor that distinguishes innovation systems from each other). Actors of an innovation system develop - consciously and unconsciously - conceptions of reality that frame their individual mental models. Due to similar context and socialisation conditions, mental models tend to be more homogeneous within one innovation system compared to other innovation systems ("cognitive trajectories", Stamboulis 2008: 11).

In addition, extrinsic factors are strongly related to the external framework conditions of innovation, i.e. the distinct organisation and structure in which innovation systems are embedded. This is related to the mode of governance and the logics of possible influence. Regarding the modes of governance, the varieties of capitalism approach (e.g. Hall/Soskice 2001) provides some useful insights. Regardless of the production re-

gimes, i.e. liberal market economy versus coordinated market economy, firms have to establish relationships to actors or associations on which they depend in their economic activities. This need for coordination refers to four institutional spheres: the sphere of industrial relations, the sphere of vocational training and education, the sphere of corporate governance and the sphere of inter-company relations (ibid, p. 6 f.) Depending on the production regime, these associations or intermediaries are characterised by different modes of governance. According to the concept of institutional coherence (Kenworthy 2009: 182 f.), the spheres and thus intermediary organisations display a similar kind of coordination. In liberal market economies, the government delegates many public intermediary tasks to autonomous organisations and agencies, which are often associations of companies or professionals, i.e. private organisations. In coordinated market economies, the non-market-oriented coordination through networks plays an important complementary role, although the state government still plays a dominant role. The governance mode of these networks is often either public or non-profit and thus differs from privately organised agencies. The interests of these organisations or agencies might therefore differ according to the predominant feature of the production regime that exerts the strongest influence on the innovation system. In addition to production regimes as detailed above, technological regimes may have an impact on associations and their way of acting.<sup>5</sup>

### 3.3 The evolution of associations

Having described the conditions under which associations come into being, the next question is how they evolve over time. As associations are founded depending on the intrinsic and extrinsic motivations or necessities, function for a shorter or longer period of time, and may also cease their activities, it can be assumed that they have a life cycle which is specific to each association, but which may show similar traits with regard to certain aspects.

One aspect is the channels used for joint activities and the mode of coordination. While activities in the first phase concern the identification of joint interests, as described in

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<sup>5</sup> The regime concept of Kemp (1994), for instance, highlights societal issues and differs from the regime notion of Nelson and Winter (1982) with its focus on search and design heuristics, or that of Malerba and Orsenigo (1993) emphasizing knowledge-related characteristics in order to explain differences in sectoral innovation patterns. Kemp (1994) highlights the institutional character of a regime as an emergent, collective outcome that cannot be changed at will. Geels (2002) proposed the term *socio-technical regime* in order to make this distinction more prominent and to emphasize that not just engineers or scientists but all kinds of business people, end users, policy makers, societal interest groups, associations, etc. share the rules and practices that constitute a regime.



section 3.1, increased coordination and organisation may be needed over time. In general it can be assumed that, in the early stages, the mechanisms are more informal. Over time, possibly influenced by the degree of institutionalization, those mechanisms become more formalized. Olson (1992) referred to size, i.e., the number of members as one decisive aspect for the degree of formalization. Obviously, the size of an association can change over time. In the beginning, it is likely that only a small number of actors come together to take action. If their activities coincide with the interests and needs of others, the association may grow as other actors join it. In this respect, the life cycle of an association shows similar traits to the life cycle of regional clusters (Tichy 2001). In their early stage, clusters are small and do not exert the positive effects of mature clusters as the critical mass of actors has not yet been reached. Over time, technological developments, competition from other regions or corporate decisions may lead to the decline and ultimately to the end of the cluster. Clusters can also rejuvenate, however, and sustain their competitiveness.

While the life cycle of a cluster depends on the ability to sustain its innovativeness, the life cycle of an association depends on its ability to address the need for collective activities and, at the same time, to offer specific services to its members (Bennett 2000). In the long run, the success of associations depends on their ability to represent the interests of their members and to offer club goods which meet their members' demand. In addition, by acting jointly, social capital may arise contributing to the success of the association<sup>6</sup>.

As described above, external factors like changes in the economic or technological environment can inspire actors to join forces. Newly established associations may, however, be perceived as competitors to established ones. In order to retain their members, these associations are likely to adapt their activities as well.

