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Institutionalization of cross-border regional innovation systems: the role of university institutional entrepreneurs

Jos van den Broek ^a, Paul Benneworth ^b and Roel Rutten^c

ABSTRACT

Cross-border regions are faced with the difficulty that resources for knowledge and innovation may be nearby but difficult to connect to because of the border. Universities could play a supportive role in building innovation environments, facilitating cross-border knowledge exchange. In this research we attempt to understand the systemic roles that universities might play by considering the activities in which they build these cross-border institutional arrangements. We focus upon activities of individual actors, conceptualized as ‘institutional entrepreneurs’. We ask the research question: How can universities through their institutional entrepreneurship activities contribute to the institutionalization of cross-border innovation environments that facilitate cross-border resource access for innovating actors? We address it by developing a conceptual framework for how these institutional entrepreneurs may operate, and identify three repertoires of contributions. We then explore how university actors in a specific cross-border region have built linkages that have acquired a degree of permanence.

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INTRODUCTION

Cross-border regions are often found to underperform other regions in terms of gross domestic product (GDP) growth, availability of jobs and innovation performance (Leick, 2012). This under-utilization partly derives from the fact that they may not be able to access and benefit from resources located across borders (van den Broek, Benneworth, & Rutten, 2018). Indeed, this is reflected in the fact that regions’ functional linkages are often more oriented towards national growth centres than to other similar kinds of nearby regions in other countries (Prok-kola, 2008). External knowledge resources are important for facilitating innovation processes

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(Tödting, Lengauer, & Höglinger, 2011), by compensating for incomplete internal knowledge resources (Barney & Clark, 2007). With spatial proximity being one dimension that facilitates knowledge exchange (Howells, 2012), the knowledge ‘across the border’ may offer firms access to these complementary knowledge resources (Gertler, 2003).

Exploiting these knowledge resources can be facilitated by institutional environments that encourage and support cross-border knowledge exchange (Lundquist & Tripl, 2013; Tripl, 2010). The role of universities in developing supportive environments (what we will refer to below as regional innovation systems – RIS) more generally is widely acknowledged (Gunasekara, 2006). We are here interested in whether universities can also play this role across borders (Tripl, Sinozic, & Lawton Smith, 2015). Collaboration between university actors is important in driving general cross-border integration (Makkonen, Weidenfeld, & Williams, 2016), although their precise roles is unclear (Hansen, 2014; Makkonen, 2015). We suggest that university contributions to innovation comprise a collection of (often uncoordinated) actions of individuals working within universities. Over time, these individual activities may develop into relationships and networks that acquire systemic properties (Benneworth, Pinheiro, & Karlsen, 2017).

Therefore, in this paper, we attempt to understand the potential systemic roles that universities might play by considering the diverse activities in which they build these cross-border institutional arrangements. We consider these actors as ‘institutional entrepreneurs’ within universities (Garud, Hardy, & Maguire, 2007) who make new combinations and connections between regional assets to realize these cross-border activities. We specifically ask the research question: How can universities through their institutional entrepreneurship activities contribute to the institutionalization of cross-border innovation environments that make it easier for innovators to access resources across the border? We address it by developing a conceptual framework proposing how institutional entrepreneurs could contribute to strengthening regional innovation environments, specifically identifying three repertoires through which these contributions may emerge. We then test this framework empirically by exploring the extent to which university actors in one cross-border region built linkages that acquired a degree of permanence. We consider the Dutch–German EUREGIO, where three projects exhibited institutional entrepreneurship, namely a joint-degree programme, a cross-border bachelor and a technology transfer programme for small and medium-sized enterprises (SMEs). We identify the roles played by the institutional entrepreneurs in improving the innovation environment, and highlight the importance of the symbolic legitimacy of cross-border activities. Institutional entrepreneurs construct those legitimacy frames, and that appears to provide the basis for the wider contributions that they make to cross-border integration processes.

THE ROLE OF INSTITUTIONAL ENTREPRENEURS IN UPGRADING REGIONAL INNOVATION ENVIRONMENTS IN CROSS-BORDER CONTEXTS

The context for our research is the systemic approach to regional innovation where regions, as daily urban systems, acquire systemic properties facilitating knowledge spillover to stimulate innovation via interactions (Doloreux, 2002; Gordon & McCann, 2000; Lawson & Lorenz, 1999; Storper, 1993, 1995; Tödting & Tripl, 2005). We argue that one property that builds up in regional innovation contexts is contact systematization; in which initial contacts by pioneer actors build up regular interactions which facilitate interactions by subsequent actors. This regional innovation systems (RIS) approach considers the dynamic interplay of actors affecting the conduciveness of a region to innovation (Cooke, 2005), with improvements in one part of the system (e.g., knowledge creation/universities) creating benefits elsewhere via system-level changes. High connectivity and interaction between actors may encourage policy-makers to

support those interactions further, creating munificent innovation environments (Asheim, Smith, & Oughton, 2011). Likewise, where there are few connections, few opportunities for useful interactions and an absence of policy to stimulate interaction there is what is effectively a 'sparse' environment (Rodríguez-Pose, 2013).

The RIS model conceptualizes improvements to sparse innovation systems (what is referred to below as 'densification') by focusing on linkage-building processes (Tödting & Tripl, 2005), and we specifically highlight the property of cross-border RIS (Lundquist & Tripl, 2013; Tripl, 2010) as potentially sparse innovation systems as where the border continually undermines interaction between innovators in various ways (Perkmann, 2007). Borders may hinder knowledge flows, labour mobility and access to critical resources (Cerina, Chessa, Pammolli, & Riccaboni, 2014; Miörner & Tripl, 2016; Miörner, Zukauskaitė, Tripl, & Moodysson 2017) by raising the opportunity costs of cross-border interaction, channelling knowledge resource-search processes to remain within national boundaries, and reducing complementarities (Leick, 2012; Lundquist & Tripl, 2013).

