

Research Concept:

Dynamic perspectives on knowledge exchange configurations in innovation processes.

Business practices from Eastern Germany and Estonia

Abstract

Within the debate on economic peripheralisation processes, innovation activities take on a focal role. A lack of innovation is regarded an essential driver of economic peripheralisation processes which is why innovation activities are also deemed a central strategy for responding to peripheralisation processes and for inducing regional change. Previous studies have identified that businesses generate innovations despite operating within and from seemingly unfavourable socio-spatial environments. By adopting an understanding of innovation that emphasizes its knowledge-driven, interactive and evolutionary nature, the project aims to investigate the mostly unaddressed question of how innovation activities come into being and evolve over time – placing a particular spatial focus regions affected by peripheralisation processes. To adequately address the project’s guiding interest its empirical strategy will be based on actor-centred and micro-level approaches.

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1 Introduction: context and scope

1.1 Introduction and Context

Within the European Union, indications of regionally uneven (economic) development can be broadly observed both on the EU level between individual member states as well as between regions on the sub-national level. The processes behind these indications are subject to intense debates, both within policy and academic circles, on the origins of regional disparities as well as potential ways to address and mitigate them. On the sub-national scale a persistent, and often further increasing polarised pattern of dynamic core regions on the one hand and the regions that lag behind the development of the cores regions, usually referred to as *peripheral regions*, can be observed (e.g. Lang, 2011).

After the political and economic changes during the 1990s, Central and Eastern European (CEE) countries have been exposed to intense globalization and internationalisation processes (e.g. Bohle and Greskovits, 2007). These dynamics further accelerated after the CEE countries joined the EU in 2004. The gap between perceived centres and perceived peripheries, in economic terms and further socio-spatial dimensions is rapidly increasing within CEE countries and has, in some cases, taken enormous extents (e.g. Lang, 2011). Such polarisation processes have a very particular and often even increasing dynamic despite extensive support from EU's cohesion policy, in place to aid balanced territorial development. Despite this substantive financial support to increase the economic well-being especially of the less developed regions in most cases only a slow rate of convergence can be identified. Economic progress is increasingly concentrated within only few localities, often metropolitan regions (and within the CEE context mostly capital regions), while other localities cannot keep up with the set pace. Further widening regional disparities have become an omnipresent phenomena of economic development processes within CEE countries. These dynamics are further fuelled by the ongoing economic and financial crisis.

1.2 Scope of the project

The dominant perspective on processes of peripheralisation and peripherality throughout this project will be an economic one. However, adopting this lens does not deny that peripheralisation processes and the state of peripherality are multidimensional and complex phenomena. The various dimensions that are placed at the centre on the peripheralisation debate relate to a number of social-economic and socio-spatial discourses and are highly interwoven, therefore influencing each other and multiple scales and through various channels.

Theoretical approaches addressing the economic dimension of peripheralisation processes commonly suggest that a lack of innovation activities acts as a central driver of regional peripheralisation (Kühn, 2015). These approaches emphasize that regions within which innovation only rarely occurs lack, to a large extent, focal capacities for economic and entrepreneurial renewal and are exposed to self-reinforcing dynamics resulting in ever more forceful peripheralisation processes and the emergence and/or continuance of regionally polarized patterns (e.g. Friedmann, 1973). Coupling of multiple processes that relate to peripheralisation on different dimensions, such as economic decline, outmigration, disinvestment etc. can frequently be observed. At the same time, such macro-level

processes also illustrate the interconnectedness between cores and peripheries: resource gains in core regions are inseparable linked to resource losses in other, peripheral localities.

Innovation activities do not only play a critical role within the debate on regional peripheralisation processes, they are also considered key factors within wider debates on endogenous growth (e.g. Martin and Sunley, 1998). Contributions from classical agglomeration theory argue that agglomerated and rather dynamic regional settings provide conditions that are most conducive for extensive innovation activities as they concentrate a diverse entrepreneurial base, universities, research and support institutions, a specialised labour market etc. (e.g. Amin, 1999; Shearmur, 2012). Following neo-classical argumentation that innovation and its benefits will eventually spill-over from centres to non-core regions, core regions, hosting a wide(r) range of high-tech industries, have received the main attention of policy makers when it comes to implementing innovation policies on European as well as national scales (Hansen and Winther, 2011). However, in case the expected and often taken for granted, spill-overs fail to materialise, top-down innovation policies, privileging metropolitan and dynamic rather than non-metropolitan and weaker regions, may have unintended effects and further fuel processes of and peripheralisation, therefore producing and reproducing such tendencies in the long run.