## 4 Types of associations and their functions

As already described in section 2, in the innovation system perspective associations fall under the category of intermediaries. In this field, much has been written about business associations as one important type of intermediary. Their major task is to influence the competitiveness of their members, and they act as collective bodies between individual businesses and the state (Bennett 1998b; Bennett/Robson 2011). In

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<sup>6</sup> According to Cohen and Prusak (2001: 4), social capital "consists of the stock of active connections among people: the trust, mutual understanding, and shared values and behaviours that bind members of human networks and communities and make cooperative action possible".

this respect, associations are one response to the need for collective action. Their range of activities is quite broad and includes collective bargaining (e.g. together with trade unions), self-regulation (e.g. development and protection of standards), representation and lobbying (e.g. to overcome asymmetric information between firms and legislative authorities), as well as forum or club activities (e.g. social exchange and informal networking) (Bennett/Ramsden 2007).

As Lane and Bachmann (1997) demonstrated, the function of associations depends on the role assigned to them by their members and, directly or indirectly, the state. As no two groups of companies or stakeholders are the same, different motivations for association inevitably lead to a broad range of missions and objectives. Furthermore, the regional 'variety of capitalism' will determine how a set of defined joint interests can and will be pursued.

Bennett (1998a) lists types of business associations like associations of companies, owner-managers, and self-employed professionals. Based on this, the following list provides an overview of associations found in Germany as an example of a coordinated market economy where policy making is important regarding the funding of R&D, technological development and innovation – also at a regional level - and where there is an existing intermediary system (public and semi-public) supporting such activities.

Table 1: Associations and their functions in regional innovation systems (derived from experiences in Germany)

Type	Function
Association of companies ("regionale Branchenverbände")	<ul style="list-style-type: none"> <li>• Lobbying, representation, participation, self-regulation</li> </ul>
Chambers of Commerce and Industry	<ul style="list-style-type: none"> <li>• Services for member firms (e.g. training, qualification, seminars, advice &amp; consultancy, information, events)</li> <li>• Regional economic policy</li> <li>• Lobbying, representation</li> </ul>
Trade Unions	<ul style="list-style-type: none"> <li>• Participation of employees</li> <li>• Labour conditions and wages</li> <li>• Safeguarding of facilities ("Standortsicherung")</li> </ul>
Employers association ("Arbeitgeberverbände")	<ul style="list-style-type: none"> <li>• Organisation of common interests of its members vis-a-vis the trade unions (e.g. wage bargaining) and policy (pressure-group function)</li> <li>• Representation and enforcing of member interests</li> <li>• Support of members (e.g. information and training activities)</li> </ul>
Publicly or privately funded cluster initiatives and networking organisations	<ul style="list-style-type: none"> <li>• Advice and consultancy, information</li> <li>• Networking and matching activities, events</li> <li>• Regional strategies and self-organisation</li> <li>• Innovation and R&amp;D support</li> <li>• Knowledge- and technology transfer</li> <li>• Public relations</li> <li>• Internationalisation</li> </ul>
Public promotion agencies ("Wirtschaftsfördergesellschaften")	<ul style="list-style-type: none"> <li>• Safeguarding regional industry's competitiveness</li> <li>• Industrial location support</li> <li>• Provision of infrastructure (e.g. industrial real estate, spaces for start-ups, incubators)</li> <li>• Cluster and network support</li> <li>• Advice and consultancy, information</li> </ul>
Business clubs and similar associations	<ul style="list-style-type: none"> <li>• Informal networking</li> <li>• Humanitarian and social activities (health, education, conflict prevention, economic development)</li> <li>• Cultural projects</li> </ul>
Innovation councils ("Innovationsräte")	<ul style="list-style-type: none"> <li>• Policy advisory board</li> <li>• Formulation of visions and objectives for innovation policy</li> <li>• Elaboration of cross-departmental solutions</li> <li>• Policy recommendations</li> </ul>
Regional conferences & initiatives ("Regionalkonferenzen, Innovationsallianzen")	<ul style="list-style-type: none"> <li>• Consensus building</li> <li>• Participation, stakeholder process</li> <li>• Formulation of statements for innovation/regional policy</li> </ul>
Research associations	<ul style="list-style-type: none"> <li>• Organising cooperative research projects</li> </ul>