We here focus on the ways in which borders produce what van den Broek and Smulders (2014) conceptualize as institutional gaps that undermine innovation activity. First, innovating actors' own (higher education) systems may impose strong rules and regulations that differ sharply across the border, creating differences in actors' expectations and responsibilities that may impede collaboration (van den Broek & Smulders, 2014). Second, a lack of cross-border governance mechanisms may hinder developing regularized interactions (van den Broek, Rutten, & Benneworth, 2018); whilst it may be possible to mobilize time-limited projects, converting these into durable collaboration activities may be difficult. Third, borders accentuate differences and this may lead to divisions rather than exploiting complementarities (e.g., separating innovation and production) (Hahn, 2013). Finally, the border may impose physical restrictions that add to the costs of interactions, such as the absence of good local transport connections between physically close locations separated by a border (van den Broek, Benneworth, et al., 2018). We therefore contend that developing university innovation contributions to the RIS involves developing or adjusting cross-border 'specific customs and procedures that shape interaction' (Rodríguez-Pose, 2013, p. 1042).

The existing literature on university cross-border collaborations largely focuses upon universities' more general roles, whilst gaps in cross-border institutional arrangements are largely glossed over (Benneworth et al., 2017; Fromhold-Eisebith, 2007; Organisation for Economic Co-operation and Development (OECD), 2013; Pugh, Hamilton, Jack, & Gibbons, 2016; van den Broek, Eckardt, & Benneworth, 2019). To focus on how individual activities build networks and connectivity, we conceptualize university actors developing cross-border activities as institutional entrepreneurs who 'mobilise resources and actionable knowledge to create/transform institutions' (Benneworth et al., 2017, p. 237). Institutional entrepreneurs are strongly embedded in their own institutional structure (Battilana, 2006) and attempt to build connections with people in external organizations. These people are entrepreneurs in the sense of perceiving (novel) opportunities, assessing their value and mobilizing resources (including knowledge) to exploit these opportunities (Stam et al., 2012), even where the result is not obviously financially viable. Institutional environments may stimulate institutional entrepreneurs by providing actors with capabilities to reflect on their activities and purposively change their existing work habits (Garud et al., 2007).

Their activities may in turn stimulate change in the wider structures within which they are embedded (Sotarauta & Mustikkamäki, 2015). At their most extreme, when institutional entrepreneurs create new activities, they may change institutional logics if 'a new practice, activity, norm, belief or some other institution becom[es] an established part of an existing system, organization, or culture' (Sotarauta & Mustikkamäki, 2015, pp. 342–343). Following Sotarauta and Mustikkamäki (2015) and Sotarauta (2009), we distinguish three kinds of institutional

entrepreneurship repertoires, namely networking activities, interpretive framing and institution-building. Networking involves connecting people with complementary skills and (material and non-material) resources, thereby facilitating interaction and exchange (Sotarauta, 2010), particularly linking previously unconnected people to realize new possibilities (Tracey, Phillips, & Jarvis, 2011). Actors' interpretive framing is their ability to reinterpret resources and activities to picture alternative practices to current ways of working (Sotarauta & Mustikkamäki, 2015) using creativity to convince others their imagined future is both desirable and achievable via their proposed course of action (Tracey et al., 2011). Institution-building involves the formalization of informal practices between determined partners into more generally applicable established rules (Sotarauta & Mustikkamäki, 2015).

These three repertoires in turn allow us to link individual acts of institutional entrepreneurship to the creation of regional-level institutions via these institutional-building processes. We contend that although actors may be hindered by these border effects, institutional entrepreneurs through their activities can contribute to addressing these border problems, lowering the threshold for further collaboration and initiating or extending these processes of institutionalization. We therefore operationalize our research question as follows: Which of these university institutional entrepreneurship repertoires contributes to institutionalizing cross-border innovation environments?

METHODOLOGY AND INTRODUCTION TO THE EUREGIO CASE

In our research we seek to understand the meso-level dynamics within cross-border RIS starting from an exploration of individual institutional entrepreneurs' micro-level activities and tracing them to more general acts of institutionalization (here defined as structuration effects that make it easier for others to extend them later) (Markard & Truffer, 2008). We use here a single-case design (Yin, 2009) with three examples where university staff tried to build up cross-border activities that in turn drove various kinds of institutionalization. These activities were selected following a lengthy search for cross-border innovation processes in which universities genuinely worked across borders, activities which research elsewhere has shown to be relatively rare (van den Broek et al., 2019). We selected the EUREGIO border region because we already knew about the first activity, and we then sought out other comparable examples. Although this limits our study as we could not sample exemplary or exceptional cases, the extant examples do have a degree of breadth, representing two primarily teaching-led activities, one of which had a specific cross-border labour market effect, along with a research and knowledge transfer example. All three cases are examples of actors building connections and networks, which may lay the ground for later collaborations.

The case descriptions are based on 21 semi-structured interviews with key informants (10 Dutch and 11 German), interviews lasting between 45 and 90 minutes and were all transcribed. Alongside this, we analyzed university policy documents, regional and national policy documents, laws and accreditation rules. For each case we produce a stylized narrative which we confront with our conceptual framework to discuss our findings and draw conclusions. Our approach is critical realist and synthetic; we use the theoretical framework presented as the basis for structuring our data. Our analysis consisted of a close reading of the interviews for each of the three cases, and coding data on the basis of these three repertoires within each case to create syntactic *items* (a claim made by one interviewee relating to one case study). Within each repertoire we grouped similar syntactic elements into syntactic *units* (representing more general claims about one sub-repertoire within a case); we then arranged similar syntactic units from similar repertoires across the cases to build the *stylised facts* for each repertoire (in the fifth section). We then related these stylized facts back to our theoretical framework in the sixth section to consider the relationship of these institutional entrepreneurship repertoires with regional capacity-building and

address our overall research relationship. The nature of this methodology is based on synthesis through stylization, and this makes presenting individual syntactic items (e.g., quotations) of the overall syntactic units or stylized facts somewhat misleading. Likewise, as we reconstruct events from many years ago using contemporary interviews this research is necessarily exploratory and the claims made are tentative.