Box 1: the periphery label within economic geography and innovation studies

Excursion: the periphery label within economic geography and innovation studies:

This thematic excursion aims at sketching the main elements of dominant conceptualisations of regions that are typically perceived as *peripheral regions* within mainstream approaches of economic geography and innovation studies. Based on reviewing a set of literature (e.g. Anderson, 2000; Baumgartner et al., 2013; Doloreux & Dionne, 2008; Fitjar & Rodriguez-Pose, 2011; Gössling & Rutten, 2007; Isaksen, 2001; Jakobsen & Lorentzen, 2015; Langendijk & Lorentzen, 2007; Mayer & Baumgartner, 2014; McAdam et al., 2004; Oinas & Malecki, 1999; Onsager et al., 2007; Tödtling & Tripl, 2005; Virkkala, 2007) that provides insights into how regions with certain social-economic and socio-spatial characteristics tend to be conceptualised, I will introduce some major dimensions as well as aspects that are used as reductionist place holder for these dimensions, of what I will refer to as the '*periphery label*'. This label, frequently adopted within the wider discourse on the *core-periphery* model and more specifically within economic geography and innovation studies, is a constructed, relative and normative representation which substantially contributes to (re)producing dichotomous *core-periphery* perspectives within the discipline.

The geographical attributes of regions can be identified as one of the most significant dimensions of the periphery label. In this understanding geography is reduced to the notion of distance (both physical but also relational) which is mobilised to conceptualised regions that are distant from centres. By being distant from metropolitan areas regions and actors face insufficient accessibility, isolation from main markets, knowledge organisations and hotspots of innovation and more generally from the core of the knowledge economy.

Closely related to a state of physical but also relational remoteness and following traditionally dominant research avenues within economic geography/innovation studies that emphasize the role of agglomeration externalities, actor co-location and localised networks, regions distant from the main centres are perceived as only providing a thin actors base. Such thinness results in a lack of a critical mass of relevant regional actors and higher order functions, an absence of sectors that provide for

technological complementaries etc. Due to low actor density, localised and regional networks tend to be fragmented and perforated and therefore hamper processes of local knowledge exchange and learning. Furthermore, regions that exhibit a persistently below average level and growth rate of GDP and higher than standard unemployment rates are considered economically peripheral and marginal. Such localities are seen to be exposed to a vicious circle which results in difficulties of creating jobs and generally a condition of long term retarded development and backwardness. This economic dimension of the periphery label is closely linked to the resource dimension which addresses that peripheral regions tend to have a shortage of critical resources such as financial capabilities for R&D, training or networking. Furthermore, regions affected by outmigration have to deal with aggravating shortages of human resources, especially highly qualified labour.

The picture that the mainstream literature draws on actors based within *peripheral* localities is that of general powerlessness. Firms in *peripheries* are generalised as being mostly small and originating from traditional and craft based industries, as lacking growth and innovation attitudes due to cognitive and cultural distances to leading industries and as missing specialisation. Furthermore, such descriptions are often linked to businesses being family owned and adhering to rather traditional management approaches. However, should these businesses manage to generate innovative solutions, these outcomes are per-se perceived as being small-scale, incremental and therefore trivial and inferior in nature which only allow for catch-up learning. Innovations generate by actors in peripheries are often reduced to process innovation and actors as late adopters rather than pioneers.

