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Innovation and SMEs in Interreg policy: too early to move beyond bike lanes?

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ABSTRACT

Since 1989 the European Commission's policy on border regions has slowly shifted focus. Current Interreg policy is increasingly focused upon innovation and cooperation between SMEs. In this paper we question whether this emphasis on firms and innovation neglects the build-up of other kinds of activities and institutions antecedent to effective firm innovation cooperation. We argue that antecedent developments should occur prior to stimulating innovation cooperation between firms, highlighting that building effective environments for regional innovation in cross-border regions encompasses four qualitatively different micro scale phases of development, each requiring qualitatively different policy measures. This four-phase model is applied to a case study of a Dutch-Flemish Interreg programme, using documentary material, a policy-maker survey and a documentary analysis of funded projects to explore incoherences between strategy and reality. We highlight a gap between the strategy's strong *ex ante* focus upon innovation, policy-maker perceptions of necessary improvements, and the projects selected for funding.

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Innovation; borders; policy; SMEs; Interreg; CBRIS

1. Introduction

Since 1989, the European Commission (EC) has provided increasing funding to stimulate cooperation in cross-border regions, culminating in a budget of more than €10bn (2014–2020). As funding of the so-called Interreg programme has increased, there has been a shift in priorities, with the latest programming period seeing a prioritization of innovation, and in particularly collaboration between SMEs and knowledge institutes. This emergence of cross-border funding programmes came at a time that innovation became more important in regional economic policies more generally (McCann and Ortega-Argilés, 2013), and the fact that Interreg since 2007 has prioritized innovation reflects this growing importance of innovation to regional development policy more generally. However, all this interest for cross-border innovation has not addressed what is arguably the most interesting dimension, namely how the border works to affect collaborative innovation processes.

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This is important precisely because innovation involves cooperation between companies and between knowledge institutes and companies to exchange knowledge resources, and regional innovation policies have sought to encourage cooperation between neighbouring firms and knowledge institutions. But Interreg ignores the effects of the border on various forms of co-operation, which build up commonly shared institutions in cross-border spaces as an antecedent to particular thematic co-operations. These institutions, often “fuzzy” and “informal” allow partners to deal with the respective pressures and restrictions emerging in their own national environments and facilitate this international exchange. These institutions involve building up trust to overcome the uncertainty and risk posed by co-operating with partners in other legal and economic systems. We contend that such antecedent institutional developments are necessary prior to effective inter-firm innovation cooperation can be stimulated.

We argue that building effective environments for regional innovation in cross-border regions can be regarded as encompassing four qualitatively different micro scale phases of development, each requiring qualitatively different policy measures. We compare this to the construction of bike lanes using Interreg funding, which is often seen as an example of what Interreg policies should move beyond. Building cross-border bike lanes is about more than increasing cross-border cycling, it lays the foundations for more effective cross-border cooperation by allowing the mass accrual of familiarity of what lies over the border. Therefore, we question whether an integrated innovation system (akin to a cross-border transport system) can be built when there are only a limited amount of innovation connections (the hypothetical bike lanes of the title of our paper). We, therefore, ask the question: how could a coherent policy approach building up cross-border innovation capacity accounting for these four qualitatively different micro scale processes?

Empirically we explore this issue in the Flemish-Dutch border region by first critically assessing its innovation-based strategy, using recent studies on the region. Second, we conducted a short survey among policymakers in the cross-border area, to assess their perception of hindrances and policy goals. Third, we confront the strategy and perceptions with the reality of the funded projects. This empirical work provides the basis for a more general discussion on the contribution of Interreg to cross-border regional innovation. From this, we distil a number of lessons for policymakers seeking to support cross-border firm innovation and contribute to a flourishing cross-border innovation environment.

2. The development of interreg policy

The European Commission (EC) played an important role in the development of cross-border cooperation in Europe, and the establishment of the Interreg policies from 1991 accelerated this process. As Prokkola noted, “... cooperation within the Interreg framework is often considered to be a concrete manifestation of cross-border regionalization in the EU area” (Prokkola, 2011, 1191). Cross-border cooperation does not exclusively take place within Interreg programmes, and there are other kinds of policy efforts to stimulate cross-border cooperation, including the European Groupings for Territorial Cooperation that have sought to consolidate more bottom-up efforts for collaborations that date back to the 1950s (Klatt and Herrmann, 2011; Perkmann, 2007; Caesar 2017). The EC intended that Interreg would enable and accelerate cross-border cooperation until the point that

that co-operation achieved a self-sustaining internal dynamic. That point has not yet been reached, and Interreg remains for most regions the dominant policy framework for cross-border collaboration, and exploring the innovation theme in Interreg provides a reasonable proxy for understanding cross-border innovation policy.

Since the third programming round, Interreg has been differentiated into three strands, referred to as “A”, “B” and “C”. The “A-programmes” are directed at cross-border cooperation between regions with contiguous borders, for example, the Flemish–Dutch and Dutch–German Interreg programmes. The “B-programmes” aim at transnational cooperation between nations sharing a border; an example is the North-West Europe (NWE) program comprising Belgium, France, Germany, Ireland, Luxembourg, The Netherlands, Switzerland and the United Kingdom. There is only one “C-program”, called Interreg Europe from 2014 onwards, targeting the whole of the European Union. As the focus of this paper is on regions with contiguous borders, we hereafter use Interreg to refer to Interreg A programmes. We are therefore interested in the way that Interreg programmes have sought to encourage small and medium-sized enterprises to cooperate across borders in their research development and technological innovation (RDTI) activities, something which has slowly emerged over the first four Interreg programming rounds.¹

2.1. Interreg programmes

Interreg was introduced in 1991 following on from 14 experimental pilot projects that were launched in 1989 directed specifically at cross-border issues (and therefore along with the Regional Technology Programmes emerged as one of the most successful of the experiments to come out of the 1989 reforms). The first two rounds of Interreg were very much experimental in their approach and sought to identify what kinds of cross-border co-operation might be possible rather than seeking to stimulate a normatively selected set of best-practice approaches. Interreg I programmes focused their investments around cross-border infrastructure, tourism and environment to stimulate co-operation between regions. Although the programmes sought to fund SMEs, in practice little was realized and innovation was almost entirely absent. Within the programmes innovation was not an issue, and the actual support to SMEs in terms of projects and funding, although named as a goal, was very limited. Interreg II (1994–1999), provided for all EU border regions to be eligible for funding, and this programming period again emphasized cross-border co-operation around tourism, culture, media and environment as an end in itself. What was distinct was that the support of SMEs and the promotion of innovation were explicitly named, albeit as desirable outcomes from activities (INTERACT, 2010; Panteia, 2009).