The EUREGIO (Figure 1) spans the cities of Enschede in the east of the Netherlands and Münster in the west of Germany, a region with a long tradition of cross-border collaboration (Perkmann, 2005) and a number of higher education institutions, including the universities of Twente and Münster alongside several universities of applied science (UASs). Universities and other regional players, such as science parks, regional development agencies and, to a lesser extent, firms, have been actively involved in the EUREGIO programmes such as INTERREG IVA and VA that are increasingly geared towards stimulating innovation collaboration (van den Broek, Rutten, et al., 2018).

Despite the long tradition of cross-border consumer mobility, collaboration between emergency services and regular meetings of policy-makers, there seems to be a lack of institutionalization beyond the EUREGIO platform created by local authorities. The EUREGIO is a legally constituted special vehicle allowing for the collaboration between these Dutch and German municipalities with a very wide notional range of competencies. These competencies permit collaboration in a wide range of areas, but in reality cooperation is restricted to three commissions dealing with social development, economic and labour market issues, and sustainable spatial development. The formal collaboration has persisted without significantly moving forward, primarily functioning as a platform for providing local authorities information about partners across the border rather than moving towards cross-border integration and governance. This results in a very basic level of cross-border institutionalization, whilst at the same time relying on funding from the INTERREG grant programme. In this programme, activities since 2007 have become more directed towards stimulating innovation and linking innovators in the cross-border context but this has been driven primarily at the European level and not through any intentional choice of regional partners.

The three examples presented below explore how institutional entrepreneurs in three different university settings made use of opportunities and gathered resources to create activities that acquired a certain permanence (in the fourth section). This then allows the analysis that follows to link the three institutional entrepreneurial repertoires with the build-up (or not) of cross-border regional innovation capacity.

INTRODUCTION TO THE CASES

Joint-degree public governance across borders

The first initiative was a collaboration between the EUREGIO's two universities around the theme of public governance and European integration. It began in 1998 with a joint seminar series established by a German professor and a Dutch professor interested in exploring the differing narratives of European integration observed in their respective countries. The seminars allowed these perspectives to meet fruitfully, bringing students and teachers together outside the formal curriculum to interact and exchange these formerly nationally bounded European integration narratives. The professors convinced university administrators of these advantages, receiving permission and support for organizing these seminars. The seminars achieved effective student participation and lively discussions and, after several years, the professors wanted to intensify the collaboration by creating a formal 'course' for the students. Initially it was difficult for Dutch students to have their participation recognized in course credits, and the workload of a short course was unattractive without these study points. The German students were able to use

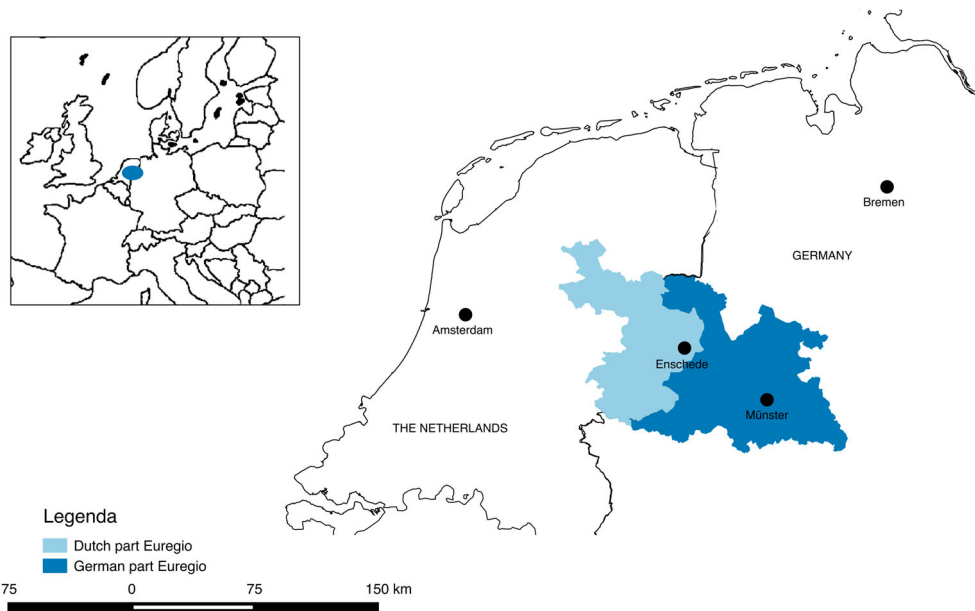


Figure 1. The EUREGIO.

Source: Authors, based on GeoBasis-DE/BKG 2017; CBS/TopGrenzen CC BY CBS and Kadaster.

the course to complete their mandatory optional learning activities (the ‘free space’ in their programme).

To progress to a more intensive course, the professors decided to formalize the collaboration as a ‘joint-degree’ programme, organizing in the first instance a cross-border stakeholder conference to brainstorm possible routes to create such a programme. This conference revealed that the lack of a formal protocol enabling joint degrees between Dutch and German universities made that practically impossible, and so the professors decided to develop a double degree, less integrated than a joint degree but allowing for joint teaching of German and Dutch students. The state government of North Rhine Westphalia (NRW), which had participated in the stakeholder conference, agreed to accredit the first degree themselves when German accreditation agencies claimed they lacked competence to accredit a double degree.