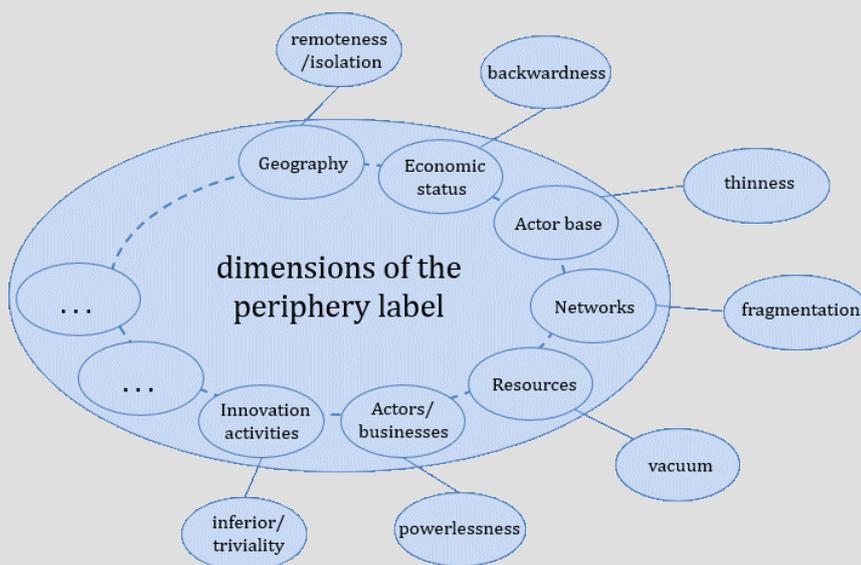


Figure 1: the periphery label in economic geography and innovation studies (own illustration)

Figure 1 illustrates the dominant conceptualisation towards peripheral regions in economic geography. However, it does not claim to be an exhaustive representation, but certainly addresses the main dimensions of the periphery label as well as frequently mobilised aspects that relate to these dimensions. The prevailing descriptions transported through this label exclusively focus attention to what regions perceived as peripheries may lack. Peripheries don't seem to be equipped with basic conditions that support innovation (Oinas & Malecki, 1999; Doloreux & Dionne, 2008), making them hostile environments for new and small firms (Anderson et al., 2001). Economic activities are regarded leftover core activities that rely on second best technologies and knowledge from the core (Langendijk & Lorentzen, 2007). This mainstream perspective is strongly one-sided and draws only rarely, if at all, references to certain qualities and capabilities of peripheral regions, however, such qualities do exist. Strong informal and social

connections between actors coined by a high degree of mutual trust and reciprocity can emerge as a result of isolation, small size and a lack of density and represent one specific capacity which has been identified across different spatial contexts (e.g. Atterton, 2007; Ring et al., 2009, Young, 2010).

Within this project I argue for a more nuanced and less dichotomous understanding as valid alternatives to the established '*strong core*' and '*fragile periphery*' notion in economic geography and innovation studies. It has been shown that *peripheral regions* and its actors are in capacity to generate innovative outcomes, but innovation processes may look and evolve differently compared to those in *core regions*.

Identifying a lack of innovation as a central driver of economic peripheralisation processes goes hand in hand with the focal role that is assigned to successful innovation in terms of regional economic development. Businesses that strive for and manage to generate innovative solutions are considered essential actors for counteracting polarisation processes and to overcome states of peripherality (e.g. Friedmann, 1973; Kühn, 2015). However, innovation related research within disciplines such as (economic) geography, economics and innovation studies that specifically addresses regional settings that are typically perceived to be peripheral, less favoured, weakly structured etc. is still relatively rare and only slowly emerging. On the other hand, the concept of innovation and its potentially stimulating effects on regional development has been and still is frequently adopted within the context of highly agglomerated, dynamic regions and/or high-tech industries which often reside within these localities. To a certain extent, this regional bias can be interpreted as reflecting the dominant orientation within innovation policy towards well performing core regions. But even if a certain imbalance can be clearly identified, a set of scholarship that investigates innovation activities outside core regions and sectors does exist (e.g. Doloreux and Dionne, 2008; Fitjar and Rodriguez-Pose, 2010; Grillitsch and Nilsson, 2015; Jakobsen and Lorentzen, 2015; North and Smallbone, 2000; Virkkala, 2007) and the number of studies is expanding – adding new and multifaceted research perspectives, both conceptually and spatially.