Source: own classification based on Bennett (1998a)

These types of associations are quite well-known, but are only partly considered in innovation systems' analyses (e.g. Chambers of Commerce and Industry as the most analysed type of association (Coleman/Grant 1988)). The classification of associations considers different objectives and covers associations with a homogeneous set of actors/members (e.g. business clubs, trade unions for specific industries) as well as those with more heterogeneous members including public and private actors, e.g. clusters, regional development partnerships, university-industry co-operations etc. Associations may also be driven by scientific institutions. Thus, an empirical analysis has to take into account the function of a specific association as well as its membership structure (Bennett 2000), in order to better understand its scope of action and possible shifts of activities.

## **5 Research hypothesis for analysing associations in regional innovation systems**

Associations, defined as a group of individuals or organisations which may be heterogeneous regarding their missions and objectives as well as the reasons for their establishment, constitute an interesting research subject, which has largely been neglected in theoretical and empirical studies on regional innovation systems. As described here, associations are part of the intermediary system in regional innovation systems and fulfil various functions, like supporting knowledge and technology transfer, supporting or initiating innovation policy strategies, providing advice and consultancy (for companies as well as policymakers), regional economic policy, lobbying and representation, or in the case of trade unions, the participation of employees, improving labour conditions and safeguarding employment.

As mentioned above, the reasons for establishing associations vary and depend heavily on the respective political system and the constitution of the regional innovation system. In a federal system like Germany, for instance, the federal states are autonomous regarding education, research and innovation policy, which results in quite different regional innovation systems with respect to both structure and capabilities. Associations within the innovation systems of the federal states may fulfil globally similar functions, but their scope in terms of actively "shaping" their innovation system or their potential to participate varies according to the socio-political as well as economic framework conditions within their states or their regions.

Against this background, we have identified the need for research focussing on the role of associations in regional innovation systems in Germany as an example of a coordinated market economy and a federal system. It is proposed to ground this research on four hypotheses which will be elaborated in the following paragraphs. They are de-

ducted from the literature analysis in the preceding sections and from selected explorative interviews in a few federal states of Germany.

One basic assumption is that associations become important players within regional innovation systems when a demand for representation or the supply of a certain service with regard to the governance of research and innovation arises. Consequently, associations then take on specific functions. Based on our observations, drivers for the establishment of an association can be a single organisation (e.g. the establishment of a business club in a university), an individual person (e.g. entrepreneur) or an already existing association (e.g. network or cluster initiative, club, regional conference). This leads to hypothesis 1:

1. *When demand for joint activities is perceived, associations are established to satisfy the requirements.*

Newly established regional associations are the result of decisions taken by existing regional organisations or individuals. Their original goals and scopes of action are not necessarily geared towards shaping the innovation system as a whole, but may comprise quite specific activities within the framework of their overall mission. The foundation of a university business club is one example of an association which pursues the overall objective of strengthening the ties between the university and the (regional) business community to increase "third party funds" or to establish a network of technology-oriented firms and which may positively influence the applied technology and research activities at the respective university. Another example is the establishment of a regional innovation alliance as an institutionalized regional network of research institutions serving as a "one-stop-shop" agency for companies seeking support for their own research activities. In the early phase of such associations, the underlying processes are informal rather than formalized or bureaucratic. Therefore, as described above, it can be concluded that the participation of newly established associations within "their" regional innovation system is initially informal in nature. Hypothesis 2 reads:

2. *In the course of the life cycle of these associations, their processes and actions become more and more formalized, resulting in routines similar to those in established/mature associations.*

Visionary individuals within existing organisations or "function owners" are particularly capable to take action in terms of looking beyond their own formal responsibilities. Such persons regularly search for how to improve the existing framework conditions, for instance concerning innovation or the regional innovation system. The typical entrepreneur is this type of individual who is motivated to realize a concrete innovation project or a business idea. A characteristic of such individuals is that their motivations are

often intrinsic in nature rather than solely focussed on external rewards or (financial) advantages. As described in section 3, however, intrinsic motivations may be complemented by external factors. So that, for example, company managers may found or get involved in associations in order to contribute to business success. This leads to hypothesis 3:

3. *Transferred to the establishment of new associations in regional innovation systems, individuals are essential drivers of activities related to the foundation of new associations (hypothesis 3).*