The double degree ran largely unchanged for almost 12 years, with both professors being replaced with new programme coordinators in this period. In 2013, the Dutch and German higher education accreditation agencies agreed a collaboration agreement permitting joint-degree awards and the two coordinators worked intensively with their respective administrators as a cross-border team to create the new joint degree and present it to the accreditation agency. This cross-border local team had to ‘translate’ the different ways of working and accreditation procedures of the two systems and mediate between accreditation organizations. The joint-degree programme Public Governance across Borders was duly launched at the end of 2013.

Euregional bachelor of social work

Before 2012, Saxion had hosted a part-time bachelor stream for social work taught in German and directed at a specific German labour market problem, which capped the number of places for social work students, whilst the German half of the EUREGIO was suffering a shortage of social workers. This development led the Dutch government to question this as part of concern at the growing number of German-taught courses at Dutch UASs. From the UASs, this was a

logical development because they were funded on the basis of total student numbers, and offering German-language courses for degrees with study number limits in Germany were a reliable way to attract German students. When a new school director was appointed who was also chairman of Saxion's 'Germany working group' and a strong proponent of cross-border initiatives, this provided this existing group of teachers and coordinators the opportunity to develop a cross-border bachelor degree in social work. They positioned this as educating professionals able to operate on both sides of the border, serving local labour market need and addressing criticism of Dutch public funds supporting skills provision for Germany.

This group argued that the Euregional bachelor was valid because it met labour market needs in the Netherlands, important to the government, and the EUREGIO, and was important to Saxion. This was justified by mobilizing a set of interviews with Dutch and German employers where the proposal was discussed and in which these employers were enthusiastic. This qualitative evidence was complemented by a survey of alumni, healthcare organizations and potential students. Taken together, they were able to mobilize and persuade the board to support the plan as a way for Saxion to sustain student numbers by providing something closely tailored to their desires.

In developing the Euregional bachelor, the teachers group faced the choice of whether to develop the bachelor as a track within the Dutch bachelor programme (the easy choice but restricting the Euregional content to 25% of all material) or to develop a completely new programme (allowing freedom but requiring new accreditation). The development team chose for reasons of speed for a new stream in the existing bachelor to avoid the regulatory burden. This option had the disadvantage that only 25% of the curriculum could be designed specifically for the Euregional bachelor as 75% of the programme was mandatory. At the time of writing, Saxion closed the course after four intakes because the Dutch social work accreditation system changed its mandatory core curriculum. That new curriculum was unsuitable for German employers meaning the existing course was unviable, thus leaving the Dutch bachelor alongside a German-taught part-time bachelor.

'Mechatronics for SMEs'

'Mechatronics for SMEs' was an INTERREG-funded project to help SMEs in the EUREGIO understand and apply mechatronics through cross-border collaborations with universities. Two innovation advisors, working for Dutch and a German innovation intermediaries respectively, had previously been in an array of cross-border technology transfer projects as well as local mechatronics projects. When they both realized that they were each interested in the potential of creating a cross-border mechatronics knowledge-exchange project, they arranged management approval from their respective organizations to invest time in developing a cross-border project. Those two advisors began approaching and encouraging universities and other intermediaries to build a partnership to bid for an INTERREG project, which in this case required that universities work with firms to transfer technology. As both German and Dutch UASs had a specific mission to engage with regional firms, and technology transfer offices to support that, it was the UASs that were initially keenest. The innovation advisors also managed to secure the research universities' participation, and the monies won were spent upon hiring an extra doctorate student who might potentially be able to work with SMEs.

Their 'Mechatronics for SMEs' project began in 2007, draw in partners from both technology transfer advisers' existing networks and then, as the area covered by the INTERREG programme was itself expanded southwards, three new UASs from this area (the Achterhoek and Niederrhein) joined the network. After this project was completed, one UAS moved forward to create a successor project for the new INTERREG round, a programme more strongly focused upon innovation and SMEs and less on technology transfer, thereby obviating the necessity of involving universities. A number of projects did continue amongst the former partners, universities

and SMEs, although they ceased to meet regularly within the INTERREG framework, losing their institutional character.

INSTITUTIONAL ENTREPRENEURSHIP REPERTOIRES PRESENTED IN THE CASES

The three activities studied provide an important insight into the repertoires adopted by institutional entrepreneurs as they built relationships and networks, and consolidated their regularities in ways that might potentially be regarded as institutionalization. We are not claiming that they transformed the nature of the EUREGIO RIS's institutional environment, but they do provide a way of perceiving how institutional entrepreneurs were able to create activities that underwent a degree of institutionalization. Networking involved two aspects: first was mobilizing actors within institutions with the resources and power necessary to deliver the activities formally. There was also external mobilization with the formal approval informal and support of regulators and subsidy-granters who provided assistance. Interpretative framing internally involved demonstrating that the cross-border activity was an effective way of meeting the overall institutional goals, whilst external framing involved building links to the demands and needs of other partners who in turn supported that activity. Our case studies suggest that 'strong external ties', 'strong internal ties', 'proactive framing' and 'resilient formal institution-building' are all present in these cases of developmental for 'institutionalized cross-border collaboration'. More detail is provided on these elements in the following section.