Departing from different spatial foci and conceptual approaches, the above mentioned literature emphasizes that the generation of innovation is not exclusively bound to highly dynamic and agglomerated localities but also emerges from regions that face rather unfavourable structural pre-conditions and which are typically not perceived as being conducive for generating innovative outcomes. Scandinavia can be identified as a specific regional context within which research related to innovation activities in non-core regions has been frequently explored. The understanding of peripherality in these studies is predominantly linked to geographical remoteness, i.e. distance to agglomerated localities. Exploring the knowledge exchange/acquisition practices of businesses in remote regions Grillitsch and Nilsson (2015) show that such actors are more likely to build links to distant partners than businesses in more agglomerated regions. Jakobsen and Lorentzen (2015) confirm this result, which can be interpreted as a specific practice arising from a certain necessity, and additionally find that within the Norwegian context firms from rather isolated settings have in general a higher propensity to engage in innovation related collaborations.

The critical role that knowledge sourcing plays in innovation processes is underlined by studies that investigate the knowledge exchange characteristics of firms located in non-metropolitan cluster settings in Norway (Fitjar and Rodriguez-Pose, 2011) and Finland (Virkkala, 2007). Within these cluster contexts, which provide for some critical actor density despite being located on the fringe, both local/regional as well as extra-local knowledge exchange act as drivers of innovation activities. Both studies establish that lead firms within the cluster, and larger firms more generally, are focal actors when it comes to acquiring knowledge from extra-local locations, and sometimes even function as distributors of this externally acquired expertise. Within the UK context North and Smallbone (2000) highlight the innovation capacities of firms from rural regions. Roughly 75% of firms in their sample are either moderately or highly innovative. In terms of firms' knowledge exchange configurations their study finds that larger firms are more likely to engage in extra-local exchange (a result confirmed by all of the above mentioned studies) and also establishes that the propensity of firms to acquire external knowledge depends on the industry within which they operate. Firms from technologically more sophisticated industries use external expertise more frequently than firms from rather traditional economic sectors.

The results from this set of literature can be seen as potential indications that economic actors located within peripheral settings have indeed the capacity to generate innovative outcomes. This capacity is mobilised through practices which allow actors to circumvent seemingly uncondusive pre-conditions. Ultimately, these results also suggest that geographical proximity between and co-location of diverse actors is not the only mechanism creating synergies. Following these lines of thought, these insights create alternatives to the traditional view which considers co-location and density as prime arguments of why agglomerated settings are privileged over non-agglomerated ones in terms of innovation capacity (e.g. Moulaert and Sekia, 2003; Porter, 1998; Simmie, 2005). Hence, the studies contribute to setting the scene for a more nuanced understanding of the dominant and reductionist dichotomy of '*innovative cores*' and '*non-innovative peripheries*'.

1.3 Research Objectives:

Taking existing empirical literature on innovation activities in regions perceived as peripheral localities as a point of departure, this study adopts the normative perspective that actors in such localities have indeed the capacity to generate innovation. Based on this initial premise, the present research seeks to contribute to further investigate innovation activities of businesses in *peripheral* (or, alternatively weakly structured, old industrialised, less favoured, transitional, remote etc.) settings. It aims to do so by addressing a gap that can be identified within the existing literature: the question of *how* innovations come into being and evolve of time and space a mostly left unaddressed within the existing scholarship. Against this background, this project places itself in a niche which is specifically interested in exploring the specific contexts under which innovations emerge, the practices through which actors' innovative capacities are mobilised and the evolutionary path that innovation processes take.

By pursuing this research objective will project will contribute to the discussion on innovation activities that emerge from regions perceived as peripheries – a field which slowly receives increasing attention within economic geography. However, by specifically addressing the question on how innovation emerges, this project aims to widen existing research avenues and partly delimits itself from previous

scholarship by introducing a range of changes in prevalent research perspectives. Firstly, the project will adopt a distinct qualitative design which is in contrast to a large number of innovation studies that follows quantitative strategies. Secondly, the project will have a distinct micro-foundation. Its main unit of analysis will be concrete innovation processes, i.e. the research focus will be placed on the micro process-level rather than the dominant but more aggregated firm-level.

