

Institutional gaps in cross-border regional innovation systems: The horticultural industry in Venlo-Niederrhein

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Introduction

Cross-border regions face the challenge to move towards a competitive position that is increasingly based on innovation, which is regarded as the most important driver of economic growth (Lundquist & Tripl, 2011). Geographical proximity can facilitate the transfer of resources for innovation in a region (Boschma, 2005; Asheim et al, 2011). Although geographical proximity is relatively high in a cross-border region, the nation-state border acts as a barrier to cross-border interaction (Tripl, 2010). There are economic, social and mental bordering processes that hinder these knowledge driven interactions. This hampers the build-up of regularities and the development of systemic innovation relations in the cross-border region. This chapter researches the role of the border in cross-border regional innovation systems.

The system of innovation approach stresses both the importance of cooperative relations in innovation and the institutions that facilitate cooperation and interaction (Doloreux & Parto, 2005; Edquist, 2006). Institutions govern and condition social life by reducing uncertainty in everyday practice and by doing so provide (temporary) stability for regular interaction between actors in the innovation system (Gertler, 2004; North, 1990). The nation-state border impedes regular interaction and the build-up of systemic relations in cross-border regions, thereby frustrating the development of a regional innovation system (CBRIS). The border does not only divide production structures, but also the formal and informal institutional architectures on both sides of the border that influence actors' innovation behaviour (Edquist, 2006; North, 1990).

One way to conceptualize the blocking effect of the nation-state border in cross-border regional innovation is in terms of institutional gaps occurring at the border. Public and private actors in a CBRIS are embedded in regional, national, European and global networks. Therefore they are influenced by an intricate web of institutions on these multiple levels as well (Bathelt, Malmberg, & Maskell, 2004; T. Hansen, 2013). We conceptualize this intersection of multiple levels of institutions in the region as the embeddedness of actors in a multi-level institutional architecture (MLIA). Actors embedded in MLIA on one side of the border interact in the cross-border region with other actors that are embedded in their own MLIA on the other side of the border. Institutional gaps occur when the MLIA's influence actors in a manner that impedes them from attracting resources from across the

border. On an aggregate level, the cumulative effect of these institutional gaps can hamper the build-up of regularities and thereby frustrate the evolution of a CBRIS and the innovation processes within.

Although actors are embedded in MLIA, their behaviour and interaction patterns are not fully determined by the institutions (Gertler, 2010). When actors are confronted with institutional gaps they try to find solutions to deal with these gaps. These solutions might be sought on different levels in the MLIA than those where the gaps arise. Public actors might focus on creating or changing formal structures, whereas firms have to bridge gaps by creatively seeking new ways to attract resources in order to pursue their own economic interest. Therefore we need to understand how actors attempt to fill the institutional gaps.

The main research question that follows is which institutional gaps at the border influence the behaviour of actors in cross-border innovation, and what actions do these actors undertake to deal with these gaps. Exploratory research has been conducted in the cross-border region of Venlo-Niederrhein, located at the Dutch-German border. Both regions of Venlo and Niederrhein are dominated by horticulture. Actors in the region have experienced difficulties when trying to cooperate across the border. The case provides an analysis of how actors are embedded in MLIA and how they deal with institutional gaps on three themes: innovation policy, the education system and the role of energy in horticulture.

The remainder of this chapter is as follows. First we discuss the conceptualization of RIS as a multilevel institutional architecture. Second, the concept of institutional gaps and agency of actors is described. This section ends with the analytical framework and the methodology for the case study. Third, the case study is presented. Fourth, conclusions are drawn, followed by a discussion about how to conceptualize institutional gaps in MLIA and what this means for theory development on cross-border regional innovation systems.

Regional innovation systems as multilevel institutional architectures

A regional innovation system can be conceptualized as regionally interacting knowledge producing and knowledge exploiting actors, and the structure of institutions that supports these interactions (Cooke, 2005). At the heart of the systems of innovation approach is the acknowledgement of innovation as an interactive process, whereby actors within and outside the firm interact (Revilla Diez & Kiese, 2009). Institutions facilitate interaction in the region, and provide (temporary) stability for actors to have regularized and repeated interaction (B. Asheim, Smith, & Oughton, 2011; Cooke, 2005). Over time, these stable patterns of institutionally supported regional knowledge interactions could be understood as having systemic properties.

The systems of innovation approach regards institutions as useful in explaining smooth knowledge interaction and transfer among actors (Edquist, 2006; Revilla Diez & Kiese, 2009). Still, the usefulness

of institutions in explaining the geographical variation in innovation performance has received quite some critique. Institutions are often considered vague (Cumbers, MacKinnon, & McMaster, 2003; Gertler, 2010) and are used as a residual explanatory concept for variation in regional innovation performance (Rodríguez-Pose, 2013). Partly, this vagueness related to institutions is a result of the level of analysis, which in RIS literature is predominantly regional (Cooke, 2005). Several scholars argue for a relational economic geography whereby the object of analysis is no longer the region, but rather the interactions of actors (Bathelt & Glückler, 2003; Rutten & Boekema, 2012). Actors are embedded in networks at multiple levels, whereby it is argued that a region can be thought of as accommodating multiple networks (Rutten & Boekema, 2012). The actors in these networks are all embedded in their particular institutional architectures. Hence, as national, regional and sectoral institutions come together in the region, they produce a rich variation of distinct, place specific institutional architectures (Pike et al., 2007). As multi-level networks and a large variety of heterogeneous actors meet in the region, analysing institutions at the regional level will only lead to general descriptions and oversimplification. Therefore we suggest that regional innovation systems can be understood as regularly interacting actors, who are embedded in multi-level institutional architectures (MLIA).

The MLIA influences 'the practices of firms in the region' (Asheim & Gertler, 2006). Besides influencing, constraining and shaping interaction, actors also pursue strategies to alter the influence of MLIA. As Gertler (2004; 7-8) argues:

'Although these institutionally shaped attitudes, values, and conventions influence choices and constrain decisions regarding practices, they do not wholly determine them. There is still a major role here for individual agency to produce a variety of responses within the same sector, region, and nation-state.'

The most common distinction with regard to institutions is that between formal and informal institutions (North, 1990). Formal institutions are mostly of a juridical nature such as laws and rules. Informal institutions can consist of routines, norms and values. An elaboration of this distinction between formal and informal institutions was made by Scott (2001). He distinguishes between three pillars of institutions: regulative, normative and cultural-cognitive. Regulative institutions show strong overlap with formal institutions. They are of a coercive nature and consist of rules, laws and accompanying sanctioning (Scott, 2001). Normative institutions on the other hand are morally governed, binding expectations to which people adhere such as values, norms and codes of conduct. The cultural-cognitive dimension of institutions refers to shared logics and common beliefs that are taken for granted, supported by culture and everyday practices (Scott, 2001; Moodysson & Zukauskaitė, 2012).