Networking

In terms of networking across the three examples, we distinguish between internal networking (within their own organization) and external networking (outside their organization) activities. The external networking was mainly directed at gaining support for the respective initiatives and engaging people in the exchange of knowledge and expertise. In the joint-degree case the professors first connected with each other before then broadening their network via the organization of a cross-stakeholder border conference. The teachers in the Euregional bachelor case already had an external network of German employers who were mobilized and surveyed to demonstrate enthusiastic for the Euregional bachelor. The innovation advisors in the Mechatronics case had already built, extended and maintained an external network of universities, firms and government parties before the formal project was initiated. These external network-building efforts in all three cases led to more people across the border exchanging knowledge and ideas border. But these networks were also each in some ways open beyond the original participants; students, for example, could freely register for the degrees or firms could apply for innovation support and effectively benefited from the prior effort that had been expended to build up a network which had ties across the border. University institutional entrepreneurs were able to play this role network initiator, being relatively large players in the region and having knowledge bases from which other actors could profit. In all three cases the external networking efforts were successful in gathering support, although there was clearly a variation in the strength of the ties created. Whilst in the joint-degree case the ties seemed strong, in the mechatronics case the ties were at least initially dependent upon the external funding that the projects bring. In the Euregional bachelor the ties to German employers had been strong and consistent over the years, although the form of the educational programme had been subject to a series of changes.

Second, the internal networking activities were important channels by which institutional entrepreneurs rallied support in developing activities in their (often bureaucratic) contexts. In the joint-degree case we saw this in the accreditation process where different administrative procedures needed to be followed, demanding support and commitment from academic staff, faculty staff and university administrators in both universities, with course coordinators able to bundle

these internal actors' competencies. Similarly, in the Euregional bachelor case, the teachers group enrolled experts on other issues including juridical issues and language skills to develop jointly the new bachelor programme. In the mechatronics case, the initiation was played by innovation intermediaries making it harder for them to mobilize strong internal networks, with the result that there were limited connections between those staff – even within the same department – that were working on projects in this area. Internal networking activities primarily contributed to building and institutionalizing intra-organizational competences amongst participants, creating a capacity that could subsequently facilitate cross-border working effort. Internal networks were also important in supporting institutional entrepreneurs' external activities by assisting the realization of the commitments they made to external partners. Here university institutional entrepreneurs may have an advantage over firms, and especially SMEs, in having a large bureaucracy at their disposal. Institution-building was empirically – as predicted in theory – the most difficult element to observe because of its relative instability and vulnerability to external forces, particularly shifts in accreditation requirements and subsidy goals. Nevertheless, it is possible to see that communities were created that allowed more general participation in cross-border working and which could be considered as an institutional contribution from the university.

Interpretive framing

Our observed interpretive framing related to networking activity involving legitimating and justifying participants' cross-border networking activities: in all three cases, institutional entrepreneurs used interpretive framing to convince other actors to participate in their activities, although with varying degrees of proactivity. The joint-degree actors proactively tried to bring cross-border collaboration further by imagining how these activities would benefit their organizations and the region. Conversely, in the Euregional bachelor the framing was merely reactive, seeking to both retain German students and satisfy parliamentary concern. In the mechatronics case, framing activities focused upon reactively securing funding and accommodating changing funding regulations.

In the joint-degree case, we content that interpretive framing is a way of understanding the two professors sketching the possibility of a cross-border seminars series as being better than the national dialogues. Likewise, when the professors coined and developed the idea of a more structural collaboration that led to the double-degree programme, they envisioned a possibility and gathered the necessary support and resources justified through the idea of it being 'Euregional' in nature. Finally, when the course evolved into a joint-degree programme, the module coordinators emphasized the injustice of the dual degree in giving students two diplomas for work equivalent to that for which the single-degree students received one, as well as a more intense institutional collaboration.

In the Euregional bachelor, the development group framed the new track as a way to sustain German student numbers whilst substantively addressing the Dutch parliament's concerns, also aligning their plans with Saxion's strategic goal to serve the whole cross-border region, to which the Euregional bachelor obviously contributed. In the mechatronics case, the innovation advisors were continually balancing their contacts with changing INTERREG regulations, which dominated activity despite changing every six-year period because there were no other suitable subsidies available. The project depended completely on the framing of particular constellations of actors as eligible for subsidy, and this framing shaped the activities that took place.

Institution-building

We observed that institutional entrepreneurs undertook activities that underwent a degree of structuration which could lead them to be considered as 'institutions' (both formal and informal). Formal institutions, such as the accreditations, were important for creating new ways of working

and without this formalization the new activities would not have been possible. However, we also saw that these formal institutions remained vulnerable to abolition or at least non-continuation. In terms of informal institutions, here represented primarily by networks of people, they were less vulnerable to changing rules and regulations and could be flexibly directed and redirected when circumstances change, although contacts needed to evolve from being between individuals to having a degree of recurrence so that if an individual left, then a hole would not emerge in the network. Both teaching cases involved explicit institution-building through programme accreditation, in which these novel cross-border practices became accepted and mainstream, only creating problems when cross-border needs were not congruent with national accreditation systems.

The double-degree programme did not involve coordinating teaching and marking practices between the two institutions, restricting cross-border interaction to a few annual meetings between programme coordinators. As a joint degree, the programme became fully integrated in the institution involving jointly supervising and grading bachelor theses. Conversely, the European bachelor programme was developed as a separate track within the existing bachelor programme, easing programme set-up but making it vulnerable to the shifting accreditation priorities, ultimately to be its downfall. The institution that built up in that case was a set of interactions between Saxion and German health sector employers that evolved into a network that met the employers' needs for German-speaking social work graduates and which sustained German student numbers for Saxion. In the mechatronics case, the network of universities, government actors and firms formed over more than 20 years, with the innovation advisors at the network's centre. The network was not closed in that new partners were in principle welcome to join, therefore allowing it to have more general regional characteristics; at the same time, the INTERREG funding requirements did impose shifting barriers to participation which undermined its overall stability as partners sometimes lost interest when the programme priorities were not their own priorities.

INSTITUTIONAL ENTREPRENEURSHIP REPERTOIRES BUILDING CROSS-BORDER INSTITUTIONAL CAPACITY?