Interreg III (2000–2006) marked a transition period for cross-border co-operation, as the 2000 structural fund reforms saw cross-border co-operation become an established funding programme. Interreg III was directed at a broad set of topics, with no clear focus in the program and allowing regions considerable freedom in their selection and programming of initiatives. There was some formal attention paid to SMEs and RDTI with 28% of the budget allocated to the “development of business spirit and SMEs, tourism and local development / employment initiatives” and 17% of the budget to “R&D, education, culture, communications, health and civil protection” (European

Commission, 2010). This suggested that there was an awareness of the importance of SME RTDI activities as a desirable policy target but the breadth of categories supported suggests in turn that there was little attention for specifically addressing problems faced by SMEs in pursuing cross-border RTDI activities. Interreg IV (2007–2013) programmes clearly bore the hallmark of Europe’s twin agendas for innovation as a driver of economic and social cohesion, namely the Lisbon and Gothenburg agenda’s. Specifically, 21% of Interreg IV’s budget was allocated to “improving knowledge and innovation for growth” (European Commission, 2015) although in practice, the 2007–2013 programmes lacked focus and fragmented funding over a broad range of topics.

In the current (at the time of writing) structural funds funding period 2014–2020, all structural funds became more concentrated, which also applied to Interreg. For the more advanced European economies this meant focusing investments on RTDI and SMEs. Most Interreg V programmes, at least in Western Europe, were strongly directed at innovation and with a larger total budget than in the preceding rounds. Although this focus on innovation follows the increasing policy attention for stimulating innovation, this focus, concentration and funding in Interreg V represented in practice a considerable shift in focus.

2.2. The importance of building bike lanes real and metaphorical

Stimulating a more integrated cross-border innovation environment consisting of multiple interactions is a complex and lengthy policy process. Inter-firm connections build up slowly over time as does policy expertise in operating in a cross-border environment. In other policy domains, there was a natural sequencing of activities as connections built-up, with initial efforts on creating infrastructures for cross-border interaction, before then mobilizing these communities across the border to utilise these infrastructures. Firstly, cross-border cycle routes had to be planned, then lanes had to be built, and shared bike-path way-marking systems developed, before it made sense to stimulate cross-border cycling tourism. Then once people are accustomed to crossing the border, and arrange their lives around a cross-border living/ working space, investments in trunk infrastructures become sensible. By taking intermediate steps, policy-makers learn how to work with their counterparts on simple issues, experience that is vital in delivering larger-scale later outcomes (Uyarra, 2009). Where this sequenced approach has not been taken, one sees that impressive but unused infrastructure emerges, such as the “bridges to nowhere” popularized by Wikipedia linking across borders that no-one meaningfully seeks to cross. Interreg programmes have corresponded with these sequential steps, creating small-scale antecedent infrastructures, mobilizing a first round of interactions, then using those interactions to justify more intensive infrastructures.

SME innovation policy in Interreg emerged relatively late in the process, and there has been an emphasis on mobilizing activities before infrastructures have been built. What has been absent in the rush to encourage SME cross-border co-operation has been consideration of the intermediate steps between the few “bike lanes” that exist and the ultimate goal of systemic integration. If the construction of physically integrated mobility systems that shaped people’s lives was the goal of Interreg in the 1990s, then the goals of the 2010s involve building institutionally integrated innovation systems that shape innovative SMEs RDTI practices. What is not clear in this process are the antecedent steps that are

necessary in order to ensure the necessary infrastructure development and policy learning that is antecedent to simulating that SME interaction.

3. Understanding cross-border innovation as network-building

The need for cross-border innovation policy stems from a particular characteristic of innovation in border regions, where the border acts to continually undermine collaboration activity, and yet despite this, there have been relatively few studies to date of cross-border innovation (Hansen, 2013). Innovating firms use knowledge to drive innovation, and co-operation is important to access external knowledge that firms do not possess internally (Hassink and Klaerding, 2012; Knoblen and Oerlemans, 2012). In co-operating, firms make a trade-off between the dependency risks of using external knowledge alongside the high costs of acquiring knowledge internally in the context of innovation processes where speed is an important determinant of success or failure (Barney and Clark, 2007; Fagerberg, 2006; Marshall, McIvor, and Lamming, 2007). Co-operation allows firms to extend their networks by building relationships with their partners contacts (Burt, 1992; Granovetter, 1973). Accessing resources is a costly and time-consuming process, as you need to have knowledge of possible cooperation partners and need to assess the usefulness of their knowledge and competences for your innovation problem.

But in border regions, the institutional disjunctures in terms of juridical systems, funding regimes, engineering standards and even business manners increase the uncertainties (and risks) associated with cross-border co-operation. These costs increase when a firm lacks network connections, which inhibits both the search process and the information sources to assess the other firms' competences. Cross-border co-operation for innovation therefore only takes place when the costs of accessing the knowledge internally are so high or the knowledge is otherwise unavailable that that collaboration is inevitable (Klatt and Herrmann, 2011; Stensheim, 2012). However, regular interactions across the border can reduce these opportunity costs as knowledge and connections build up, as well as second-order connections (partner's connections), leading to a generally higher level of connectivity.

This higher level of interaction regularizing connections that in turn facilitate future interactions can be understood in terms of the Cross-Border Regional Innovation Systems concept (CBRIS). This CBRIS model of Lundquist and Trippel (2013) takes a meso-level approach on the development of CBRISs, developing from weakly integrated, via semi-integrated to a fully integrated CBRIS. The existing models of CBRIS (Lundquist and Trippel, 2013; Trippel, 2010; Trippel 2018) do not explain at a micro-level how connections build up and then acquire network then systemic properties such a process unfolds by making it easier for other firms to access cross-border knowledge resources. In a previous paper (Van den Broek, Benneworth, and Rutten, 2018) we distinguished, following Van Houtum (1998) and Koen (2011), Marxt and Link (2002), four qualitatively different phases in the way that cross-border co-operations build up, namely initiation, partner selection, set-up and execution.²



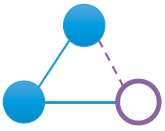
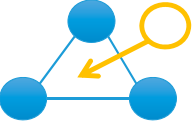
The first phase is the initiation or pre-cooperation phase where firms make the decision about whether or not to collaborate for innovation, assessing the possibilities to acquire the required knowledge resources via collaboration, or for example, hiring new employees or commissioning consultants that are needed. Collaboration is then one of the options,

next to amongst others hiring new employees or seeking advice from consultants. In considering collaboration, the issue of likely partners may be included as a positive, and a lack of knowledge about potential cross-border partners may reduce the likelihood of cooperation (Leick, 2012) via (unintended) cognitive neglect of the other side of the border (Van Houtum and van der Velde, 2004). The second phase for firms that decide to collaborate is partner selection and execution, where suitable partners are sought and arrangements made or co-operation; firms; first cross-border co-operation is often a question of dealing with uncertainty, whilst for more experienced firms, the border issue becomes less germane (Van den Broek, Benneworth, and Rutten, 2018). In the third phase, bilateral cooperation starts acquiring network properties; a fourth and final stage would be for these networks to acquire systemic properties and cohere around shared collective innovation assets emerges. Table 1 set out on a phase-wise basis the nature of the activity, actors involved and the underlying interaction process.

4. Development phases in cross-border innovation

As depicted in Table 1, each phase in our model of the build-up of co-operation involves a different underlying process, and these processes each have distinctive characteristics. Effectively targeting firms in the cross-border regions to become more co-operative therefore involves not merely encouraging co-operation but also encouraging qualitatively different kinds of activities with different motivations, dynamics, incentives and barriers.

Table 1. Four phases of cross-border collaboration for innovation.