Whereas institutions are regarded facilitating interaction in regional innovation systems, we argue that in a cross-border RIS the influence of institutions on actors on both sides of the border can actually lead to institutional gaps that hamper cross-border cooperation.

Institutional gaps and agency in CBRIS

Lundquist & Trippel (2011) describe how innovation systems can be conceptualized in a cross-border regional setting. The particularity of this form of RIS is the presence of the nation-state border. With respect to the development of CBRIS, Lundquist and Trippel (2011) suggest how cross-border innovation relations can become regularized to a point where these relations can be understood as being systemic of nature.

Just as actors in RIS are embedded in MLIA, so are actors in CBRIS. Institutions on a supranational, (sub) national and regional level influence actors when they are trying to pursue economic opportunities in this cross-border setting. Figure 1 depicts possible institutional levels in a European setting, as this is a particular supranational institutional level (dotted lines) of importance in European cross-border regions.

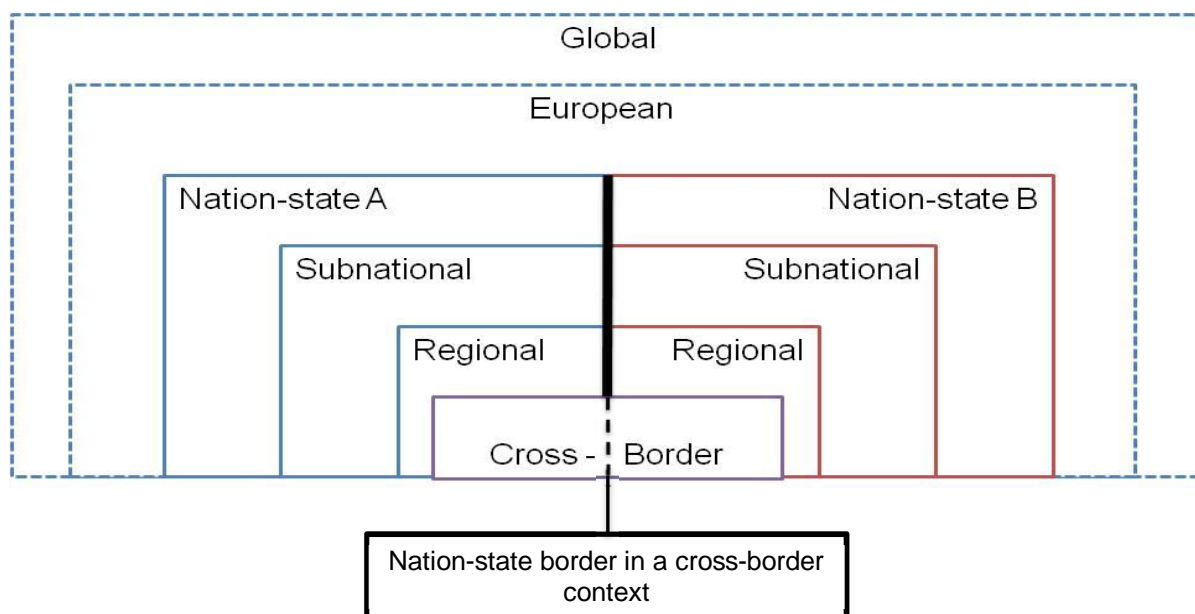


Figure 1: Multi-level institutional embeddedness of actors in a cross-border context

Institutions may facilitate processes of collective learning and the build-up of regularized economic relations by providing (temporary) stability in the evolution of a CBRIS. When the embeddedness of actors in their respective MLIA frustrates cross-border cooperation we speak of institutional gaps.

Institutional gaps can obstruct the evolution of the CBRIS because it prevents actors on both sides of the border from cooperating smoothly. However, actors do not always passively accept the consequences of these gaps. Although actors do not always purposively try to bridge the institutional gaps, they do develop strategies to smooth the cooperation process. Strategies to induce institutional change can be divided into several types: creative destruction, patching up and transposition (P. A. Hansen & Serin, 2010; Genschel (1997). Creative destruction is the replacement of existing

institutions by new ones. Patching up is the process of creating new institutions alongside existing ones to facilitate development, which is not possible through the existing set of institutions. Transposition is the process of using existing structures in innovative ways to reach the objective of cross-border innovative cooperation (Genschel, 1997; Hansen & Serin, 2010). These are predominantly public actor strategies. However, private actors creatively seek ways in existing institutional architectures through transposition strategies. With respect to informal institutional gaps, strategies to deal with these gaps will often take the form of a gradual build-up of trust by taking small steps forward. When the economic interest of actors is sufficiently high, they will most likely find a way to deal with informal institutional gaps. This can then lead to convergence in terms of mutual understanding of modes of organization, culture, norms and values, which further facilitates filling the institutional gap.

The results of actor strategies can lead to a structuring process from which institutions evolve in the cross-border region, reshaping the embeddedness of actors in cross-border MLIA, further facilitating regularized knowledge interaction and the evolution of CBRIS. This is a non-linear process, characterized by small steps ahead, drawbacks, periods of inactivity and leaps forward. The evolution of a CBRIS is not a staged process, where the system flips from one stage to a more advanced stage. Evolution of CBRIS is characterized by feedback loops that are influenced by institutional gaps and the strategies of actors. This chapter contributes to the understanding of the evolution of CBRIS by focusing on the role of institutional gaps and agency in this evolutionary process. In figure 2 the concept of Lundquist & Trippel (2011) is complemented with feedback loops and institutional gaps.