The final hypothesis considers the dynamics of "mature" or established associations, how their responsibilities shift during the course of their lifetime, which may result in either redundancies vis-a-vis the newly established intermediary institutions or the substitution of tasks formerly fulfilled by other/similar associations. Observations of the regional innovation systems of North-Rhine Westphalia and Baden-Württemberg, for instance, indicate that the Chambers of Commerce have taken over certain tasks that are usually the responsibility of cluster management organisations. On the other hand, it can also be observed that newly established associations like cluster initiatives or business clubs not only address deficits regarding (public) innovation and research policy, but also take on functions (in their own life cycle) formerly performed by existing regional organisations. In this way, they either contribute to regional redundancies or the necessity for mature associations to adapt their fields of activities. Thus, the final hypothesis is:

4. *It can be assumed that, as soon as the political influence of mature associations in regional innovation systems decreases, their scope of action changes in terms of developing and implementing new activities (hypothesis 4).*

## **6 Conceptual framework for the empirical analysis**

Our research questions and the four hypotheses require a specific, multidimensional conceptual approach to further empirical analysis. The lack of research on the role of associations in regional innovation systems has to be addressed by developing and implementing an empirical concept which takes into consideration the institutional paths dependencies of different regions, key intermediary organisations involved in delivering or implementing innovation policy in their life-cycle and the role of actors motivated intrinsically or by external factors as well as the framework condition of regional innovation systems. Thus, the empirical concept has to integrate different analytical layers ranging from individuals to organisations, to institutions in terms of routines and finally to the respective innovation system as a whole. The following Table 2

gives an overview of these analytical layers linked with concrete methodological or empirical approaches. In general, an empirical concept integrating both qualitative and quantitative elements appears to be the most appropriate for our research hypotheses.

Table 2: Hypotheses and resulting methodological approach

<b>Hypotheses</b>	<b>Analytical layer</b>	<b>Methodological approach</b>
H1: When demand for joint activities is perceived, associations are established to satisfy the requirements.	Macro and meso levels (systems and organisations)	Qualitative methods to analyse both regional systems and involved associations: desk research, interviews with stakeholders, workshops, ethnographic investigations. Additional quantitative surveys.
H2: In the course of the life cycle of these newly established associations, their processes and actions become more and more formalized, resulting in routines similar to established/mature associations.	Meso level (organisations)	Qualitative methods to analyse both new and established associations: desk research, interviews with stakeholders, ethnographic investigations.
H3: If there is a strong driver, new associations are established.	Micro level (individuals)	Qualitative methods to analyse the character traits of these individuals.
H4: As soon as the political influence of mature associations in regional innovation systems decreases, their scope of action changes in terms of developing and implementing new activities.	Meso level (organisations)	Qualitative methods to analyse the shift in mission and instruments. Additional quantitative surveys.

The conceptual framework for the empirical analysis will focus on the micro level of single individuals as drivers of newly founded associations, the meso level of a single or various organisations (associations) acting as intermediaries, and finally the macro level of the actual regional innovation system. Furthermore, the empirical concept has to address the fact that regional innovation systems differ in both their structural configurations as well as their institutions. Thus, a comparative and contrasting approach seems appropriate. In the case of Germany, for instance, the regional innovation system of Baden-Württemberg is significantly different to the one of Saxony-Anhalt, both in terms of size (input-output) and intermediary systems as a whole and associations in particular. However, whether the reasons for the establishment of new associations, the role of established associations or the role of individuals differ between the regional innovation systems, or whether the "system" as such shapes organisations and institutions has to be analysed in the course of the empirical research.

With regard to the methodologies to be applied in the empirical analysis, qualitative approaches are clearly necessary to obtain a deeper understanding of how the various

associations operate, what their strategies are and also if and why their scope of action changes over a certain period of time. In this respect, factors like political influence or lobbying are crucial. On the basis of these qualitative steps, additional quantitative surveys may be suggested in order to abstract from single cases and broaden the perspective on the intermediary landscape. In-depth interviews will also be necessary to find out more about the motivations of individuals or to discover under which framework conditions individuals like entrepreneurs, university professors, key persons at the chambers of commerce, branch associations or trade unions etc. join forces with others to influence their innovation system. Finally, the macro level needs to be addressed by both qualitative and quantitative methods for a more detailed understanding of the interdependencies within regional innovation systems and the (changing) "impact" of newly established associations as well as mature ones seeking a new role.