These stylizations of university institution entrepreneurship behaviour allow a degree of analysis of the relationship between the entrepreneurship repertoires and institutional-building. First, in our presented examples, framing and legitimacy-building were central to institutional entrepreneurship. The most important institutions created were informal institutions, the new ways of working and shared practices, rather than formal institutions with terms of reference, competences and legal personality. Finally, the within-border institutional context remained a determining influence on the institutional entrepreneurship processes, with institutional entrepreneurs sometimes being able to negotiate in the cross-border context but remaining in various ways constrained by their national regulatory contexts. For further discussion, see below (see [Table 1](#) for a summary).

First, all three repertoires were interconnected: institutional entrepreneurs were framing their activities both internally and externally as well as working on institutional-building; cross-border activities needed to be imagined and justified to people who could not imagine those potential benefits before the achievement of any concrete activities could be realized. Proactive framing was associated with more freestanding environments, whilst stricter institutional environments encouraged a more reactive form of framing. These framings were important in the emergence of networks with their own norms and values (what we here regard informal institutions). In our case, we were unable to identify the creation of a formal cross-border regional innovation institution through these activities, although as van den Broek et al. (2019) identify elsewhere, it has been hard to identify good examples of this occurring in other regions (cf. OECD, 2013).

Table 1. Characterization of university institution entrepreneurship repertoires.

	Joint degree	Euregional bachelor	Mechatronics
External networking	Successful Strong ties	Successful Strong ties	Successful Weak ties
Internal networking	Successful Strong ties	Successful Strong ties	Relatively absent Weak ties
Interpretive framing	Proactive framing	Reactive framing	Reactive framing
Institution-building	Resilient formal and informal institution-building	Vulnerable formal institution-building Resilient informal institution-building	Vulnerable formal institution-building Resilient informal institution-building
Result	Institutionalized cross-border collaboration	Collaboration continues, but form keeps changing	Ties remained, but concrete collaborations terminated

Second, formal institution-building was important in legitimating activities, validating the idea of cross-border interaction, and raising overall enthusiasm levels, although these were not specifically focused on innovation. The most functionally important institutions mobilized were those informal institutions that encouraged actors to meet and interact across the border; indeed, we surmise placing these informal activities into a formal cross-border institutional framework would have represented a risky strategy because of the regulatory dependencies that this raised on two separate legal frameworks; the limited progress the EUREGIO had made in developing new competencies suggested how difficult a proposition this was. However, this informal character also made them dependent on individuals to sustain the dynamic without the support of anchor points which allow prior negotiations and mobilizations to be taken for granted. However, the informal character of networks dependent upon individuals also left them vulnerable, and formal institutions such as a joint-degree programme can be anchor points where activities are organized and people can come together.

Third, within their organizations, institutional entrepreneurs were able to change existing practices, whilst it was much harder to change existing regional-level institutional frameworks, such as INTERREG strategies or course-accreditation requirements. These findings align with those of Sotarauta (2016) who noted that institutional entrepreneurs moving outside of their institutions may function as what he calls 'institutional navigators', strategically complying with existing regulatory frameworks, rather than as institutional entrepreneurs, seeking to existing frameworks. What we observed certainly appears to fit with this idea of institutional navigation, particularly where the boundary conditions are set by high-level decisions such as European-level accreditation regulations or the strategic priorities of the whole INTERREG programme.

CONCLUSIONS

In this paper we asked the question: How can universities through their institutional entrepreneurship activities contribute to institutionalizing cross-border innovation environments? The above analysis makes it possible to nuance the initial conceptual model in a number of important ways. Cross-border institutional activities are often developed as adjuncts or extensions to existing activities, often embedded within their own (primarily national) networks. There is clearly a trade-off here between the effort spared in not having to change existing structures and practices and the problem of regulatory dependency (these norms are only permitted until an external regulation change undermines the activity). It is also clear that although these calculi may also be germane in other contexts, in cross-border regions they can have an overpowering effect on efforts to

create integration. This effect at the same time acts to bound what institutional entrepreneurs are able to achieve at the regional scale, being forced into navigating between the complex incongruent web of cross-border institutional architectures. This restricts what can be achieved with these efforts; and because the activities' legitimacy is underpinned by the framing – the imagining of this more positive future – we here envisage a risk that disbelief in this potential undermines the positive framing.

This becomes important in the context of the evolution implied within cross-border regional innovation systems (CBRIS) models, something that is dependent upon the representation of past success in integration as suggesting that it is possible to build a better future of improved cross-border working. It is clear that 'not crossing the border' may be the rational choice for many innovators, whilst at the same time denying the possibility for alternatives to emerge in which actors learn how to cross the border in innovating, thereby in turn making it a more natural and rational decision for these innovators. What can mitigate this effect is the importance of symbolic framing repertoires where forms of legitimation emerge based not upon the benefits to private individuals, but as being one of the more generally desirable outcomes of a more integrated cross-border space (cf. Jensen & Richardson, 2004). If the CBRIS problematic is to be taken seriously, more attention is needed for this symbolic framing dimension, of the ways in which it becomes seen as somehow desirable, and breaking the vicious cycle by which innovation activity becomes constrained within borders.

On that basis, we contribute to the discussion of the roles of universities in cross-border RIS. We contend that universities can contribute to the development of cross-border RIS, using their resources and reputation to build cross-border connections and networks. However, it appears that it might be more important that universities are sites of symbolic framing of the positive potential of cross-border working. Despite its symbolic nature, without this framing, institutional entrepreneurs cannot achieve the changes needed to materialize real benefits, because of the persistence of regulatory tensions experienced by cross-border institutions. This lens also reveals the vulnerability of external engagement to the enthusiasm and hard work of successive individuals. At the same time, it is important to recognize the relative scarcity of regions where there is the necessary antecedent functional integration for the institutional entrepreneurs to have binding points in ways that allow their institutional entrepreneurship achieve these wider densification effects (cf. van den Broek et al., 2019).