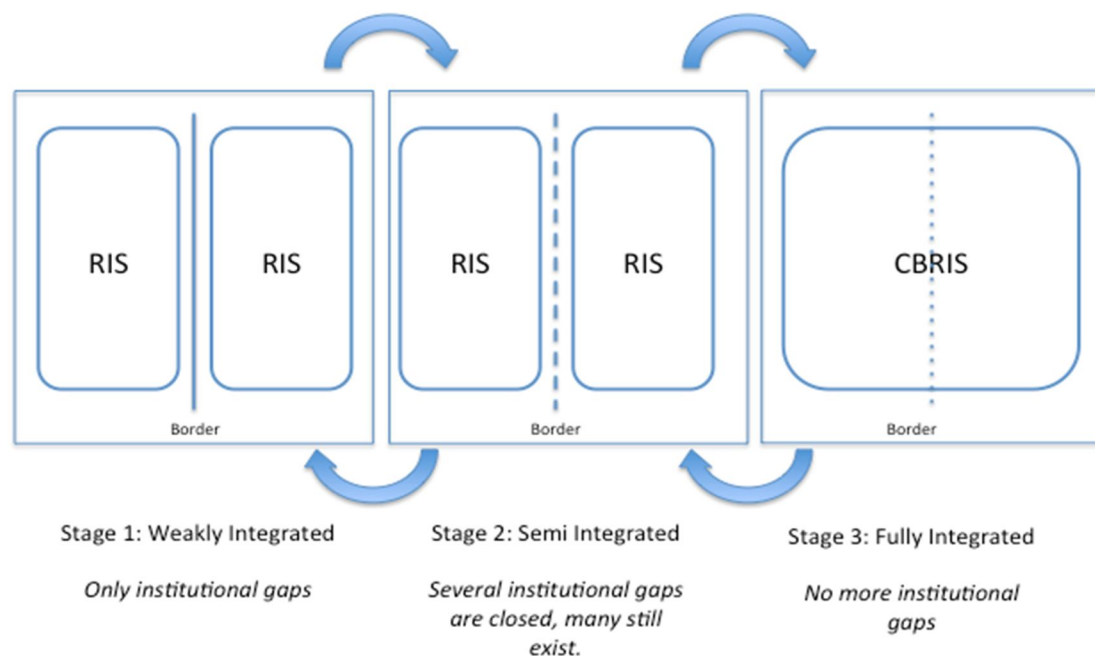


Figure 1: Feedback loops in the construction of CBRIS (adapted from Lundquist & Trippel, 2011. Adjustment by authors)

The analytical framework: Institutional gaps and agency

The main research question that follows from the theoretical framework is which institutional gaps are present in cross-border regional innovation systems and what strategies do actors in the innovation system follow to deal with these gaps.

First, for the analysis of institutional gaps we need to understand what types of institutional gaps are present in the cross-border region. Analogous to Scott's (1995) typology we differentiate between regulative, normative and cultural-cognitive gaps. Regulative gaps occur when formal institutions such as laws and regulations impede the cooperation among actors. Normative and cultural-cognitive gaps can occur due to limited knowledge of the values, norms, codes of conduct and cultures on the other side of the border. These gaps are a result of having limited cross-border interaction.

Second, actors are embedded in multi-level institutional architectures. Actors that try to pursue cross-border economic activities, encounter institutional gaps in the cooperation process. These institutional gaps can occur on different levels in the MLIA, and the strategies to overcome them can also be present on different levels in the MLIA.

Third, actors develop strategies to deal with the institutional gaps. Strategies of actors can be dependent on the types of institutional gap. Formal institutional gaps are mostly present due to a mismatch in laws and regulations in the cross-border region. This provides room for government officials to replace, create or change formal institutions, as it is part of their public management duty and facilitators to innovation. Besides lobbying practices, it is harder to induce formal institutional change for firms. Informal institutional gaps (normative and cultural-cognitive) can be related to the lack of experience in cross-border cooperation. Through repeated interaction, mutual understanding of the cultural context, divergent modes of organization, norms, values and operating systems can grow. This will smooth the cooperation processes whereby normative and cultural-cognitive institutional convergence can take place in the cross-border region.

Fourth, the analysis in this chapter will give insights into the results of the strategies of actors and what this means for future development of the cross-border regional innovation system in terms of forward or backward feedback loops.

Table 1 summarizes the analytical framework.

Objects of analysis	Concepts	Analytical approach
Institutional gaps	<ul style="list-style-type: none">• Regulative• Normative• Cultural – cognitive (Scott, 1995)	Description and analyses of themes where institutional gaps are present for actors in the CBRIS
MLIA	Embeddedness of actors in Multi-level institutional architectures	Analysis of the levels on which the institutional gaps are present.
Agency	Public and private strategies of actors. <ul style="list-style-type: none">• Creative destruction (Blatter, 2003)• Patching up (Genschel, 1997)• Transposition (Genschel, 1997)	Analysis of the actions actors undertake to deal with practical problems that are related to the institutional gaps.
Results	Forward, backward feedback loops or unchanged situation	Analysis of the results of actor strategies for the cross-border cooperation theme.

Table 1: Analytical framework (authors' own composition)

Methodology

A qualitative, exploratory case study approach is taken to analyze the behavior of actors. We have selected a case study where we could observe actors trying to cooperate cross-border with regard to innovation. In the Dutch-German cross-border region of Venlo-Niederrhein, public and private actors seek economic opportunities on the other side of the border in the horticultural sector. The approach consisted of interviews with a diversity of actors, complemented by desk research of policy documents and reports.

First, 24 semi-structured interviews were conducted with representatives of governments, intermediary bodies, firms and knowledge institutes on both sides of the border. Questions mainly concerned the motives for cross-border cooperation, the perceived added value from cross-border integration, involvement of actors in cross-border cooperative projects and the role of the nation-state border. The effect of the border was further investigated by asking question concerning differences in laws, regulations and culture, and the solutions that actors seek accordingly.

Second, the interviews were part of a research project that resulted in a report about the complementarity of the horticultural sector in the regions of Venlo and Niederrhein. The report was used for the analyses in this case study. Additional desk research was carried out to check the the interview results. This consisted of analysis of official policy documents and research carried out previously. Third, all meetings of a cross-border steering committee for cross-border cooperation were attended and observed.

The research has some limitations. We focus upon a single industry in a single region, which asks for cautiousness when generalising the results. The advantage of analysing the same industry on both sides of the border is that we can control for cross-sectoral differences.

Cross-border integration of horticulture in the Venlo-Niederrhein region

The Venlo-Niederrhein case is analysed to answer the question what institutional gaps are present in CBRIS and which strategies actors in MLIA develop in order to overcome these gaps. Three cooperation themes are selected: innovation policy, the labour market and energy usage. The case study is structured as follows. First, a general description is given of the Venlo-Niederrhein region. Second, the institutional gaps and strategies of the actors within the three selected domains of cooperation are analysed. Third, the results are summarized in a table.

General context

The Venlo-Niederrhein region is situated in the southern part of the Dutch-German border region. It consists of the Northern part of the Dutch province of Limburg and the German region of Niederrhein (figure 3). The cross-border region has no formal status, but is located in the administrative Euroregion Rhine-Meuse North (RMN).

In Germany, the Niederrhein region is located within the State of North-Rhine Westphalia (NRW). Niederrhein consists of counties Kreis Kleve, Kreis Wesel, Kreis Viersen, Rhein-Kreis Neuss and the cities of Monchengladbach, Duisburg and Krefeld. Niederrhein itself has no policy decision making capabilities, so the region has to rely on the formal jurisdictional levels of NRW, Kreisen or municipalities. The most active and relevant municipalities in Niederrhein in this case are Straelen and Nettetal.

Venlo is a Dutch city in the northern part of the Province of Limburg. It is one of seven municipalities that cooperate in the 'Venlo Region' partnership. The province of Limburg can be understood as the intermediate level between the nation-state and municipalities.

Both Venlo and Niederrhein are relatively peripheral regions within their respective countries. Niederrhein is not only peripheral within Germany, but also within the federal state of North Rhine-Westphalia (NRW). This does not mean that the German national level is not important, but for most regulative institutions, such as laws and government jurisdiction it is less important than the state level. Here, NRW differs from the Province of Limburg, as from a regulative perspective; NRW is more comparable to the nation-state of the Netherlands.