2 Theoretical considerations, conceptual framework

This section aims at introducing the essential theoretical considerations and the conceptual framework that the thesis will rest on and based on which a set of research questions will be derived. The section starts out by introducing the central concept of business innovation which is, despite being widely used within academic and policy related discourses, characterised by a large degree of fuzziness. However, some commonly accepted characteristics of innovation can be identified and will be presented below. The project will specifically focus on business innovation, therefore centre innovations and innovation activities which exhibit a distinct market-orientation. Additionally this parts aims at clarifying the project's guiding perspective towards innovation. This perspective will essentially be an inclusive and broad understanding of innovation – as opposed to an exclusive and restricted understanding which is frequently adopted in economic geography and innovation studies, e.g. by privileging solely technological and rather large-scale innovation processes.

Based on innovations' central characteristics of (i) evolutionary process thinking, (ii) knowledge foundation and (iii) interactivity, the remainder of the section sets out to compose a conceptual framework which adheres to and puts a particular emphasize on these focal aspects.

2.1 Innovation theory and the concept of business innovation

Due to the central role that is ascribed to innovation and associated entrepreneurial activities, innovation has been and still is an influential concept both within policy and academic centred debates on regional economic development issues. Strategies of enabling and stimulating business innovation, e.g. through providing and further developing corresponding framework conditions but also actions that aim at further strengthening innovation activities are on top of the agenda of most regional economic development strategies. Despite its popularity, underlying conceptual approaches innovation and what it empirically refers to remain largely fuzzy and elusive, highly context related and frequently subject to rather normative agendas¹.

With the aim of establishing a multi-disciplinary meta-definition of business innovation, Baregheh et al. (2009) reviewed more than 60 individual definitions from seven distinct academic disciplines which frequently adopt the concept.

¹ e.g. by adopting an exclusively technological understanding of innovation which is implicitly adopted by using patent related data as a measure for innovation.

'Innovation is the multi-stage process whereby organizations transform ideas into new/improved products, services or processes, in order to advance, compete and differentiate themselves successfully in their marketplace.' (Baregheh et al. 2009, p.1334)

The definition specifically highlight the process nature of innovation activities by which ideas are transformed into products or processes. The aspect of innovation being an evolutionary process is a widely accepted conceptual feature within academic scholarship and derives from seminal innovation models that have established stylised representations of innovation processes (e.g. Godin, 2006; Kline and Rosenberg, 1986; Rothwell and Zegveld, 1985).

Despite the wide approval of considering innovation as evolutionary, organisational transformation processes, much of the literature in economic geography and innovation studies is preoccupied by devoting most attention to the outcomes of according development processes. By merely focusing on the outcomes of (successful) innovation activities, the process view is significantly constricted as the actual organisational process of interest, which eventually and finally leads to new or improved products/processes, is mostly completely neglected.

The above mentioned attempt of a meta-definition puts clear emphasize on the process nature of innovation. Yet, some features of innovation that are widely accepted within academic discourses are only marginally, if at all, addressed. These features also seem to originate from some of the above mentioned innovation models. In particular the 'coupling model' (Rothwell and Zegveld, 1985) and the 'chain-linked model' of innovation (Kline and Rosenberg, 1986) have specifically focussed attention on the interactive nature to innovation processes. Interactivity in innovation processes refers to relations between various partners (individuals/organisations) that contribute to innovation activities and is closely related to the knowledge driven nature of innovation processes. Interactivity between partners involved in innovation processes occurs both on the intra-firm level (e.g. teams, departments, subsidiaries) as well as the inter-organisational level (Bathelt et al., 2004). Interaction in innovation processes serves as a means to mobilise and unlock expertise and resources within and between organisations based on which new knowledge can be created or existing knowledge combined in novel ways (Asheim & Coenen 2005). Furthermore, interactivity takes on essential roles by reducing uncertainty in highly complex innovation processes. Inter-organisational forms of interactivity by which processes of knowledge exchange and learning between organisations are stimulated go increasingly beyond sectoral/industrial boundaries by accessing and combining expertise from different knowledge bases and geographical origins (Asheim, 2007; Crevoisier and Jeannerat, 2009).

Throughout the thesis a broad and inclusive understanding of innovation will be adopted. Following such an inclusive perspective on innovation the project will consider

- technological and non-technological innovations as well as product and process innovation,
- small scale and incremental as well as more radical innovation as potential cases.