## 7 Summary

This paper addressed the need for research regarding the role of associations in innovation systems. As defined here, the term association embraces not only organisations like business associations, but all actors who associate to pursue joint objectives and positively influence their (regional) innovation system. In the innovation system's perspective, these associations perform intermediary functions. As the relevant activities are often initiated by individuals acting in specific environments and circumstances, we need to consider not only the level of the organisation (i.e. meso level), but also the macro level of the innovation system and the micro level of individuals. Against the background of economic and social theory, intrinsic motivations have therefore also been discussed. External conditions, like the mode of governance and the logic of influence are also relevant as these define the framework conditions. Over time, associations may evolve in line with changes in the environment and internal developments. This evolution can be regarded as a life cycle which is specific to each association.

Different types of associations and their specific functions have been mentioned using the example of Germany. While each of the listed associations can be regarded as an individual case, we can also assume that there are certain traits which are shared by all of them. Thus, we proposed four hypotheses addressing the macro level, i.e. the level of the regional innovation system, the meso level, i.e. the level of the association, and the micro level, which considers the motivations of individuals. We further proposed an empirical concept to be applied to study the role of associations in innovation systems.



## 8 References

- Asheim, B.T./Coenen, L. (2005): Knowledge bases and regional innovation systems: Comparing Nordic Clusters, *Research Policy*, 34, 1173-1190.
- Asheim, B.T./Gertler, M.S. (2005): The Geography of Innovation: Regional Innovation Systems. In: Fagerberg, J./Mowery, D.C./Nelson, R.R. (eds.): *The Oxford Handbook of Innovation*. New York: Oxford University Press, 291-317.
- Bennett, R.J. (1998a): Business associations and their potential contribution to the competitiveness of SMEs, *Entrepreneurship & Regional Development*, 10, 243-260.
- Bennett, R.J. (1998b): Explaining the Membership of Voluntary Local Business Associations: The Example of British Chambers of Commerce, *Regional Studies*, 32, 503-514.
- Bennett, R.J. (2000): The Logic of Membership of Sectoral Business Associations, *Review of Social Economy*, 58, 17-42.
- Bennett, R.J./Ramsden, M. (2007): The Contribution of Business Associations to SMEs, *International Small Business Journal*, 25, 49-76.
- Bennett, R.J./Robson, P.J.A. (2011): Exploring the use of trade and professional association services, *Applied Economics*, 1595-1605.
- Bergek, A./Jacobsson, S./Carlsson, B./Lindmark, S./Rickne, A. (2008): Analyzing the functional dynamics of technological innovation systems: A scheme of analysis, *Research Policy*, 37, 407-429.
- Boschma, R./Martin, R. (2010): The aims and scope of evolutionary economic geography. In: Boschma, R./Martin, R. (eds.): *The Handbook of Evolutionary Economic Geography*. Cheltenham: Edward Elgar, 3-39.
- Boschma, R.A. (2005): Proximity and Innovation: A Critical Assessment, *Regional Studies*, 39, 61-74.
- Capello, R./Faggian, A. (2005): Collective Learning and Relational Capital in Local Innovation Processes, *Regional Studies*, 39, 75-87.
- Carrincazeaux, C./Coris, M. (2011): Proximity and innovation. In: Cooke, P./Asheim, B./Boschma, R./Martin, R./Schwartz, D./Tödtling, F. (eds.): *Handbook of Regional Innovation and Growth*. Cheltenham, Northampton: Edward Elgar, 269-281.
- Coase, R.H. (1991): The Nature of the Firm (1937). In: Williamson, O.E./Winter, S.G. (eds.): *The Nature of the Firm. Origins, Evolution, and Development*. New York, Oxford, 18-33.
- Cohen, D./Prusak, L. (2001): *In Good Company. How Social Capital Makes Organizations Work*. Boston, Ma.: Harvard Business School Press.