Figure 3: The Venlo-Niederrhein region

Sectoral collaborations in agriculture exist on both sides of the border. In Niederrhein there is a non-profit organization called 'Agribusiness Network Niederrhein'. On the level of the counties and municipalities in Niederrhein, the horticulture sector is the most important economic activity.

At the Dutch side of the border the city of Venlo is cooperating with neighboring towns in a regional cooperative structure called 'Greenport Venlo'. Greenport Venlo is one of six Dutch regions with the 'Greenport' status, which comes with financial benefits. This enables the intermediary body of Greenport Venlo, to adhere budgets and spend them on innovative projects in the horticultural and food sector.

A broad conceptualization of relevant levels in the Venlo-Niederrhein region is listed in the table below.

Nation-state	Germany	Netherlands
Sub-national	State of North Rhine Westphalia (NRW)	Province of Limburg
Regional	Niederrhein, counties	Greenport Venlo, Region of Venlo (7 municipalities)
Local	Municipalities of Straelen, Nettetal	Municipality of Venlo
Cross-border	Euroregion Rhine-Meuse-North	

Table 2: MLIA in Venlo-Niederrhein

Over the last years, government officials have started to undertake several projects in the cross-border region to investigate whether there is room for more cooperation between the regions to create an integrated horticultural industry. Here we focus on three topics: innovation policy, the labor market and energy usage. First, innovation policy is an important topic for public actors, it guides their economic strategies and project funding. Similar or complementary policy goals are an important condition for successful cross-border cooperation efforts. Second, with respect to the labour market, research has suggested that the cross-border region will face large structural shortcomings in labour supply in horticulture (E'til, 2012). Both Niederrhein and Venlo need a large influx of students and workers to be able to match labor supply with demand in the region. Third, energy usage is one of the most important topics for firms in greenhouse horticulture. Firms seek ways to innovate in order to develop energy efficient production methods. Therefore they have developed several projects related to energy innovation.

Below, we discuss these three topics of cooperation. First, we analyze the institutional gaps. Second, strategies of actors are discussed. Third, we list the results of these actions.

Innovation policy

Dutch innovation policy

In the Netherlands the national level dominates innovation policy. The two key governmental actors are the ministry of economic affairs (EZ) and the ministry of education, culture and science (OC&W). EZ is responsible for innovation policy and more oriented towards industry. OC&W is responsible for the science and education policy. The innovation policy of the Dutch government rests on a selection of nine 'top-sectors' and the ambition to establish head offices of multi-national firms. Agriculture and food (A&F) and horticulture and propagation materials (T&U) are selected as two top sectors of the Dutch economy (Ministry of Economic Affairs, 2011).

The national policy attention is also reflected in the spatial-economic policy of selecting a few horticultural hotspots, the 'Greenports'. Regions with the Greenport status receive national level investments with priority, because the nation-state government expects the clustering of activities in agriculture in these regions to be of great importance to the competitive position (Nota Ruimte, 2006). Venlo is one of the six Greenports in the Netherlands. The Greenport Venlo foundation is founded in 2009 to 'economically strengthen the Greenport Venlo region and act as linking pin between the agrofood, horticulture and logistics sector within and outside the region' (www.greenportvenlo.nl). Whereas the other five Greenports are mainly located in the Western part of the Netherlands, Greenport Venlo is located in the East. It fulfils an important role in the Dutch export system towards Germany. Over the years, Venlo has developed both a horticultural specialization, but also an important logistic function, as it is located between the western ports of Rotterdam and Antwerp, and the industrial German Ruhr area. The national government has acknowledged the ambitions of Greenport Venlo and has developed several infrastructural and spatial planning projects to facilitate this development (Berenschot, 2012; Ministerie van Infrastructuur en Milieu, 2012).

At the regional level the province of Limburg cooperates with the Greenport Venlo foundation. The main formal role of the province of Limburg is related to spatial-economic planning and innovation. In the innovation and economic domain they play a supporting, but very active, role. The province acts as the most important funding partner of projects and lobbies actively in national and European policy arenas.

German Innovation policy

Innovation policy in Germany is a shared domain at the national level and the level of the sixteen states. This is expressed through the constitutional rule that financing of public science and research activities is a joint responsibility of the ministries and authorities on federal and state level (Stehnen, 2010).

On the national level Germany has implemented the 'high tech strategy 2020' which is designed to create a coherent innovation policy framework at this level. It focuses innovation policy on matters of major societal challenges and key technological fields. Primary production of food is not incorporated in the innovation policy, but food processing is. The vast majority of funding of science and technology, is in the hands of governing bodies at the state level (Stehnken, 2010). The federal government spends the majority of funds on science and technology through the Ministry of Education and Research (BMBF) and the Ministry of Economics and Technology (BMW). The states have a say in the allocation of federal budgets and also have influence through their position in intermediary committees that are engaged in innovation policy and funding thereof (Koschatzky & Kroll, 2009).

The states are responsible for financing research and teaching at public universities. As Niederrhein is situated in the state of North-Rhein Westphalia (NRW), this state will be singled out here. The innovation policy of the state of NRW covers 16 sectors. The Cluster Agency NRW (Exzellenz NRW) acts on behalf of the state NRW in order to operationalize the innovation policy of the state. The Cluster Agency sets out the main areas of work in the specific clusters. In the case of Agrifood Business, a cluster management network (Nutrition.NRW) has been started in 2008. It collaborates with other generic network initiatives that deal with innovation issues in NRW, such as the Innovation Alliance 'Innovationsallianz' of NRW Universities.

Institutional gaps in innovation policy

We observed two institutional gaps present in the Venlo-Niederrhein region related to innovation policy.

The first institutional gap is that Niederrhein does not have its own policy-making capabilities. All policy initiatives can be traced back to the responsibility of the state NRW. Venlo is located in the Province of Limburg, thereby having an intermediary level between local and national policy levels. The province has been an important partner in matters of financing new projects and lobbying in national settings to embed the Greenport Venlo in innovation policy. This intermediary level is not present for Niederrhein, thereby limiting the room for project funding in Niederrhein and lobby at the level of NRW. This has to be done by government officials at the level of towns and Kreisen.

The second institutional gap is the representation of horticulture in the various policy domains. Horticulture is a topsector in the Netherlands, and Greenport Venlo has acquired a good position in this perspective, thereby opening up chances for additional funding from the national level. Moreover, the logistic hub function of Venlo is both embedded in the spatial planning policy of the Netherlands and a topsector in itself. Horticulture in Niederrhein has a very marginal role in the NRW innovation policy domain and most attention is given to food processing, because it fits better with the high tech focus of the NRW innovation strategy. So in more detail, the agro-logistic function of Venlo does not comply with attention for food processing in NRW innovation policy.