Phase	Nature of activity	Actors involved	Process	Literature
I. Pre-cooperation	Individual 	<ul style="list-style-type: none"> Individual deliberation 	Threshold of indifference	<ul style="list-style-type: none"> Van Houtum and van der Velde (2004)
II. Bilateral cooperation	Dyad 	<ul style="list-style-type: none"> Two actors on both sides of the border 	Structural separation	<ul style="list-style-type: none"> Van Houtum (1998) Marx and Link (2002) Koen (2011) Malecki (2012)
III. Network cooperation	Network 	<ul style="list-style-type: none"> Different dyadic relations Possibility to access knowledge from the actor, without direct connection 	Proximity and tacit knowledge exchange	<ul style="list-style-type: none"> Casper (2007) Gluckler (2007)
IV. Systemic cooperation	Collective assets 	<ul style="list-style-type: none"> The pool of collective assets Accessible without prior connection with the network 	Knowledge spillover	<ul style="list-style-type: none"> Trippel (2010) Lundquist and Trippel (2013) Perkmann (2007)

In an ideal type cross-border regional innovation system, there will be activity in all areas, and policy could realistically target all four activities directly. However, following our previously identified principle of sequencing for cross-border activity, we can see that to promote the later phases of development activity without the underlying infrastructures of bilateral co-operation is the equivalent of the cross-border “bridge to nowhere”. This section sets out the underlying process dominant at each phase in the sequence linking it with appropriate policy interventions to encourage the desired co-operative activity.

4.1 Pre-cooperation phase

The key problem in the pre-cooperation phase is that firms considering cooperating need a firm to solve a particular knowledge deficit, and do not know of suitable firms across the border which in turn reduces the likelihood that they will consider cross-border working. There is, therefore, a mismatch between the potential opportunities that exist across the border and the firms’ knowledge of those opportunities. This can be understood in terms of the concept of “threshold of indifference” developed by Van Houtum and Van der Velde (2004) who used it to describe individual disdain for working across the border, identifying that there can be a “habitualised indifference towards the ‘other side’, the ‘market’ across the border” (105). It is this “habitualised indifference” that firms here seem to demonstrate in their unwillingness to consider establishing cross-border innovation connections.

The border here has two effects. Firstly, it continually undermines developing new connections across the border because of the lack of a critical mass of connections which allow contacts to be secured through existing networks (Van den Broek, Benneworth, and Rutten, 2018). Second, there is a rationally bounding effect (Van den Broek, Benneworth, and Rutten, 2018) undermines firms perceiving potential cooperation partners over the border. Policies to address the threshold of indifference therefore need to address these disincentives to co-operate. Typical policy measures in this phase are related to providing information about the possibilities and potential benefits of cross-border co-operation, cross-border innovation advisory services, and organizing business trips (OECD, 2013). The availability of funding can be an incentive for firms to start considering working cross-border.

4.2 Bilateral cooperation phase

This phase involves establishing work routines and then sharing knowledge with partners across the border, focusing on firms searching for resources that are not found within their existing contact networks in pursuit of necessary novel insights, knowledge or technology. Once the decision has been made to search for cooperation across the border, the majority of firms, especially SMEs, lack connections with other firms, knowledge institutes and regional development agencies across the border. This hinders their ability to connect with collaboration partners, and effectively transfer knowledge (Van Houtum, 1998). We here distinguish two kinds of effect that emerge, namely network breaking and structural separation. The first is that there is no mutual self-reinforcement of cross-border connections in existing networks – a “dead-end” effect or network breaking effect; every new connection starts from the basis of being built locally and therefore it is difficult to

derive critical mass from these activities. The second is that activities typically proceed in a way that can be expressed as “working together apart”, two parallel sets of activities that occasionally interact rather than the creation of a simple knowledge creation and innovation community between the companies; we refer to this as a structural separation problem (Van den Broek, Benneworth, and Rutten, 2018).

If policymakers want to help firms find the relevant knowledge resources over the border and exploit these collaborations to drive local knowledge accumulation, policy measures need to address network breaking and structural separation effects. The dead-ending/ network breaking effect could be addressed by setting up cross-border networks; general or industry-specific, or subsidizing cross-border innovation cooperation. The structural separation effect emerges as partners handle the uncertainties and risks associated with working with a (cross-border) partner. Typical measures aim at building trust and limiting the risks of the cooperation, then as trust gradually builds-up, interactions can be increased in their complexity to create multiple activities, for example, by coaching SMEs on differences in business culture and helping them to cope with differences in regulations.

4.3 Network cooperation phase

The third phase in the development of a cross-border innovation environment comes when a set of separate dyadic relations between firms concatenate into a network of relations across the border that helps to convert “*latent demand for collaboration into actual cooperation*” (Kroll, Dornbusch, and Schnabl, 2015, 6). Network formation is an emergent property of cooperating actors where actors can connect with their contacts connections through signposting from their known contacts, allowing them to access knowledge much more easily (Casper, 2007). In this phase, the border may lead to the development of structural holes in these networks with many connections within a border and few cross-border connections (Glückler, 2007), reducing the networks’ overall efficiency for building a connection between hitherto unknown actors.

Given these structural gaps, the question is what kinds of policy measures are possible to facilitate the step from bilateral relationships to networks. Policy action could range from actively linking firms with each other and setting-up university-industry networks, opening up traditional networks or link firms to knowledge sources (Tödtling and Trippl, 2005). These policies could be operationalized through measures such as organizing network events, setting up joint projects, search for partners and establishing network organizations. In establishing cross-border networks, established dyads may serve as a bridge, allowing the development of more connections eventually leading to more direct cross border interactions. These connections may, in turn, have a reinvigoration activity on moribund regional networks if they find themselves unable to access suitable knowledge, leading to their decline.

4.4 Systemic cooperation phase

The fourth phase involves the systematization and routinization of these networks into what can be regarded as regional systemic properties, with as a result the situation where working across the border is regarded as normal, with SMEs working with

collaborations on both sides of the border in their RTDI activities. The extant RIS literature highlights the importance of the development of a stable set of institutional governance arrangements. It is therefore perhaps unsurprising that the most significant barriers in the evolution from the network phase to this systemic phase are in the governance domain (Lundquist and Trippel, 2013). To develop a cross-border innovation strategy requires for policymakers on both sides of the border to engage in policy entrepreneurship and to call into being institutional arrangements often in the absence of the formal competence for this to occur (Perkmann, 2007).

Policy measures in this phase are about actively constructing and strengthening cross-border institutions, something that can be regarded as other words thickening the institutional environment (Asheim, Moodysson, and Tödtling, 2011). Examples of such institutions are cross-border innovation platforms, cross-border knowledge exchange organizations, cross-border educational cooperation or facility sharing in the border region. These might be new organizations or a cooperation of existing organizations. The defining feature of these organizations is that they are geared towards the strengthening of the border region as a whole. This institutionalization may be complicated by the fact that the relevant authorities may have different competencies for innovation across the border (or indeed no innovation competence) further complicating the development of these institutional arrangements. In border regions this institutional environment might be present or absent in both regions, or present in one region and absent in the other.