- Coleman, W./Grant, W. (1988): The organizational cohesion and political access of business: a study of comprehensive associations, *European Journal of Political Research*, 467-487.
- Cooke, P. (2002): Regional Innovation Systems: General Findings and some new Evidence from Biotechnology Clusters, *Journal of Technology Transfer*, 27, 133-145.
- Cooke, P. (1992): Regional Innovation Systems: Competitive Regulation in the New Europe, *Geoforum*, 23, 365-382.
- Coombs, R./Harvey, M./Tether, B.S. (2003): Analysing distributed processes of provision and innovation, *Industrial and Corporate Change*, 12, 1125-1155.
- Deci, E.L./Ryan, R.M. (1985): *Intrinsic Motivation and Self-Determination in Human Behavior*. New York: Plenum Press.
- Doloreux, D./Parto, S. (2005): Regional innovation systems: Current discourse and unresolved issues, *Technology in Society*, 27, 133-153.
- Dosi, G./Freeman, C./Nelson, R.R./Silverberg, G./Soete, L. (eds.) (1988): *Technical Change and Economic Theory*. London: Pinter.
- Edquist, C. (2005): Systems of Innovation. Perspectives and Challenges. In: Fagerberg, J./Mowery, D.C./Nelson, R.R. (eds.): *The Oxford Handbook of Innovation*. New York: Oxford University Press, 181-208.
- Foray, D./Lundvall, B.-Å. (1996): The Knowledge-based Economy: From the Economics of Knowledge to the Learning Economy. In: Foray, D./Lundvall, B.-Å. (eds.): *Employment and Growth in the Knowledge-based Economy*. Paris: OECD, 11-32.
- Fraunhofer Institute for Systems and Innovation Research ISI (ed.) (2012): *Innovation System Revisited. Experiences from 40 Years of Fraunhofer ISI Research*. Stuttgart: Fraunhofer Verlag.
- Freeman, C. (1987): *Technology Policy and Economic Performance: Lessons from Japan*. London: Pinter Publishers.
- Frey, B.S. (2000): Motivation and Human Behaviour. In: Taylor-Gooby, P.F. (ed.): *Risk, Trust and Welfare*. Basingstoke: Palgrave Macmillan, 31-50.
- Frey, R.L. (2003): Regional Governance zur Selbststeuerung territorialer Subsysteme, *Informationen zur Raumentwicklung*, 8/9, 451-462.
- Fromhold-Eisebith, M. (2007): Bridging Scales in Innovation Policies: How to Link Regional, National and International Innovation Systems, *European Planning Studies*, 15, 217-233.
- Geels, F.W. (2002): Technological transitions as evolutionary reconfiguration processes: A multi-level perspective and a case-study, *Research Policy*, 31, 1257-1274.

- Geels, F.W. (2004): From sectoral systems of innovation to socio-technical systems: Insights about dynamics and change from sociology and institutional theory, *Research Policy*, 33, 920.
- Graham, S./Weiner, B. (1996): Theories and Principles of Motivation. In: Berliner, D.C./Calfee, R.C. (eds.): *Handbook of Educational Psychology*. New York: Simon & Schuster Macmillan, 63-84.
- Granovetter, M. (1973): The Strength of Weak Ties, *American Journal of Sociology*, 78, 1360-1380.
- Granovetter, M.S. (1985): Economic Action and Social Structure: The Problem of Embeddedness, *American Journal of Sociology*, 91, 481-510.
- Halinen, A./Törnross, J.-A. (1998): The role of Embeddedness in the evolution of Business Networks, *Scandinavian Journal of Management*, 14, 187-205.
- Hall, P.A./Soskice, D. (2001): An Introduction to Varieties of Capitalism. In: Hall, P.A./Soskice, D. (eds.): *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*. Oxford: Oxford Univ. Press, 1-68.
- Hekkert, M.P./Negro, S.O. (2009): Functions of innovation systems as a framework to understand sustainable technological change: Empirical evidence for earlier claims, *Technological Forecasting and Social Change*, 74, 413-432.
- Hekkert, M.P./Suurs, R.A.A./Negro, S.O./Kuhlmann, S./Smits, R.E.H.M. (2007): Functions of innovation systems: A new approach for analysing technological change, *Technological Forecasting & Social Change*, 74, 413-432.
- Kemp, R. (1994): Technology and the Transition to Environmental Sustainability. The Problem of Technological Regime Shifts, *Futures*, 26, 1023-1046.
- Kenworthy, L. (2009): Institutional coherence and macroeconomic performance. In: Hancké, B. (ed.): *Debating Varieties of Capitalism: A Reader*. Oxford: Oxford Univ. Press, 180-199.
- Kline, S.J./Rosenberg, N. (1986): An Overview of Innovation. In: Landau, R./Rosenberg, N. (eds.): *The Positive Sum Strategy. Harnessing Technology for Economic Growth*. Washington: National Academy Press, 275-305.
- Knieling, J. (1994): Intermediary organisation and co-operative regional development. The example of FORUM for the Rural Area for advancing regional development in northern Hesse, *Raumforschung und Raumordnung*, 52, 116-126.
- Kuhlmann, S./Arnold, E. (2001): *RCN in the Norwegian Research and Innovation System. Background report No 12 in the evaluation of the Research Council in Norway*. Oslo: Royal Norwegian Ministry for Education, Research and Church Affairs.
- Lambooy, J.G./Boschma, R.A. (2001): Evolutionary economics and regional policy, *The Annals of Regional Science*, 35, 113-131.