Furthermore, the project seeks to adhere to the above identified central and widely acknowledged characteristics of innovation processes: (i) knowledge foundation, (ii) interactivity and (iii) evolutionary

process thinking. The project aims to integrate and reflect these aspects throughout the research process – both conceptually and methodologically.

Composing a conceptual framework:

This section seeks to sketch the composition of the project's conceptual framework. Due to the central position that is devoted to the concept of innovation – the central aspects of the overarching conceptual framework aims at reflecting the essential characteristics of innovation processes and to expand them into a coherent framework. Therefore, theoretical considerations for the conceptual framework depart from

- knowledge foundation
- interactivity and
- evolutionary process thinking

These central and widely acknowledged characteristics of the nature of innovation processes are largely interconnected and exhibit certain overlaps, such as the interconnection between knowledge creation and learning processes and interactivity. Therefore, the aspects cannot be seen as units that are clearly separable.

2.1.1 Knowledge foundation of innovation processes

The significance of knowledge within the innovation debate derives from the notion that knowledge is widely considered the essential input to innovation that need mobilising throughout the innovation process rather than marking a preliminary stage within the innovation process (e.g. Kline & Rosenberg, 1986; Lundvall & Johnson 1994; Pavitt, 2006). Knowledge that is transformed into innovation can either be newly created or new combination of previously existing knowledge and helps to structure highly complex innovation processes by reducing uncertainty (Pavitt, 2006; Simmie 2005). However, to a certain degree knowledge that is newly created builds upon existing knowledge and expertise (e.g. Fagerberg, 2006). This is because, as Howells (2002, 2012) suggests, knowledge is an individual-centred phenomenon which is constantly evolving and substantially shaped through past and personal experiences. Hence, in spite of, or rather because, knowledge being largely individually based, knowledge also has a substantial relational aspect. Creation and exchange of new knowledge requires to put knowledge into a wider context with its environment such as other individuals and on more upwards scales working groups, units, firms or industries. Such inter-linked learning processes are essential for innovation and highlight at the same time the notion of understanding knowledge as a socially constructed process (Howells, 2002) as well as the interactive nature of innovation activities which is strongly interconnected to knowledge specifications (and further discussed in section 2.2.2).

Although knowledge has been differently theorised and conceptualised within innovation related literature the most widely accepted distinction is that between explicit/codified and tacit knowledge, going back to Polanyi (1962). These two types of knowledge differ in their degree of formalisation. While tacit knowledge cannot be directly communicated/documentated and is largely embedded into direct experiences and practices explicit knowledge involves know-how that is formally transmittable. These characteristics have facilitated debates on the spatial mobility of tacit knowledge and it is frequently

concluded that tacit forms of knowledge are localised, i.e. spatially sticky in nature (e.g. Crevoisier & Jeannerat, 2009; Feldman & Kogler, 2010; Howells, 2002, 2012; Simmie, 2005). Lundvall and Johnson (1994) group economically relevant knowledge into the categories (i) know-what, (ii) know-why, (iii) know-who and (iv) know-how which exhibit relations to the explicit/tacit distinction. The categories of know-what (e.g. factual knowledge) and know-why (e.g. scientific background knowledge) are largely explicit while know-who (e.g. personal relations) and know-how (e.g. skills and practices) are more implicit in nature. More recently, the knowledge base concept (Asheim & Coenen, 2005), distinguishing between analytical, synthetic and symbolic knowledge bases, was introduced as an alternative conceptual approach that has been frequently adopted. While highlighting inter-industrial differences of using and producing knowledge (science based, engineering based and art based), the conceptualisation is built on the basic distinction between explicit and tacit types of knowledge.

2.1.2 Interactivity

The interactive nature of innovation processes is a main insight stemming from stylised innovation models emphasizing the role of knowledge exchange and interactive learning in innovation (Kline & Rosenberg, 1986; Rothwell & Zegveld, 1985). These interactive models have basically replaced a strictly linear and isolated understanding of knowledge creation in innovation processes (Godin, 2006) by drawing attention to recursive feedback loops between the individual stages of the innovation process, drawing on both intra- and inter-organisational relations. Linkages and interdependencies between a variety of actors in innovation processes is closely connected to interpreting knowledge creation and acquisition as social processes which requires learning through exposing individually bound knowledge to common environments within which it is interpreted (Howells, 2002).