4.5 Towards a sequential model of cross-border innovation policy

This section sets out a sequential model identifying four stylized phases for the institutionalization of cross-border regional innovation systems and the appropriate policy interventions to deliver this, summarized in Table 2. What this process model allows is to make a diagnosis of cross-border regional innovation approaches in terms of the implied problems that the policy measures are attempting to solve. This, in turn, can be compared with the actual situation in terms of innovative actor behaviour in order to understand whether the policy framework is attempting to solve the issues that are typically faced by firms at that level of integration, or whether there is here a mismatch. In effect, it provides us with a lens to look at a cross-border regional innovation strategy and ask whether the policy makers are indeed building bike-lanes (antecedent steps to cooperation) or whether they are risking building these “bridges to nowhere”.

5. Methods and research context

5.1 Methods

To explore the utility of our diagnostic tool, we apply it to the Interreg IV program in the Flemish-Dutch border region. The empirical research takes a three-step approach, firstly looking at the strategy and how this fits the regional needs. We then as our second step consider specifically how regional policymakers on both sides of the border have perceived the regions’ needs the accompanying policy goals to understand how the strategy is interpreted. Here we focus explicitly on the policy and policymakers, the focus group of the policy, SMEs, was part of an earlier research project (Van den Broek, Benneworth, and

Table 2. Possible policy interventions per phase.

Phases	Characteristics	Possible policy interventions
Pre cooperation	<ul style="list-style-type: none"> Firms do not consider working cross-border 'Threshold of indifference' (Van Houtum and van der Velde 2004) Not crossing the border, despite availability and access. The decision to cooperate is embedded in set of other decisions concerning the innovation. 	<ul style="list-style-type: none"> Coaching/mentoring about possibilities of cooperation Pilots/experiments of working cross-border
Bilateral cooperation	<ul style="list-style-type: none"> Need to establish connections across the border If wanting to cooperate cross-border, firms in general lack networks across the border (Leick 2012) Especially when comes to innovation and new partners are needed 	<ul style="list-style-type: none"> Boundary spanners connecting networks, can be RDAs Subsidy scheme stimulating cross-border cooperation Coaching on differences in business culture Assistance in coping with different rules and regulations.
Network cooperation	<ul style="list-style-type: none"> One off projects to become more regularized interactions Contact with one partner, does not constitute a network Firms can only have a limited amount of network ties and past ties influence new ties (Gluckler 2007) Nationally bound networks of firms influence the built-up of new ties, and can lead to national lock-in 	<ul style="list-style-type: none"> Organizing network events Setting up joint projects and (network) organizations
Systemic cooperation	<ul style="list-style-type: none"> When there are CB networks and clusters in place, time might be right to move to a more systemic whole Stable set of institutional and governance arrangements. 	<ul style="list-style-type: none"> Developing joint CB innovation strategy Setting up a CB innovation platform

Rutten, 2018).³ The last step consists of looking at how the strategy is implemented in the concrete funding of projects.

We analyse the strategy of the Interreg program on the basis of desk research of policy documents and grey literature. To identify policymakers' perceptions, we conducted a short questionnaire among the policymakers of the INTERREG FL-NL programme; the total number of policy makers was relatively low (14 including the INTERREG secretariat) and we asked all to participate, eventually receiving a response rate of 70%, thereby limiting the error margin (Fowler Jr, 2013).⁴ However, given the small size of the sample (and the underlying population), we have not undertaken any statistical tests, and rather use the survey descriptively-numerically to try to enumerate in some way the policy-makers' perceptions regarding what is necessary to improve the cross-border innovation environment. The small sample size leads us to be cautious when interpreting the results as there is a risk of specious specificity on the basis of this approximate information.

We asked the policymakers two questions: (1) what do you think are the main hindrances cross-border cooperation for innovation, and (2) what are, according to you, the main goals of cross-border innovation policy through the INTERREG programme? For both questions, we constructed three to four statements per phase of our conceptual model (pre-cooperation, bilateral cooperation, network cooperation and systemic cooperation). Then we randomized these statements into one list of statements for both questions. The policymakers were asked to state on a five-point Likert scale (1 = totally disagree, 5 = totally agree) on the extent to which they agreed with that statement. They were asked for both questions to indicate which three statements of all the statements presented

under that question they considered as most important. After completion, we grouped the randomized statements again alongside the four phases to see where the most important barriers and policy goals are according to the policymakers. Questions were asked in Dutch (the language of the policy communities on both side of the border), and a translation is provided in Appendix. To analyse how the strategy became implemented into concrete projects we analysed the list of funded projects on the website of the programme (www.grensregio.eu). We firstly selected the projects that focused on innovation then categorized each of these sixteen projects using our conceptual model to derive a picture of the relative balance between policies oriented towards addressing problems in each of the four phases.

5.2 Characterizing the Flemish – Dutch border region

There are two important reasons why this programme in this border region provides an interesting case study. First, the Flemish –Dutch border region is a non-typical border region. On both sides of the border people speak the same language, albeit in different dialects, there is a long history of cooperation and formal border controls were fully removed in the early 1960s. Secondly it is also atypical because of its relative economic growth and prosperity, with all of the regions being relatively innovative; as measured through the EU's regional innovation scoreboard, all its subregions are characterized as innovation followers, excepting the province of North Brabant in the Netherlands, which is an innovation leader (European Commission, 2014).

Although the participating regions can be seen individually as strong, innovative economies, this has not translated across to representing a strong, innovative border region. The OECD (2013) undertook an analysis of six border regions in 2013, and identified this border region as being one of the most developed in terms of innovation co-operation. The main strength of the region identified by the (2013, 222) lay in its “*significant innovation and research assets and strong innovation performance*”, “*similarities in areas of technology specialization*” and “*active collaboration (...) in different science parks and campuses*”. However, the OECD also pointed to a number of weaknesses in the coherence of the cross-border region, highlighting “insufficient awareness of potential across borders, especially for SMEs”, a “weak institutionalisation and unbalanced political commitment” and “limited cross-border funding” (almost entirely based on public funding, mostly through Interreg programmes).

The PBL Netherlands Environmental Assessment Agency (Weterings and Van Gessel-Dabekaussen, 2015) assesses that the total commuting is less than 5% of the potential based on the opportunities on both sides of the border, something that contributes to a high threshold of indifference across the border. Only 14.800 Belgians live in Belgium and work in the Netherlands, and 4.800 Dutch people work in Belgium, whilst living in the Netherlands (Weterings and Van Gessel-Dabekaussen, 2015).⁵ Moreover, a recent study (Van den Broek, Bennenworth, and Rutten, 2018) observed only a limited number of SMEs collaborating across the border for innovation, the firms experiencing persistent difficulties in finding partners due to a lack of cross-border networks.

This border region has experienced successive Interreg programmes, with the contemporary programme area covering the Dutch provinces of North Brabant, Zeeland

and Limburg (NL) and the Flemish provinces of West Flanders, East Flanders, Antwerp, Flemish Brabant and Limburg (BE) (see [Figure 1](#)). Interreg IV did prioritize SME innovation albeit in a less systematic and urgent way than in the subsequent programme (see below). The programme had three priorities⁶: *economy*, *habitat* and *people*, with economy receiving 50% of the total budget, habitat 24% and people 20% (with the remaining 6% for technical assistance). Each priorities involved several lines of action, with the economic priority being divided into *innovation and extension of the knowledge economy*, *cross-border entrepreneurship* and *strengthening economic structures and environmental factors*. Projects were invited that contributed to one or more of these respective lines of action, and under the terms of the subsidy, a maximum 50% of the total cost of activities could be provided. The projects were evaluated as they were received, and reviewed on both their overall contribution to the programme goals as well as their compliance with a list of more technical requirements; following the internal evaluation, a steering committee ultimately decided upon which projects got funding. The full amount of funding was available from the start of the programme, there were no yearly budgets.