For policy-makers, our findings imply that in order to build a strong and resilient cross-border region, universities can be important sources of institutional entrepreneurs. The contributions they can make to RIS densification, in turn, may impact upon other RIS subsystems such as firms and policy-makers. As universities are the most evenly spread innovation asset around Europe, they provide an opportunity for more peripheral regions, such as are many border regions (Jonkers, Tijssen, Karvounaraki, & Goenaga, 2018). Universities can have a bridge function and create structures in which young people are educated with a cross-border mindset and are able to build networks across the border. However, for a sustainable contribution of universities policy-makers should be aware that these cross-border activities are vulnerable and external support in the form of helping to build networks and showcase the activities is needed. Financial support can also be helpful, but this should be accompanied by a plan on how to sustain the activities after the funding ends because otherwise there is a risk of continuing project-based collaborations that only partially institutionalize.

In this paper we have taken three examples of (partially) successful institutional entrepreneurship in an old, established cross-border region, but these may equally have salience to other regions where there are other tensions that see suboptimal non-cooperation as being preferable in the first instance to working together to build up institutions. A similar problem can be observed in other border regions, for example, those studied by the OECD (2013) in which it looked at cross-border innovation in six border regions: Bothnian Arc, Hedmark-Dalarna;

Helsinki–Tallinn; Ireland–Northern Ireland; Top Technology Region Eindhoven–Leuven; Aachen triangle (TTR-ELAt); and Öresund. Analysis of the roles of universities within these six cross-border regions found that there was only limited university cross-border collaboration. Even in relatively successful regions such as Öresund and TTR-ELAt, cross-border activities remained marginal (van den Broek et al., 2019).

Exploring these tensions that lead to suboptimal non-cooperation in more depth could potentially involve taking a more in-depth, longitudinal approach to the institutional entrepreneurs and understand their drivers, barriers and the way their agency contributes to changes in (cross-border) innovation systems. Specific attention should thereby be paid to actors in cross-border regions that face considerable barriers in terms of institutional differences.

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REFERENCES

- Asheim, B., Smith, H. L., & Oughton, C. (2011). Regional innovation systems: Theory, empirics and policy. *Regional Studies*, 45(7), 875–891.
- Barney, J. B., & Clark, D. N. (2007). *Resource-based theory: Creating and sustaining competitive advantage*. Oxford: Oxford University Press.
- Battilana, J. (2006). Agency and institutions: The enabling role of individuals' social position. *Organization*, 13(5), 653–676. doi:10.1177/1350508406067008
- Benneworth, P., Pinheiro, R., & Karlsen, J. (2017). Strategic agency and institutional change: Investigating the role of universities in regional innovation systems (RISs). *Regional Studies*, 51(2), 235–248. doi:10.1080/00343404.2016.1215599
- Cerina, F., Chessa, A., Pammolli, F., & Riccaboni, M. (2014). Network communities within and across borders. *Scientific Reports*, 4, 4546. doi:10.1038/srep04546
- Cooke, P. (2005). Regionally asymmetric knowledge capabilities and open innovation. *Research Policy*, 34(8), 1128–1149. doi:10.1016/j.respol.2004.12.005
- Doloreux, D. (2002). What we should know about regional systems of innovation. *Technology in Society*, 24(3), 243–263.

- Fromhold-Eisebith, M. (2007). Bridging scales in innovation policies: How to link regional, national and international innovation systems. *European Planning Studies*, 15(2), 217–233.
- Garud, R., Hardy, C., & Maguire, S. (2007). Institutional entrepreneurship as embedded agency: An introduction to the special issue. *Organization Studies*, 28(7), 957–969. doi:10.1177/0170840607078958
- Gertler, M. S. (2003). Tacit knowledge and the economic geography of context, or the undefinable tacitness of being (there). *Journal of Economic Geography*, 3(1), 75–99. doi:10.1093/jeg/3.1.75
- Gordon, I. R., & McCann, P. (2000). Industrial clusters: Complexes, agglomeration and/or social networks? *Urban Studies*, 37(3), 513–532.
- Gunasekara, C. (2006). The generative and developmental roles of universities in regional innovation systems. *Science and Public Policy*, 33(2), 137–150.
- Hahn, C. K. (2013). The transboundary automotive region of Saar–Lor–Lux: Political fantasy or economic reality? *Geoforum*, 48, 102–113. doi:10.1016/j.geoforum.2013.04.022
- Hansen, T. (2014). Substitution or overlap? The relations between geographical and non-spatial proximity dimensions in collaborative innovation projects. *Regional Studies*, 1–13. doi:10.1080/00343404.2013.873120
- Howells, J. (2012). The geography of knowledge: Never so close but never so far apart. *Journal of Economic Geography*, 12(5), 1003–1020. doi:10.1093/jeg/lbs027
- Jensen, S., & Richardson, T. (2004). *Making European space: Mobility, power and territorial identity*. London: Routledge.
- Jonkers, K., Tijssen, R. J. W., Karvounarakis, A., & Goenaga, X. (2018). *A regional innovation impact assessment framework for universities*. Luxembourg: Publications Office of the European Union.
- Lawson, C., & Lorenz, E. (1999). Collective learning, tacit knowledge and regional innovative capacity. *Regional Studies*, 33(4), 305–317.
- 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., & Trippel, M. (2013). Distance, proximity and types of cross-border innovation systems: A conceptual analysis. *Regional Studies*, 47(3), 450–460.
- Makkonen, T. (2015). Scientific collaboration in the Danish–German border region of Southern Jutland–Schleswig. *Geografisk Tidsskrift – Danish Journal of Geography*, 115(1), 27–38. doi:10.1080/00167223.2015.1011180
- Makkonen, T., Weidenfeld, A., & Williams, A. M. (2016). Cross-border regional innovation system integration: An analytical framework. *Tijdschrift voor Economische en Sociale Geografie*. doi:10.1111/tesg.12223
- Markard, J., & Truffer, B. (2008). Actor-oriented analysis of innovation systems: Exploring micro–meso level linkages in the case of stationary fuel cells. *Technology Analysis and Strategic Management*, 20(4), 443–464. doi:10.1080/09537320802141429
- Miörner, J., & Trippel, M. (2016). Paving the way for new regional industrial paths: Actors and modes of change in Scania's games industry. *European Planning Studies*, 4313, 1–17. doi:10.1080/09654313.2016.1212815
- Miörner, J., Zukauskaitė, E., Trippel, M., & Moodysson, J. (2017). Creating institutional preconditions for knowledge flows in cross-border regions. *Environment and Planning C: Politics and Space*, 1–18. doi:10.1177/2399654417704664
- Organisation for Economic Co-operation and Development (OECD). (2013). *Regions and innovation: Collaborating across borders (OECD review)*. OECD Publ. doi:10.1787/9789264205307-en
- Perkmann, M. (2005). The emergence and governance of Euroregions: The case of the EUREGIO on the Dutch–German border.
- Perkmann, M. (2007). Construction of new territorial scales: A framework and case study of the EUREGIO cross-border region. *Regional Studies*, 41(2), 253–266.
- Prokkola, E.-K. (2008). Resources and barriers in tourism development: Cross-border cooperation, regionalization and destination building at the Finnish–Swedish border. *Fennia – International Journal of Geography*, 186(1), 31–46.