Interactivity in innovation processes aims at mobilising knowledge and expertise which resides outside the own organisation and to integrate this expertise into internal processes. Complementing internal capacities with external ones not only creates learning potentials between actors, uncertainties of complex projects are being reduced and processes and be streamlined. Blending of expertise through interaction is, however, not only a choice in facilitating innovation, it also becomes more and more a necessity in the sense that it enables organisations to innovate in the first place. Within the literature this notion is linked to the fact a number of observations. Firstly, innovation processes are becoming increasingly complex, for instance due to rapidly evolving technologies and demands. Hence, ever more expert knowledge is needed within an expanding number of fields of expertise. Secondly, organisations themselves are focussing their expertise through specialisation on certain sub-fields and niches. Therefore, ever increasing dispersed and fragmented knowledge source need mobilisation for solving complexities and generating innovation (e.g. Bathelt & Glückler, 2003; Howells, 2012). Against this background, interaction in innovation processes can be seen as an essential factor for why knowledge dynamics become increasingly heterogeneous in terms of spatial scales (Bathelt et al., 2004) but also sectoral/industrial contexts (Crevoisier & Jeannerat, 2009).

2.1.3 Evolutionary process thinking

Innovation processes are highly uncertain developments, constantly being shaped and re-shaped and evolve as they evolve and imply changes and novelties to varying degrees. Stylised innovation models have introduced a certain structure onto these processes by identifying certain stages which innovation processes typically traverse. However, the high degree of uncertainty implies that innovations are open-ended and contingent processes, and their outcomes can only be hardly determined from the outset (Pavitt, 2006). Such evolutionary perspectives on innovation mainly focus on change as a critical aspect. Innovation processes are concerned with established knowledge, routines, practices being complemented or even replaced by alternative/new ones. Such changes are not only confined to organisational processes by which innovations are generated, they also relate to the organisations themselves, to associated networks and relational configuration through which they engage in knowledge acquisition and exchange processes. These overarching structures change over time as innovation processes and, on a larger scale, organisations evolve (Boschma & Martin, 2007).

2.2 The proximity debate

Proximity and distance are a central conceptual pair within economic geography which refers to the constellations between economic agents, coined by the co-existence of similarities and differences between them. Proximity between agents is mainly seen as a positive feature, mitigating the coordination problem. Distance, on the other hand, is predominantly not considered a resource, even though novelties usually originate from a certain degree of distance (Ibert et al., 2014). The theoretical building blocks of the innovation concept outlined above, can be clearly identified within the wider discussion on both spatial and relational proximity configurations.² Hence, the proximity debate is considered a useful framework for connecting and integrating the essential aspects derived from innovation theory.

2.2.1 Spatial proximity as dominant perspective within economic geography

Economic geography has traditionally adopted a proximity perspective that privileges its physical dimension. Permanent co-location of economic agents within certain regions has been a prime explanatory factor for innovative capacity and the economic success of such actor dense and institutionally thick localities (Amin & Thrift, 1995; Amin, 1999). Departing from a perspective that considers knowledge a highly localised resource with only restricted mobility (Howells, 2002, 2012) leads to the notion that knowledge transmission, and especially the transmission of tacit knowledge, and learning is largely rooted in and facilitated through geographically proximate relations. Hence, it has been argued that being closely located to knowledge sources, and more generally a large number of

² Knowledge foundation: proximities and their impact on learning; Interaction: proximities as factors for why agents connect; Evolutionary process thinking: fluid and evolving nature of proximities;

diverse actors generating and possessing knowledge, increases the likelihood of benefitting from knowledge diffusion (e.g. Feldman & Kogler, 2010; Koschatzky, 2001). Furthermore it has been argued that spatial co-location creates a communication ecology that is most conducive for stimulating processes of knowledge exchange and mutual learning (e.g. Bathelt et al., 2004; Simmie, 2005). The benefits of agglomeration are seen in providing exchange environments that allow for rich social contact and frequent face-to-face interactions, contribution to the emergence of informal institutions and trustful relations supporting learning and, ultimately, innovation (Boschma and Martin, 2010).