- Lane, C./Bachmann, R. (1997): Co-operation in Inter-firm Relations in Britain and Germany: The Role of Social Institutions, *British Journal of Sociology*, 42, 226-254.
- Malerba, F./Orsenigo, L. (1993): Technological regimes and firm behavior, *Industrial and Corporate Change*, 2, 45-71.
- Markard, J./Truffer, B. (2008): Technological innovation systems and the multi-level perspective: Towards an integrated framework, *Research Policy*, 37, 596-615.
- Maskell, P. (2000): Social capital and competitiveness. In: Baron, S./Field, J./Schuller, T. (eds.): *Social capital. Critical perspectives*. Oxford: Oxford University Press, 111-123.
- May, T.C./McHugh, J./Taylor, T. (1998): Business Representation in the UK since 1979: the Case of Trade Associations, *Political Studies*, XLVI, 275.
- Nahapiet, J./Goshal, S. (1998): Social capital, intellectual capital and the organizational advantage, *Academy of Management Review*, 23.
- Nelson, R.R./Winter, S.G. (1982): *An Evolutionary Theory of Economic Change*. Cambridge (MA.): Belknap Press.
- Nelson, R.R. (ed.) (1993): *National Innovation Systems. A Comparative Analysis*. New York: Oxford University Press.
- Nonaka, I. (1994): A Dynamic Theory of Organizational Knowledge Creation, *Organization Science*, 5, 14-37.
- Olson, M. (1985): *Aufstieg und Niedergang von Nationen: Ökonomisches Wachstum, Stagflation und soziale Sicherheit*. Tübingen: J.C.B. Mohr.
- Olson, M. (1992): *Die Logik des kollektiven Handelns*, 3rd Edition, Die Einheit der Gesellschaftswissenschaften; Bd. 10. Tübingen: Mohr.
- Ostrom, E. (2000): Crowding out Citizenship, *Scandinavian Political Studies*, 23, 3-16.
- Patel, P./Pavitt, K. (1994): National innovation systems: why they are important and how they might be measured and compared, *Economics of Innovation and New Technology*, 3, 77-95.
- Polanyi, M. (1997): The Tacit Dimension. In: Prusak, L. (ed.): *Knowledge in Organizations. Resources for the knowledge-based economy*. Boston, Oxford, Johannesburg: Butterworth-Heinemann, 135-146.
- Singh, J. (2008): Distributed R&D, cross-regional knowledge integration and quality of innovative output, *Research Policy*, 37, 77-96.
- Smedlund, A. (2006): The roles of intermediaries in a regional knowledge system, *Journal of Intellectual Capital*, 7, 204-220.

- Stamboulis, Y. (2008): Exploring the System Dynamics of Innovation Systems. Athens, Greece: System Dynamics Society. Online: <http://www.systemdynamics.org/conferences/2008/proceed/papers/STAMB454.pdf> (accessed: 11.12.2012).
- Tichy, G. (2001): Regionale Kompetenzzyklen - Zur Bedeutung von Produktlebenszyklus- und Clusteransätzen im regionalen Kontext, *Zeitschrift für Wirtschaftsgeographie*, 45, 181-201.
- Wihlborg, E./Söderholm, K. (2013): Mediators in action: Organizing sociotechnical system change, *Technology in Society*, 35, 267-275.

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