- Pugh, R., Hamilton, E., Jack, S., & Gibbons, A. (2016). A step into the unknown: Universities and the governance of regional economic development. *European Planning Studies*, 24(7), 1357–1373. doi:10.1080/09654313.2016.1173201
- Rodríguez-Pose, A. (2013). Do institutions matter for regional development? *Regional Studies*, 47(7), 1034–1047.
- Sotarauta, M. (2009). Power and influence tactics in the promotion of regional development: An empirical analysis of the work of Finnish regional development officers. *Geoforum*, 40(5), 895–905. doi:10.1016/j.geoforum.2009.06.005
- Sotarauta, M. (2010). Regional development and regional networks: The role of regional development officers in Finland. *European Urban and Regional Studies*, 17(4), 387–400. doi:10.1177/0969776409352581
- Sotarauta, M. (2016). An actor-centric bottom-up view of institutions: Combinatorial knowledge dynamics through the eyes of institutional entrepreneurs and institutional navigators. *Environment and Planning C: Government and Policy*, 1–16. doi:10.1177/0263774X16664906
- Sotarauta, M., & Mustikkamäki, N. (2015). Institutional entrepreneurship, power, and knowledge in innovation systems: Institutionalization of regenerative medicine in Tampere, Finland. *Environment and Planning C: Government and Policy*, 33(2), 342–357. doi:10.1068/c12297r
- Stam, E., Bosma, N., Van Witteloostuijn, A., De Jong, J., Bogaert, S., Edwards, N., & Jaspers, F. (2012). Ambitious entrepreneurship: A review of the literature and new directions for public policy. AWT Report.
- Storper, M. (1993). Regional ‘worlds’ of production: Learning and innovation in the technology districts of France, Italy and the USA. *Regional Studies*, 27(5), 433–455.
- Storper, M. (1995). The resurgence of regional economies ten years later: The region as a nexus of untraded interdependencies. *European Urban and Regional Studies*, 2(3), 191–221.
- Tödting, F., Lengauer, L., & Höglinger, C. (2011). Knowledge sourcing and innovation in ‘thick’ and ‘thin’ regional innovation systems – Comparing ICT firms in two Austrian regions. *European Planning Studies*, 19(7), 1245–1276.
- Tödting, F., & Tripl, M. (2005). One size fits all? *Research Policy*, 34(8), 1203–1219. doi:10.1016/j.respol.2005.01.018
- Tracey, P., Phillips, N., & Jarvis, O. (2011). Bridging institutional entrepreneurship and the creation of new organizational forms: A multilevel model. *Organization Science*, 22(1), 60–80. doi:10.1287/orsc.1090.0522
- Tripl, M. (2010). Developing cross-border regional innovation systems: Key factors and challenges. *Tijdschrift voor Economische en Sociale Geografie*, 101(2), 150–160.
- Tripl, M., Sinozic, T., & Lawton Smith, H. (2015). The role of universities in regional development: Conceptual models and policy institutions in the UK, Sweden and Austria. *European Planning Studies*, 1–19. doi:10.1080/09654313.2015.1052782
- van den Broek, J., Benneworth, P., & Rutten, R. (2018). Border blocking effects in collaborative firm innovation. *European Planning Studies*, 26(7), 1330–1346. doi:10.1080/09654313.2018.1476470
- van den Broek, J., Eckardt, F., & Benneworth, P. (2019). The transformative role of universities in regional innovation systems: Lessons from university engagement in cross-border regions. In A. Varga, & K. Erdős (Eds.), *Handbook of universities and regional development*. Cheltenham: Edward Elgar Publishing.
- van den Broek, J., Rutten, R., & Benneworth, P. (2018). Innovation and SMEs in INTERREG policy: Too early to move beyond bike lanes? *Policy Studies*. doi:10.1080/01442872.2018.1539225
- van den Broek, J., & Smulders, H. (2014). Institutional gaps in cross-border regional innovation systems: The horticultural industry in Venlo-Niederrhein. In R. Rutten, P. Benneworth, D. Irawati, & F. Boekema (Eds.), *The social dynamics of innovation networks* (pp. 157–175). London: Routledge.
- Yin, R. K. (2009). *Case study research: Design and methods* (4th ed., Vol. 5). Thousand Oaks: Sage.