Actor strategies to fill institutional gaps

German actors primarily experience the consequences of the institutional gaps. They use the collaborative cross-border projects and their results to influence innovation policy mechanisms in their own region. By showing cross-border synergies they try to get increased policy attention at the level of NRW. In other words, the German actors use the strength of the Dutch horticultural sector to gain policy attention from government officials in their own state. Their goal is not only to increase cross-border cooperation, but also to direct higher-level attention and funding opportunities to their own local and regional economy.

The actors in the border region use the EU level to support their regional and cross-border ambitions. The cross-border Euroregion Rhine-Meuse-North organization is used to direct EU funding to joint horticultural projects in the Venlo-Niederrhein region. It is in the interest of the Dutch partners to help their German counterparts get more policy attention because this fits their own policy goals as well. One of their goals is to strengthen their position within the Dutch innovation system. Together with Niederrhein, Venlo can claim they are a large and important horticultural and logistic cluster, thereby strengthening their position vis-à-vis the other Dutch Greenports in the West.

Skills on the labour market

The labour market plays an important role in a regional innovation system as a generator of knowledge flows. The development of a common labour market is important, because it can facilitate cross-border knowledge flows. Moreover, employees or students from one side of the border could solve labour market shortages on the other side. A side effect of this could be a better understanding of divergent cultures, which smoothens cooperation processes. However, there are still institutional gaps in the region that impede student exchange, certification, and acknowledgement of competences across the border.

Dutch skills development

The ministry of education, culture and science (OC&W) centrally governs the Dutch education system. Children are in primary school from 5 to 12 years, after which three types of secondary education are possible. Secondary education has three types of schools: preparatory vocational education (VMBO), school of higher general secondary education (HAVO) and preparatory scientific education (VWO). Tertiary education consists of schools for vocational education, universities of applied science and general and technical universities. Certification at all levels is supervised by the ministry of OC&W, and executed by the educational institutes.

German skills development

In Germany the states are responsible for education, with a few exceptions such as military universities (Busse, Berkhof, & Meijer, 2006). Primary education in Germany lasts for only four years. After these four years there is a choice between Hauptschule, Realschule or Gymnasium. Hauptschule can be more or less compared to the Dutch VMBO, mainly preparing children for the dual system, which is seen as an important factor of the high quality of German workforce. In the dual system children study, but also work several days a week. At the regional level Chambers of Commerce are responsible for certification and accreditation of these schools (Busse, 2010).

Institutional gaps in the development of skills

Two institutional gaps are present in the cross-border development of skills. The first one is related to cross-border certification of skills, the second to mobility of students.

At the German side the Chambers of Commerce are responsible for the certification, in the Netherlands the central Ministry of OC&W has this responsibility. They use different examination and qualification requirements. However, when attempting to harmonize these standards, the Dutch provinces and cities, which are the main actors promoting cross-border cooperation, have no legal authority and demand action from the central government. Whereby for the central government, cross-border harmonization of certification means that it has to deal with every single Chambre of Commerce on the German side of the border one-on-one. This fragmentation has prohibited harmonization to take place.

Cross-border mobility of students on the vocational training level is also subject to an institutional gap. German students can study at a Dutch vocational training institute. However, when one wants to take an exam, they need to have advanced knowledge of the Dutch language. It is not allowed to take an exam in German or English at the Dutch vocational training institutes. This discourages foreign students, primarily German students, to pursue education opportunities in Dutch vocational training institutes.

Actor strategies to deal with institutional gaps

Central and regional actors from government and educational institutes are cooperating at the European level for solutions. At this level different initiatives are being developed to address this problem, from a European Credit System for Vocational Education and Training (ECVET) to a European Qualifications Framework (EQF). This is an example of how institutional differences between two neighbouring countries are being resolved by cooperating on a different institutional governance level, in this case the European level. The problem with this is the fact that harmonization on a European level with 27 member states takes very long.

On the European level much effort has been put in the harmonization of higher education through the introduction of the bachelor-master system and the European Credit Transfer and Accumulation System (ECTS). At the level of vocational education and training this harmonization is also taken up, but is not yet common practice. In the Venlo-Niederrhein region this can be observed when it comes to certification of diplomas of vocational education.

For the specific cross-border case of the Venlo-Niederrhein region, the above-mentioned differences can have a negative impact on the ability to develop a well functioning cross-border labour market in the horticulture. To be able to maintain a sufficient amount of well-trained employees, schools specialized in horticultural training look across the border for new supplies of students. The institutional gaps mentioned above form a barrier to cooperation on this important domain, despite of Interreg IVA projects that are developed in order to increase the attractiveness of studying in the neighbouring region across the border. The institutional gaps with respect to cross-border development of skills in horticulture are hard to fill because the regional actors have limited capacity to influence some parts of institutional architecture by themselves.

Role of energy in horticulture

Within horticulture there is a division between horticulturists who grow their crops in greenhouses and those who do so in open fields. The advantage of a greenhouse is that you can fully control the environment in terms of water, light and heat supplies. Moreover, you can monitor the environment in order to minimize the chance of crop diseases. This leads to a continuous, season independent supply of horticultural products, such as fruits, vegetables and trees. One of the disadvantages of using a greenhouse is the amount of energy that is needed to sustain the production system. For greenhouse horticulture, energy consumption is the main cost driver. The supply of cheap energy is therefore an important condition for greenhouse horticulturists to be competitive on the world market of horticultural products.

Differences in energy policy have lead to substantial differences in the evolution of the horticultural system on both sides of the border in Venlo-Niederrhein. These differences still influence the way actors in both regions deal with the energy issue nowadays.

Energy usage in Venlo

In the Netherlands, the discovery of large natural gas supplies facilitated a generous national energy policy. This led them to develop a policy in which the natural gas reserves were made available at low prices, especially for industrial use. This national level policy of low energy prices provided an incentive for Dutch greenhouse horticulturists to continue to build large greenhouse estates.

Energy usage in Niederrhein

Firms in Niederrhein also built large greenhouses prior to the first oil crisis in 1973. At that moment energy prices were low and it was attractive to grow crops in a controlled environment at only limited extra costs. However, after two consecutive oil crises energy prices were high. This forced firms to focus more on energy-extensive crops. They stopped growing certain crops that they cultivated before, such as ornamental horticulture, and focused on crops that were less dependent on greenhouse environments, such as heathers. Although they use greenhouses for some crops, German farmers only heat them for a limited amount of months during the year. Moreover, they have developed innovative ways of coping with their less favourable energy situation. For example, foils have been developed to grow lettuce. This way, it is able to retain the heat and to shelter plants from rain and ice, without building large and expensive greenhouses.

Institutional gaps

The differences in energy policy and use, have led to divergent production paths and methods in horticulture in Germany and the Netherlands respectively. The innovation activities have also adapted to this situation. Dutch firms focus on innovation of their greenhouses in terms of energy and production efficiency. German firms try to innovate in their open field production system, focusing on other types of innovation. This gap has been present for several decades, and the question is whether the cognitive distance between German and Dutch farmers in the same sector has become too high for effective cooperation to develop. Although actors on both sides of the border underscore the relevance of energy efficient innovations the coming years, their projects, technologies and innovations can be completely different. A complementary economic structure in the horticulture is therefore not a guarantee for synergetic effects of cooperation in this case.