For the Interreg V strategy more than 40% of the budget was allocated to be spent on cross-border innovation, being divided two action lines. The first sought to stimulating research and experimental development by extending the research infrastructure for public and private knowledge institutes and by making connections between knowledge institutes. The other focused on product, service and process innovation through collaborations between companies, or between companies and knowledge institutes.

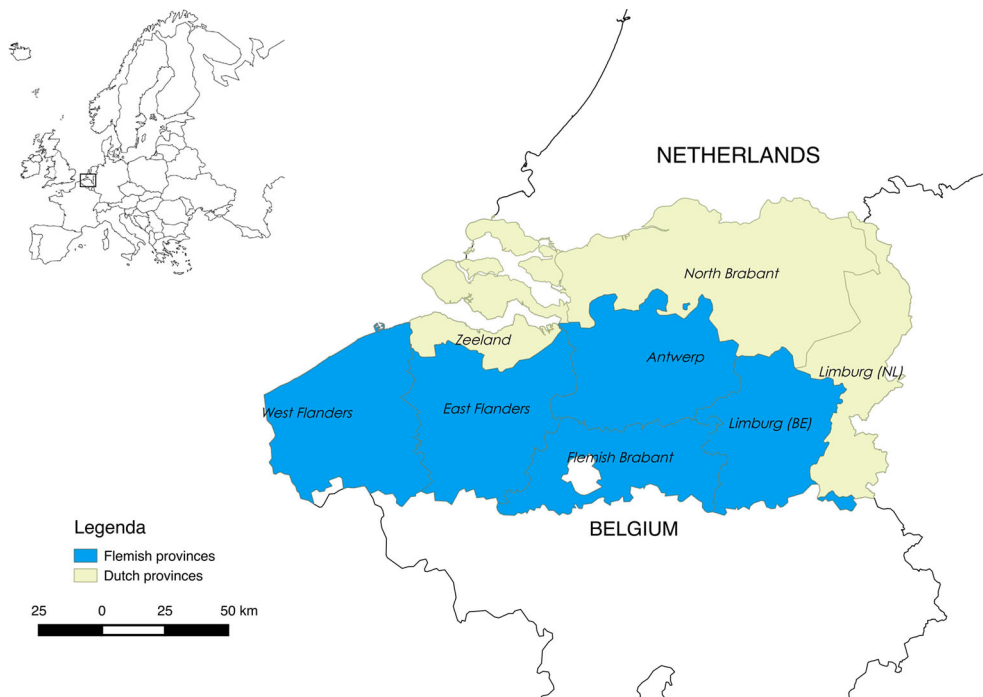


Figure 1. Program area Interreg IV Flanders – Netherlands.

6. Results

6.1 Policymakers' perception of hindrances and policy goals

The first step of our analysis is to consider the ambitions of the policymakers in devising the programme through their formulation of the overall programme, and then through the concrete project selection activities, advising prior to proposals being made and then evaluating formal received proposals. The results of this analysis are shown in Table 3, and suggest that policymakers perceived that the greatest hindrances for firm activities in the Flemish-Dutch border region are those that correspond with the pre-cooperation and bilateral cooperation phase of our model presented in 4.5, with half the respondents, in turn, argued that the most important hindrances were situated in the bilateral cooperation phase (see Table 4). For the network cooperation phase and systemic cooperation phase, the results are mixed, with the policymakers reporting divergent ideas regarding the barriers in these phases. The survey also revealed that the policymakers were consistent in terms of our conceptual framework, likewise arguing that the appropriate policy interventions were those that corresponded with the bilateral cooperation phase (see section 4.2).

However, the preference of the policy makers for supporting activities in this phase was overall less strong than their idea of where the biggest hindrances lay. In general, they perceived activities in all the phases as important policy goals, although that might relate to the *ex post* timing of our research of the work. We were asking our respondents questions about Interreg IV when their policy attention had shifted to Interreg V, where as we have seen there is an extensive emphasis on innovation. Perhaps the most interesting result from our perspective was the inconclusive findings regarding the importance of barriers

Table 3. Importance of hindrances and policy goals according to policymakers.

Hindrances	Not a Hindrance	Neutral	Hindrance	No opinion
Pre-Cooperation phase	7%	27%	45%	20%
Bilateral cooperation phase	20%	16%	48%	16%
Network cooperation phase	32%	20%	32%	16%
Systemic cooperation phase	34%	20%	30%	16%
% of respondents ranking the given examples from 1 (no/totally no hindrance) to 3 (an important/ very important hindrance)				
Policy goals	Not a policy goal	A policy goal	An important policy goal	No opinion
Pre-Cooperation phase	9%	36%	52%	2%
Bilateral cooperation phase	25%	18%	57%	0%
Network cooperation phase	18%	39%	42%	0%
Systemic cooperation phase	16%	27%	55%	2%
% of respondents ranking the given examples from 1 (no/totally no policy goal) to 3 (an important/ very important policy goal)				

Table 4. Importance of hindrances and policy goals according to policymakers.

	Most important hindrances		Most important policy goals
Pre-Cooperation phase	17%	Pre-Cooperation phase	13%
Bilateral cooperation phase	50%	Bilateral cooperation phase	40%
Network cooperation phase	17%	Network cooperation phase	7%
Systemic cooperation phase	17%	Systemic cooperation phase	18%
% of respondents ranking the examples of hindrances or policy goals in this phase as one out of three most important hindrances/policy goals			

in the systemic co-operation phase, in parallel with a desire to implement policy measures whose rationale is based on attempting to systematize already existing networks. This leads to the first of our tentative propositions, namely that most policymakers perceive most hindrances to cross-border activities in the bilateral cooperation phase and think that the most important policy goals are geared towards lowering the hindrances in this phase.

6.2 Implementation: categorizing the funded projects

The second step of the analysis was to categorize those projects that were funded to support the development of the cross-border innovation environment. In the Interreg IV period, we found one project directed at general awareness raising or providing information specifically on the possibilities of cross-border innovation, seeking to inform and inspire SMEs to engage in more sustainable business practices. Regional development agencies on both sides of the border were also active in informing firms in their regions about the possibilities and advantages of collaboration, including cross-border collaboration. The second initiative that we could also categorize as falling into the pre cooperation phase and helping to address firms' threshold of indifference was the BIELAt, a private foundation promoting collaboration between entrepreneurs, knowledge institutes and government in the Eindhoven Leuven Aachen triangle (ELAt).