Actor strategies to deal with institutional gaps

Although the energy usage in horticulture seems very different on both sides of the border, public and private actors do undertake several cross-border energy projects. This is the case because actors on both sides of the border share a common sense of urgency concerning the rising costs of energy. Public actors mostly try to bring firms together in order to start cross-border projects. Firms and knowledge institutes work together in several projects, of which the High Tech Greenhouse 2020 is the most ambitious project. Together, 5 knowledge institutes and 12 firms, located at both sides of the border, develop an innovative integrated greenhouse system. This requires different types of knowledge concerning water, light, surface and climate control. In practice, the Dutch and German partners work rather separated, but the project partners do in fact share knowledge on their findings.

In table 3, a summary is provided of the most important institutional gaps per theme in the horticultural case of Venlo-Niederrhein. The table also includes the role of agency, as actors try to overcome the problems that they encounter in cross-border cooperation.

	Innovation policy	Education	Energy
Institutional gaps	<ul style="list-style-type: none"> Horticulture is not part of the NRW innovation policy, while it has a prominent role in the Netherlands. Niederrhein does not have its own administrative and political body for innovation policy making. The Province of Limburg does and pursues an active role in developing the Venlo region Venlo region is a prioritized agrofood cluster in the Netherlands (Greenport status). Niederrhein is not a prioritized agricultural cluster in NRW. 	<ul style="list-style-type: none"> Cross-border cooperation in vocational training and the labour market is impeded by the fact that the education system is nationally governed in the Netherlands, and State governed in NRW. Accreditation for specific professions takes place by the Chambers of Commerce in Germany. In the Netherlands, the national Ministry of Education governs this. German vocational training is more oriented towards working and studying at the same time (dual system), while the Dutch vocational training is more theory oriented. 	<ul style="list-style-type: none"> National energy policy in the Netherlands has enabled greenhouse production advantages, thereby creating a competitive advantage in energy-intensive production methods in the horticulture. German actors have specialized in different products, production methods and innovation projects German actors experience subsidization of energy as a form of uneven competition.
Actor strategies to deal with institutional gaps	<ul style="list-style-type: none"> Interreg IVA projects are developed in order to come to a jointly developed innovation policy concerning horticulture. Policy makers in Niederrhein use the strength of the Venlo region to gain policy attention in their own state of NRW. 	<ul style="list-style-type: none"> Vocational training initiatives are being developed such as the ECVET and EQF whereby actors try to find solutions to institutional differences on a EU level. Student exchange projects are being undertaken, but problems with the acceptance of training certificates remains an impediment in the cross-border region and development of the joint horticultural ambitions. 	<ul style="list-style-type: none"> Energy efficiency is still of importance to both sides of the border, thereby creating a commonly felt sense of urgency and cooperation opportunities. Public and private partners work together to build an innovative integrated system for new greenhouse development with smart energy solutions.

Table 3: Institutional gaps and public and private strategies to deal with gaps (Source: authors' own composition).

Discussion and conclusions

The aim of this chapter is to identify institutional gaps that hamper the build-up of regularized knowledge interactions in the cross-border region, and the public and private strategies that actors develop in order to fill these gaps. We address the problem of limited cross-border cooperation on innovation. Despite being geographically proximate, innovation resources are rarely sought directly on the other side of the border. Our take on this problem is related to the institutional embeddedness of actors in the cross-border region. They operate in multiple networks on multiple levels and are therefore embedded in a multilevel institutional architecture (MLIA). The nation-state border separates actors, and MLIA's where actors are embedded in. The Venlo-Niederrhein region was used to explore the types of institutional gaps and the variety of public and private strategies of actors in a CBRIS.

Conclusions: institutional gaps and actor strategies in Venlo - Niederrhein

For innovation policy we have observed two gaps, being a difference in policy attention on supraregional levels and the problem of formal jurisdiction of regions. First, the state of NRW has an innovation strategy based on high tech innovation. In agriculture, this means that food processing is of interest, but not horticulture. The Dutch innovation policy facilitates development of the agricultural-logistic hub function of Venlo. Second, Niederrhein does not have formal jurisdiction, so the regional actors have to rely on innovation policy of several municipalities and the state of NRW. The public strategy in Niederrhein to overcome the gap is to use the strength of (Greenport) Venlo to gain more policy attention in their own system.

The development of a joint labour market and a cross-border skill set for horticulture reveal several gaps. Filling these gaps is perceived as a crucial element in developing a cross-border labour market in the horticultural sector of the cross-border region, due to expected future shortages on the labour market. Gaps arise due to divergent national and regional authorities concerning the certification of students in vocational training. Regional actors in the system cannot harmonize this part of the system, because it requires intervention on the level of nation-states and even the European level. Lobbying strategies and cross-border student mobility projects are undertaken, but they have a limited effect. The expectation is that the gaps in cross-border skill development in horticulture are hard to fill.

The pressure to reduce energy costs on both sides of the border suggests that private cross-border strategies could be developed to deal with increasing energy costs in horticulture. Institutional gaps are present and can be traced back to decisions made decades ago, which were based on the abundance of certain production factors such as gas. The availability of cheap gas for farmers in the Netherlands has made it possible to engage in an innovation driven path in greenhouse production systems. The German horticultural industry has specialized in other types of products, production methods and innovation paths, partly due to this competitive advantage for Dutch producers. Still, private actors and knowledge institutes try to develop cross-border innovation projects to learn from each other's production methods and energy efficient innovations.

Discussion: institutional gaps in MLIA

The perspective of institutional gaps in MLIA sheds light upon the mechanisms that lead to experienced difficulties in cross-border cooperation. Building upon this concept requires a deeper understanding of the types of institutional gaps, the levels where they are present in MLIA and the types of strategies that public and private actors undertake.

Institutional gaps can vary from formal to normative or cultural-cognitive gaps. Differences in regulative institutions are relatively simple to observe and identify. In the case study we observe that mainly regulative institutional gaps are present, due to different laws, regulations and policies on both sides of the border. Differences in normative or cultural-cognitive institutions are much more engrained within actors and therefore need more in-depth actor specific analysis. The origin of institutional gaps can vary in terms of the levels where these are relevant. In this case the nation-state and the federal state are very influential and dominant in the MLIA.

For regional actors, most regulative institutional gaps are difficult to fill themselves because decisions to change or create institutions are taken on higher levels in the multi-level system. The range of influence is limited to local or regional levels for both private and public actors. From an innovation policy perspective, German actors can use the Dutch side of the border to gain attention in their own RIS. But in the case of the cross-border skill development, the European level is needed to harmonize accreditation by creating new institutions. Adjusting or altering existing national level institutions contributes to small, incremental steps forward but for more radical change new institutions seem necessary.