There were three projects directed at funding concrete cross-border innovation projects in the Fl-NL programme which we consider to correspond with the bilateral cooperation phase. One involved a bilateral cooperation between two knowledge institutes directed at developing better methods for the diagnosis of cardiovascular diseases. A second project was cooperation between two knowledge institutes and a firm on a feasibility study of geothermal energy in the border region. The third project was aimed at stimulating cross-border cooperation between firms in the high tech sector, which led to 21 collaborative RTDI activities involving partners on both sides of the border.

The Fl-NL programme funded twelve projects that can be categorized as network cooperation. Ten of these consisted of knowledge institutes mutually cooperating, complemented by regional development agencies, municipalities and provinces. One example was a project where small laboratories were set-up by knowledge institutes to provide a test facility for SMEs to make use of innovative computer-controlled tools. A second example was a network of incubators in the region that facilitated cooperation and exchange between start-ups. Two projects were directed towards developing cross-border "clusters", groupings of firms seeking to improve their competitiveness by collectively innovating, in the fields of the bio-based economy and hydrogen fuel cells, respectively (Table 5).

Finally, we did not find any projects or activities that sought to develop shared innovation governance activities. This fits with what we identified in 5.2, namely that although there is a strong regional brand associated with the idea of the top technology region Eindhoven – Leuven – Aachen (TTR-ELAt), there is very little network collaboration and almost no cross-border innovation governance associated with this (see OECD, 2013). These four individual elements lead us to the observation that the implementation of the programme in practice led to a greater emphasis on the development of networking activities, with much less emphasis on mobilizing firms to think across "over the border", or to deal with the practical problems that attempting to work over the border brings.

Table 5. Policy activities in Interreg IV FI-NL per phase.

Phases	Policy activity in Interreg IV Flanders – Netherlands
Pre cooperation	<ul style="list-style-type: none"> • One project directed at general awareness raising • Private initiative on stimulating cross-border innovation cooperation • More general activity of regional development agencies
Bilateral cooperation	<p>Three projects</p> <ul style="list-style-type: none"> • Two bilateral cooperation projects between two knowledge institutes • SME funding scheme for firms in the high tech sector
Network cooperation	<ul style="list-style-type: none"> • 12 different projects on network cooperation • Of which ten seem to be dominated by knowledge institutes • And two projects have the aim of establishing a cross-border cluster
Systemic cooperation	<ul style="list-style-type: none"> • No projects found targeting this systemic phase • Also, the OECD (2013) finds no systemic strategic policy making

6.3 Tensions between strategy and implementation

In the preceding sections, we have considered the coherence of the cross-border innovation space, policy-makers' perceptions of cross-border interactions and the policies introduced to shift cross-border innovation behaviours. The reviewed evidence suggests that although there are strong innovation systems in each side of the border, what is missing here is cross-border integration of any form. The policy-makers interviewed reported that they believed that the main problems that firms in the regions faced were specifically in developing linkages with firms over the border, whilst finding it important to support interventions at all stages of the innovation networking process. The reality of the policies funded in turn demonstrated that they were primarily targeting network building activities, with some minor attention for awareness raising and connection building activities (the pre-cooperation and bilateral cooperation phases). Much of that funding in turn went to funding knowledge institutes, with relatively limited interest in funding the development of networks that have second-order connectivity properties (contacts across the order that in turn refer on to other contacts across the border).

We, therefore, contend that this situation seems to be a *prima facie* example of where investments are funding massive infrastructures before the regularized interactions have been mobilized. There are a number of possible explanations for this happening. The first is that the policy-makers lack an overall strategic grip on the project, and by deciding on projects as they are received, what should be a programme becomes a piecemeal patchwork of projects. As knowledge institutions often have technology transfer offices responsible for acquiring funding, the programme has effectively been captured by these knowledge institutions rather than creating the antecedent conditions for future effective network activities. An alternative explanation is that there is a desire to create the best innovation environment by policy-makers, and that is seen as seeking to create ideal structures today without a recognition of the need to build up the antecedent foundations to allow those structures to function effectively. In the absence of any kind of cross-border institutional arrangement to collectively guide and decide priorities, there is a loss of consistency in the strategies and ultimately investments are not directed to what policy-makers wish, nor to directly addressing the real innovation problems faced by these places.

7. Discussion and conclusions

In this paper, we have sought to address the research question of how could a coherent policy approach building up cross-border innovation capacity accounting for the qualitatively different micro scale processes that capacity building entails? Our conceptual model identified that there are very different processes at play as innovation networks build up from the ground-up, implying that a sequenced approach reflects these different underlying processes. Our exploratory study provides the basis to provide a micro-scale model of cross-border interaction to operationalize Lundquist and Tripp's (2013) meso-scale model CBRIS development of cross-border regional innovation system development. On the basis of a reflection on the model from a single empirical case study, it is possible to propose theoretical and policy developments to improve understanding and management of innovation in cross-border environments.

Our sequential model appears to provide a mechanism to link micro-scale activities, SME cross-border innovation collaboration, with the development of the meso-scale property, through the creation of networks that acquire systemic properties. Lundquist and Tripp's model foresees three stages of embryonic systematization, partial systematization, and a well-functioning CBRIS. From our perspective, there is an intuitive link to be seen between these phases and our development phases, and this suggests that progression from one phase to the next in the Lundquist and Tripp model requires addressing the micro-scale problems identified in Table 1.

Therefore, creating an embryonic CBRIS has been achieved, when the threshold of indifference has been passed, achieving partial systematization requires addressing network breaking (dead-ending) and structural separation effects and a well-functioning CBRIS has addressed problems of structural holes within cross-border networks whilst shared governance arrangements have been developed. This implies that policy should focus on the different kinds of challenges that are involved in each of these phases. This should in turn reflect the extent to which actors (firms, policy-makers, knowledge institutions and other agents) in the cross-border region are motivated to seek out co-operation, their past experiences in collaboration, the topology of cross-border networks and the emergence of collective cross-border institutional arrangements.

We suggest that cross-border innovation policy could benefit from a more conceptually founded idea of cross-border innovation, in particular, because it is in principle possible to align cross-border innovation policy within Interreg around the particular needs of SMEs depending on their progress through our development phases. The single case study we presented, of the Dutch-Flemish border region, highlighted the potential mismatch that existed between the cross-border situation (where there was very little motivation antecedent to cooperation), policy-makers (who believed firms needed help with the practices of cross-border collaboration) and the policy tool set selected, which promoted networking activities. The framework we have developed in 4.5 provides a potential screening tool for regions seeking to promote cross-border innovation to see if the policy-maker beliefs and the chosen interventions match the reality. At the same time we concede that for other regions it would be necessary to construct some kind of baseline for cross-border interaction. In practical terms, this could potentially be provided through joint collaborations on research project (reported in CORDIS), co-patenting from the OECD REGPAT database or co-publishing from Leiden University's proprietary database.

A final policy advantage of this approach for Interreg regions would be that it would also allow recommendations to be developed for Interreg V strategies; if Interreg 4 was overly ambitious, then we see that the extra emphasis, funding and concentration pushed in Interreg V might, in turn, encourage partnerships to pursue “big ticket” strategic infrastructure investments whilst what would, in reality, be more helpful is awareness raising and co-operation coaching. Different policy measures are needed in different phases of cross-border firm innovation, and therefore policymakers should take a more targeted approach, ensuring that their interventions are based on what actors need in different phases. Then it will gradually become clear where measures are missing and needed, and that innovation system equivalent of bike lanes might still be necessary, next to or indeed in preference to the construction of trunk roads and motorways for innovation.