Although actors do not always purposively try to bridge or close institutional gaps, except perhaps some public actors, their actions do. Cultural convergence can take place when repeated interaction leads to more mutual understanding. However, this mutual understanding does not automatically lead to strong cooperation. In the case of cooperation on the energy issue in greenhouses, German and Dutch partners share a sense of urgency related to energy innovations. However, because of the divergent energy usages in horticulture that developed over time, the Dutch and the German actors in projects still operate rather separated.

Contribution to the debate

Our contribution to the debate on regional innovation systems, and more specific cross-border regional innovation systems is twofold. First, we suggest that there can be forward and backward feedback loops, depending on the subject at hand. We follow up on the CBRIS concept of Lundquist & Trippel (2011), who identify three stylized stages of development of a CBRIS. We elaborate on this concept, by introducing feedback loops between the stages. CBRISs do not 'flip' from one stage to another, but can evolve positively or negatively, depending on the cooperation theme at hand. Different cooperation themes are facing different kinds of institutional gaps and solutions. Institutional gaps can be unstable, as willingness to cooperate can change over time on certain subjects, as can

the external regulatory environment. Thereby the evolution of a (CB)RIS can go forward, but there is the possibility of backward feedback loops should be acknowledged.

Second, the origins and solutions for these institutional can be found on multiple levels in the MLIA. The MLIA concept presented in this chapter shows that actors' behaviour is constrained and enabled through an intricate web of institutions that pertain to multiple levels. Therefore we cannot limit ourselves to an analysis that is merely focused on this cross-border regional envelope. The cross-border regional innovation system can be conceptualized as a MLIA which accommodates multiple multi-leveled networks (Rutten & Boekema, 2012).

The concept of institutional gaps and forward and backward feedback loops in the evolution of cross-border regional innovation systems raises new questions. In this chapter we focused on innovation policy, the labour market and business innovation. When analysing regional innovation systems, the role of actually innovating firms is crucial. And as institutions are still considered to be somewhat vague and residualized, we need to gain understanding of what type of institutions on what level matter for what type of knowledge relations a firm has during the innovation process.

References

- Asheim, B., Smith, H. L., & Oughton, C. (2011). Regional Innovation Systems: Theory, Empirics and Policy. *Regional Studies*, 45(7), 875–891. Retrieved from <http://www.tandfonline.com/doi/abs/10.1080/00343404.2011.596701>
- Asheim, B. T., & Gertler, M. S. (2006). The Geography of Innovation: Regional Innovation Systems. In J. Fagerberg, D. C. Mowery, & R. R. Nelson (Eds.), *The Oxford Handbook of Innovation* (pp. 291–317). Oxford University Press. doi:10.1093/oxfordhb/9780199286805.001.0001
- Bathelt, H., & Glückler, J. (2003). Toward a relational economic geography. *Journal of Economic Geography*, 3(2), 117–144.
- Blatter, J. (2004). 'From Spaces of Place' to 'Spaces of Flows?' Territorial and Functional Governance in Cross-border Regions in Europe and North America. *International Journal of Urban and Regional Research*, 28(3), 530–548.
- Boschma, R. (2005). Proximity and Innovation: A Critical Assessment. *Regional Studies*, 39(1), 61–74. doi:10.1080/0034340052000320887
- Boschma, R. A., & Frenken, K. (2006). Why is economic geography not an evolutionary science? Towards an evolutionary economic geography. *Journal of Economic Geography*, 6(3), 273–302.
- Boschma, R. A., & Frenken, K. (2009). Some notes on institutions in evolutionary economic geography. *Journal of Economic Geography*, 85(2), 151–158.
- Brainport. (2011). Brainport 2020.
- Busse, G. (2010). *Landenstudie secundair beroepsonderwijs: Duitsland* (pp. 1–27). Retrieved from http://www.kenniscentrum-ba.nl/doc/pdf/Landenstudie_Duitsland.pdf
- Busse, G., Berkhof, S., & Meijer, K. (2006). *Beroepsonderwijs in Duitsland* (pp. 1–22). Nijmegen. Retrieved from http://www.lerendeeuregio.com/media/7623/onderwijssysteem_duitsland_juni06.pdf
- Cooke, P. (2005). Regionally asymmetric knowledge capabilities and open innovation: Exploring 'Globalisation 2'—A new model of industry organisation. *Research policy*, 34(8), 1128–1149.
- Cumbers, A., MacKinnon, D., & McMaster, R. (2003). Institutions, Power and Space Assessing the Limits to Institutionalism in Economic Geography. *European urban and regional studies*, 10(4), 325–342.
- Doloreux, D., & Parto, S. (2005). Regional innovation systems: Current discourse and unresolved issues. *Technology in Society*, 27(2), 133–153. Retrieved from <http://linkinghub.elsevier.com/retrieve/pii/S0160791X05000035>
- Edquist, C. (2006). Systems of Innovation: Perspectives and Challenges. In J. Fagerberg, D. C. Mowery, & R. R. Nelson (Eds.), *The Oxford Handbook of Innovation* (pp. 181 – 208). Oxford University Press. doi:10.1093/oxfordhb/9780199286805.001.0001
- Genschel, P. (1997). The Dynamics of Inertia: Institutional Persistence and Change in Telecommunications and Health Care. *Governance*, 10(1), 43–66. doi:10.1111/0952-1895.281996028
- Gertler, M. S. (2004). *Manufacturing Culture : The Institutional Geography of Industrial Practice: The Institutional Geography of Industrial Practice*. OUP Oxford.
- Gertler, M. S. (2010). Rules of the Game: The Place of Institutions in Regional Economic Change.

Regional Studies, 44(1), 1–15. doi:10.1080/00343400903389979

- Hansen, P. A., & Serin, G. (2010). Rescaling or Institutional Flexibility? The Experience of the Cross-border Øresund Region. *Regional & Federal Studies*, 20(2), 201–227. doi:10.1080/13597561003731646
- Haselsberger, B., & Benneworth, P. (2011). Cross-border communities or cross-border proximity? Perspectives from the Austrian- Slovakian border region. In N. Adams, G. cotella, & R. nunes (Eds.), *Territorial Development, Cohesion and Spatial Planning: Building on EU Enlargement* (pp. 229–254). Taylor & Francis.
- Klatt, M., & Herrmann, H. (2011). Half Empty or Half Full? Over 30 Years of Regional Cross-Border Cooperation Within the EU: Experiences at the Dutch–German and Danish–German Border. *Journal of Borderlands Studies*, 26(1), 65–87. doi:10.1080/08865655.2011.590289
- Koschatzky, K., & Kroll, H. (2009). Multi-level governance in regional innovation systems. *Ekonomiaz*, 70, 44–59.
- Lofgren, O. (2008). Regionauts: the Transformation of Cross-Border Regions in Scandinavia. *European Urban and Regional Studies*, 15(3), 195–209. doi:10.1177/0969776408090418
- Lundquist, K.-J., & Tripl, M. (2011). Distance, Proximity and Types of Cross-border Innovation Systems: A Conceptual Analysis. *Regional Studies*, 1–11. doi:10.1080/00343404.2011.560933
- Mattes, J. (2012). Dimensions of Proximity and Knowledge Bases: Innovation between Spatial and Non-spatial Factors. *Regional Studies*, 46(8), 1085–1099. doi:10.1080/00343404.2011.552493
- Moodysson, J., & Zukauskaitė, E. (2012). Institutional Conditions and Innovation Systems: On the Impact of Regional Policy on Firms in Different Sectors. *Regional Studies*, 1–12. doi:10.1080/00343404.2011.649004
- Ministerie van Economische Zaken (2011) *Naar de top: De hoofdlijnen van het nieuwe bedrijfslevenbeleid. Naar de top: De hoofdlijnen van het nieuwe bedrijfslevenbeleid* (pp. 1–16).
- North, D. C. (1990). *Institutions, institutional change and economic performance*. Cambridge: Cambridge University Press.
- Rafiqui, P. S. (2008). Evolving economic landscapes: why new institutional economics matters for economic geography. *Journal of Economic Geography*, 9(3), 329–353. Retrieved from <http://joeg.oxfordjournals.org/cgi/doi/10.1093/jeg/lbn050>
- Revilla Diez, J., & Kiese, M. (2009). Regional innovation systems. *International Encyclopedia of Human Geography*. Amsterdam Elsevier.
- Rodríguez-Pose, A. (2013). Do Institutions Matter for Regional Development? *Regional Studies*, 1–14. Retrieved from <http://www.tandfonline.com/doi/abs/10.1080/00343404.2012.748978>
- Rutten, R., & Boekema, F. (2012). From Learning Region to Learning in a Socio-spatial Context. *Regional Studies*, 46(8), 981–992. Retrieved from <http://www.tandfonline.com/doi/abs/10.1080/00343404.2012.712679>
- Scott, W. R. (2001). *Institutions and organizations* (2nd ed.). Thousand Oaks, California: Sage Publications.
- Asheim, B., Smith, H. L., & Oughton, C. (2011). Regional Innovation Systems: Theory, Empirics and Policy. *Regional Studies*, 45(7), 875–891. Retrieved from <http://www.tandfonline.com/doi/abs/10.1080/00343404.2011.596701>

- Asheim, B. T., & Gertler, M. S. (2006). The Geography of Innovation: Regional Innovation Systems. In J. Fagerberg, D. C. Mowery, & R. R. Nelson (Eds.), *The Oxford Handbook of Innovation* (pp. 291–317). Oxford University Press. doi:10.1093/oxfordhb/9780199286805.001.0001
- Bathelt, H., & Glückler, J. (2003). Toward a relational economic geography. *Journal of Economic Geography*, 3(2), 117–144.
- Bathelt, H., Malmberg, A., & Maskell, P. (2004). Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation. *Progress in Human Geography*, 28(1), 31–56. Retrieved from <http://phg.sagepub.com/cgi/doi/10.1191/0309132504ph469oa>
- Berenschot. (2012). *Gebiedsopgave Greenport Venlo*.
- Cumbers, A., MacKinnon, D., & McMaster, R. (2003). Institutions, Power and Space Assessing the Limits to Institutionalism in Economic Geography. *European urban and regional studies*, 10(4), 325–342.
- E'til. (2012). *De toekomstige arbeidsmarkt van Greenport Venlo*.
- Edquist, C. (2006). Systems of Innovation: Perspectives and Challenges. In J. Fagerberg, D. C. Mowery, & R. R. Nelson (Eds.), *The Oxford Handbook of Innovation* (pp. 181 – 208). Oxford University Press. doi:10.1093/oxfordhb/9780199286805.001.0001
- Genschel, P. (1997). The Dynamics of Inertia: Institutional Persistence and Change in Telecommunications and Health Care. *Governance*, 10(1), 43–66. Retrieved from <http://dx.doi.org/10.1111/0952-1895.281996028>
- Gertler, M. S. (2010). Rules of the Game: The Place of Institutions in Regional Economic Change. *Regional Studies*, 44(1), 1–15. Retrieved from <http://www.tandfonline.com/doi/abs/10.1080/00343400903389979>
- Hansen, P. A., & Serin, G. (2010). Rescaling or Institutional Flexibility? The Experience of the Cross-border Øresund Region. *Regional & Federal Studies*, 20(2), 201–227. Retrieved from <http://www.tandfonline.com/doi/abs/10.1080/13597561003731646>
- Hansen, T. (2013). Bridging regional innovation: cross-border collaboration in the Øresund Region. *Geografisk Tidsskrift-Danish Journal of Geography*, 113(1), 25–38. doi:10.1080/00167223.2013.781306
- Lundquist, K.-J., & Tripl, M. (2011). Distance, Proximity and Types of Cross-border Innovation Systems: A Conceptual Analysis. *Regional Studies*, 1–11. Retrieved from <http://www.tandfonline.com/doi/abs/10.1080/00343404.2011.560933>
- Ministerie van Infrastructuur en Milieu. (2012). *Structuurvisie Infrastructuur en Ruimte (SVIR)*.
- North, D. C. (1990). *Institutions, institutional change and economic performance*. Cambridge: Cambridge University Press.
- Revilla Diez, J., & Kiese, M. (2009). Regional innovation systems. In *International Encyclopedia of Human Geography*. Amsterdam Elsevier.
- Rodríguez-Pose, A. (2013). Do Institutions Matter for Regional Development? *Regional Studies*, 1–14. Retrieved from <http://www.tandfonline.com/doi/abs/10.1080/00343404.2012.748978>
- Rutten, R., & Boekema, F. (2012). From Learning Region to Learning in a Socio-spatial Context. *Regional Studies*, 46(8), 981–992. Retrieved from <http://www.tandfonline.com/doi/abs/10.1080/00343404.2012.712679>

- Scott, W. R. (2001). *Institutions and Organizations*. SAGE Publications. Retrieved from <http://books.google.nl/books?id=kpDUHoaNhqYC>
- Stehnken, T. (2010). The German Innovation System at a Glance: Governance and Strategies (pp. 1–30). Presented at the Workshop between Inmetro, ABDI and Fhg: „Innovation and Opportunities for Cooperative Projects Brazil – Germany“, Rio de Janeiro, 19./20. August 2010.
- Torre, A. (2008). On the Role Played by Temporary Geographical Proximity in Knowledge Transmission. *Regional Studies*, 42(6), 869–889. doi:10.1080/00343400801922814
- Trippl, M. (2010). Developing Cross-border Regional Innovation Systems: Key factors and Challenges. *Tijdschrift Voor Economische en Sociale Geografie*, 101(2), 150–160. doi:10.1111/j.1467-9663.2009.00522.x