Notes

1. We are not looking at public sector innovation, whilst we acknowledge that this played an important role in cross-border policy development (Perkmann, 2007).
2. Although Van Houtum (1998) starts at the point of a first contact, we add an additional step, pre-cooperation phase.
3. In this study, we studied 15 SMEs working on cross-border collaborative innovation projects to explore how the border impacted upon the different phases of their collaboration process. These SMEs received funding from Interreg to develop their projects and were thus one of the target groups of the policy discussed here. For a complete discussion see Van den Broek, Benneworth, and Rutten (2018).
4. In total 11 policymakers completed the survey, two indicated they did not have enough knowledge of the subject to complete the survey and 1 policymaker did not work on cross-border issues anymore and was therefore unavailable.
5. In total 39,200 people commute from Belgium to the Netherlands of which 22,500 are Dutch nationals living in Belgium. Another 1,900 people with other nationalities than Dutch or Belgian commute from Belgium to the Netherlands for work. In the opposite direction there are in total 8,100 people living in the Netherlands and working in Belgium. Next to the Dutch people commuting to Belgium there are 3,300 people with a Belgian nationality living in the Netherlands and working in Belgium.
6. There is a fourth priority called technical assistance, but as this is only about management of the program it is not related to the content of the programme.

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No potential conflict of interest was reported by the authors.

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References

- Asheim, B., J. Moodysson, and F. Tödting. 2011. "Constructing Regional Advantage: Towards State-of-the-Art Regional Innovation System Policies in Europe?" *European Planning Studies* 19 (7): 1133–1139.
- Barney, J. B., and D. N. Clark. 2007. *Resource-based Theory: Creating and Sustaining Competitive Advantage*. Oxford: Oxford University Press.
- Burt, R. 1992. *Structural Holes: The Social Structure of Competition*. Cambridge, MA: Harvard University Press.
- Caesar, B. 2017. "European Groupings of Territorial Cooperation: a Means to Harden Spatially Dispersed Cooperation?" *Regional Studies, Regional Science* 3: 247–254. doi:10.1080/21681376.2017.1394216.
- Casper, S. 2007. "How do Technology Clusters Emerge and Become Sustainable? Social Network Formation and Inter-Firm Mobility Within the San Diego Biotechnology Cluster." *Research Policy* 36: 438–455. doi:10.1016/j.respol.2007.02.018.
- European Commission. 2010. *Ex-Post Evaluation of Interreg III (2000-2006)*. Brussels.
- European Commission. 2014. *Regional Innovation Scoreboard 2014*. Brussels.
- European Commission. 2015. *Co-operation across borders*. http://ec.europa.eu/regional_policy/index.cfm/en/policy/cooperation/european-territorial/cross-border/.
- Fagerberg, J. 2006. "Innovation: A Guide to the Literature." In *The Oxford Handbook of Innovation*, edited by J. Fagerberg, D. C. Mowery, and R. R. Nelson, 1–26. Oxford: Oxford University Press.
- Fowler Jr, F. J. 2013. *Survey Research Methods*. 5th ed. Los Angeles, CA: Sage.
- Gluckler, J. 2007. "Economic Geography and the Evolution of Networks." *Journal of Economic Geography* 7 (5): 619–634.
- Granovetter, M. S. 1973. "The Strength of Weak Ties." *American Journal of Sociology* 78 (6): 1360–1380.
- 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.
- Hassink, R., and C. Klaerding. 2012. "The End of the Learning Region as We Knew It; Towards Learning in Space." *Regional Studies* 46 (8): 1055–1066.
- INTERACT. 2010. "20 years of territorial cooperation." *INTERACT Newsletter*, September.
- Klatt, M., and H. Herrmann. 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.
- Knoben, J., and L. A. G. Oerlemans. 2012. "Configurations of Inter-Organizational Knowledge Links: Does Spatial Embeddedness Still Matter?" *Regional Studies* 46 (8): 1005–1021.
- Koen, C. 2011. *Collaborative Innovation in High-Technology Sectors*. Tilburg: Tilburg University.
- Kroll, H., F. Dornbusch, and E. Schnabl. 2015. "Universities' Regional Involvement in Germany: How Academics' Objectives and Opportunity Shape Choices of Activity." *Regional Studies* (August 2015): 1–16. doi:10.1080/00343404.2015.1051016.
- Leick, B. 2012. "Business Networks in the Cross-Border Regions of the Enlarged EU: What do we Know in the Post-Enlargement Era?" *Journal of Borderlands Studies* 27 (3): 299–314. doi:10.1080/08865655.2012.750952.

- Lundquist, K.-J., and M. Trippl. 2013. "Distance, Proximity and Types of Cross-Border Innovation Systems: A Conceptual Analysis." *Regional Studies* 47 (3): 450–460.
- Malecki, E. J. 2012. "Regional Social Capital: Why it Matters." *Regional Studies* 46 (8): 1023–1039. doi:10.1080/00343404.2011.607806.
- Marshall, D., R. McIvor, and R. Lamming. 2007. "Influences and Outcomes of Outsourcing: Insights From the Telecommunications Industry." *Journal of Purchasing and Supply Management* 13 (4): 245–260.
- Marxt, C., and P. Link. 2002. "Success Factors for Cooperative Ventures in Innovation and Production Systems." *International Journal of Production Economics* 77: 219–229.
- McCann, P., and R. Ortega-Argilés. 2013. "Modern Regional Innovation Policy." *Cambridge Journal of Regions, Economy and Society* 6: 187–216. doi:10.1093/cjres/rst007.
- OECD. 2013. *Regions and Innovation: Collaborating Across Borders (OECD Revue)*. OECD. doi:10.1787/9789264205307-en.
- Panteia. 2009. *Ex-Post Evaluation of INTERREG 2000-2006 Initiative: 1st Interim Report*. Zoetermeer: Panteia.
- Perkmann, M. 2007. "Policy Entrepreneurship and Multilevel Governance: a Comparative Study of European Cross-Border Regions." *Environment and Planning C: Government and Policy* 25 (6): 861–879.
- Prokkola, E. K. 2011. "Cross-border Regionalization, the INTERREG III A Initiative, and Local Cooperation at the Finnish - Swedish Border." *Environment and Planning A* 43: 1190–1208. doi:10.1068/a43433.
- Stensheim, I. 2012. "R&D Practices and Communities in the TNC--Proximities and Distances." *Journal of Economic Geography* 12 (3): 651–666.
- Tödtling, F., and M. Trippl. 2005. "One Size Fits all?" *Research Policy* 34 (8): 1203–1219. doi:10.1016/j.respol.2005.01.018.
- Trippl, M. 2010. "Developing Cross-Border Regional Innovation Systems: Key Factors and Challenges." *Tijdschrift Voor Economische En Sociale Geografie* 101 (2): 150–160.
- Trippl, M. 2018. "'Innovationsdynamiken und Integrationsprozesse in Grenzüberschreitenden Wirtschaftsregionen: Grenzen als Triebkräfte und Barrieren Verstärkter Zusammenarbeit.'" In *Grenzen: Theoretische, Konzeptionelle und Praxisbezogene Fragestellungen zu Grenzen und Deren Überschreitungen*, edited by M. Heintel, R. Musil, and N. Weixlbaumer, 235–252. Dordrecht: Springer Verlag.
- Uyarra, E. 2010. "What is Evolutionary About "Regional Systems of Innovation"? Implications for Regional Policy." *Journal of Evolutionary Economics* 20 (1): 115–137.
- Van den Broek, J., P. Benneworth, and R. Rutten. 2018. "Border Blocking Effects in Collaborative Firm Innovation." *European Planning Studies* 26 (7): 1330–1346. doi:10.1080/09654313.2018.1476470.
- Van Houtum, H. 1998. *The Development of Cross-Border Economic Relations*. Tilburg: Tilburg University Press.
- Van Houtum, H., and M. van der Velde. 2004. "The Power of Cross-Border Labour Market Immobility." *Tijdschrift Voor Economische En Sociale Geografie* 95 (1): 100–107.
- Weterings, A., and G. Van Gessel-Dabekaussen. 2015. *Arbeidsmarkt Zonder Grenzen*. The Hague: PBL.

Appendix. Survey results

(1) What are, according to you, the main hindrances cross-border cooperation for innovation?

Pre-cooperation phase	1	2	3	4	5	6
	Totally disagree	Disagree	Neutral	Agree	Totally agree	No opinion
Firms think it is too much trouble to search for a partner on the other side of the border	0	1	5	3	0	2
Firms are not aware of the available funding possibilities for cross-border cooperation	0	1	1	7	0	2
Firms think that cross-border cooperation will lead to unforeseen problems and high costs	0	1	4	2	1	3
Firms do not work cross-border because they are not aware of the knowledge possessed by partners at the other side of the border	0	0	2	6	1	2
N = 11						
<i>Bilateral cooperation phase</i>						
Firms do (unconsciously) not consider possible partners at the other side of the border when they think of searching for a partner	0	1	1	5	1	3
There is a lack of cross-border innovation support by governments and intermediary organizations	2	3	3	0	2	1
Firms experience juridical and administrative differences when designing a cross-border partnership	0	2	1	4	2	2
The networks of firms are build-up alongside regional and national lines, which leads them to have trouble finding partners at the other side of the border	0	1	2	5	2	1
<i>Network cooperation phase</i>						
Firms do not cooperate with partners at the other side of the border to draw technology roadmaps en signal collective opportunities on a medium-long term	0	4	0	3	2	2
There are no cross-border industry-wide organizations representing similar innovative firms	0	3	5	1	1	1
There are no cross-border fora or meetings where firms can exchange practical knowledge to solve their innovation problems.	1	5	1	3	0	1
Firms are hestant in recommending potential knowledge suppliers from across the border to their own contacts	0	1	3	2	2	3
<i>Systemic cooperation phase</i>						
A cross-border innovation strategy is lacking	0	1	4	4	1	1
There is no pool of highly educated engineers and experts with experience in working on cross-border innovation projects	0	7	1	2	0	1
There are no cross-border clusterorganizations or innovation platforms	0	5	2	3	0	1
There is a lack of cross-border education tracks	0	2	2	3	0	4

2) What are, according to you, the three most important hindrances for cross-border cooperation for innovation?

Pre-cooperation phase	Importance
Firms think it is too much trouble to search for a partner on the other side of the border	1
Firms are not aware of the available funding possibilities for cross-border cooperation	1
Firms think that cross-border cooperation will lead to unforeseen problems and high costs	2
Firms do not work cross-border because they are not aware of the knowledge possessed by partners at the other side of the border	0

<i>Bilateral cooperation phase</i>	
Firms do (unconsciously) not consider possible partners at the other side of the border when they think of searching for a partner	4
There is a lack of cross-border innovation support by governments and intermediary organizations	0
Firms experience juridical and administrative differences when designing a cross-border partnership	4
The networks of firms are build-up alongside regional and national lines, which leads them to have trouble finding partners at the other side of the border	4
<i>Network cooperation phase</i>	
Firms do not cooperate with partners at the other side of the border to draw technology roadmaps en signal collective opportunities on a medium-long term	2
There are no cross-border industry-wide organizations representing similar innovative firms	0
There are no cross-border fora or meetings where firms can exchange practical knowledge to solve their innovation problems.	1
Firms are hesitant in recommending potential knowledge suppliers from across the border to their own contacts	1
<i>Systemic cooperation phase</i>	
A cross-border innovation strategy is lacking	2
There is no pool of highly educated engineers and experts with experience in working on cross-border innovation projects	1
There are no cross-border cluster organizations or innovation platforms	1
There is a lack of cross-border education tracks	0

3) According to you, what is the goal of the INTERREF V programme on cross-border innovation cooperation ?

Pre-cooperation phase	1 Totally disagree	2 Disagree	3 Neutral	4 Agree	5 Totally agree	6 No opinion
Actively inform firms about the opportunities and possibilities that the other side of the border offers	0	1	3	3	4	0
Inform firms about cross-border support possibilities	0	1	3	4	3	0
Organize cross-border work visits for firms to build trust	0	2	7	2	0	0
Unlock the knowledge base of the cross-border industry	0	0	3	2	5	1
<i>Bilateral cooperation phase</i>						
Organize cross-border match-making between firms (and knowledge institutes)	1	0	0	3	7	0
Providing cross-border funding for cooperating firms	0	0	0	1	10	0
Lowering administrative and juridical barriers for firms	2	3	5	1	0	0
Coaching firms in coping with cultural differences	3	2	3	3	0	0
<i>Network cooperation phase</i>						
Install cross-border network organizations	1	2	3	4	1	0
Organize cross-border network events	1	2	4	3	1	0
Connecting national and regional network organizations and regional development associations	0	0	6	2	3	0
<i>Systemic cooperation phase</i>						
Draft a cross-border innovation strategy	0	3	4	3	1	0
Facilitating supply and demand on the cross-border labour market	0	0	1	4	6	0
Set-up cross-border cluster organizations	0	2	3	5	1	0
Developing cross-border minors and parttime education tracks	0	2	4	3	1	1

4) What are, according to you, the three most important goals for cross-border cooperation for innovation?

Pre-cooperation phase	Importance
Actively inform firms about the opportunities and possibilities that the other side of the border offers	0
Inform firms about cross-border support possibilities	2
Organize cross-border work visits for firms to build trust	1
Unlock the knowledge base of the cross-border industry	2

<i>Bilateral cooperation phase</i>	
Organize cross-border match-making between firms (and knowledge institutes)	7
Providing cross-border funding for cooperating firms	9
Lowering administrative and juridical barriers for firms	0
Coaching firms in coping with cultural differences	0
<i>Network cooperation phase</i>	
Install cross-border network organizations	0
Organize cross-border network events	1
Connecting national and regional network organizations and regional development associations	1
<i>Systemic cooperation phase</i>	
Draft a cross-border innovation strategy	2
Facilitating supply and demand on the cross-border labour market	4
Set-up cross-border cluster organizations	1
Developing cross-border minors and parttime education tracks	0