Based on these streams of thought, a variety of conceptual approaches to modelling localised relations and learning has emerged. These concepts are grouped under the umbrella of territorial innovation models (TIMs) (e.g. Moulaert & Sekia, 2003). Particular prominent and extensively explored concepts are innovative milieux, industrial districts, industrial and innovation clusters or regional innovation systems.

More recently, the notion of permanent co-location has been complemented by a strand of scholarship that considers the role of specific formats of temporary co-presence like trade fairs or business conferences at which a multitude of diverse actors come together, therefore providing a platform for intense interaction as well as knowledge dissemination and creation. Due to the knowledge rich and actor dense environment such industry gatherings potentially create, they are frequently conceptualised as temporary 'cluster-like' settings that allow for engaging with extra-local and even global information flows (e.g. Bathelt & Schuldt, 2008; Henn & Bathelt, 2014; Maskell, 2014).

2.2.2 Extending proximity: multi-dimensional perspectives

Even if role of spatial proximity for processes of interactive learning and innovation remains broadly accepted, the ascription of such rich and fruitful interactions to merely the local scale seems to have become more relative. Intense and rich relations between agents can also be established over distance. In a seminal contribution Boschma (2005) argues that spatial proximity between actors is neither a necessary, nor a sufficient condition for facilitating learning and innovation.

Beside geographical proximity Boschma explores alternative proximity dimensions in the light of coordination and learning between agents and establishes a typology of different proximity dimensions which help to explain which agents connect – therefore exchanging knowledge and engaging in mutual learning which may ultimately lead to innovation.

- *Cognitive proximity* relates to the knowledge and expertise of individuals and organisations. Specialisation within certain key areas, technical and market competencies determine cognitive abilities.
- *Organisational proximity* refers to a set of interdependencies and relations by which processes of knowledge exchange are coordinated e.g. either between organisations (e.g. firm networks, associations etc.) or within organisations (e.g. subsidiaries).
- The notion of *social proximity* originates from the literature on embeddedness, and relates to the micro-level relations between actors based on trust, kinship and mutual experience.

- *Institutional proximity* emphasizes the macro-level and associated formal frameworks of norms, codes of conduct but also laws and regulatory settings.
- *Geographical proximity* refers to physical distance between economic actors both in absolute and relative terms.

A central outcome from the proximity debate is that a balance between closeness and distance in any of the proximity dimensions is deemed most conducive for facilitating processes of learning and innovation (Boschma, 2005). Too much proximity can create rigid routines and potentially reduces openness for recognising novelties – a central capacity for innovation. Too much distance on the other hand compromises the effectiveness of communication and exchange. This condition, phrased the proximity paradox (Boschma & Frenken, 2010), highlights the role of firm heterogeneity and the potential that distances between agents, especially in cognitive and social terms, have for learning processes and the emergence of innovation.

When it comes to the interplay between the individual proximity dimensions it is widely considered that they act as both substitutes and complements. While suggesting that proximity in one dimension helps to overcome distance in another, the substitute perspective downplays the traditionally prominent role of physical co-location (Boschma, 2005; Balland et al., 2013). On the other hand, it has also been argued that non-spatial forms of proximity are facilitated by spatial proximity, hence, geographical proximity maintains to have a positive impact on the emergence of trust or cognitive similarities between actors (e.g. Hansen, 2014; Malmberg & Maskell, 2006).

Such multidimensional perspectives on proximity have substantially widened research avenues within economic geography and innovation studies. However, within these extended research perspectives proximities are mainly considered as given and static conditions rather than entities that are themselves exposed to dynamics and changes. Attributes of actors change over time as well as relations between actors. However, such dynamic perceptions, taking into consideration that proximities between agents and constantly shaped and re-shaped through interaction and collaboration have only been recently called for (Balland et al., 2013; Balland et al., 2014).

2.3 Research questions

Based on the aforementioned scope and the research objectives, the project specifically addresses regions that can, adopting the dominant perspective in economic geography and innovation studies, be referred to as being affected by peripheralisation processes. The thesis sets out to shed light on how innovations in such localities in the East German and Estonian context emerge/come into being and evolve over time and throughout space. Thereby, the project specifically addresses a research field that is greatly underexplored. From this central objective and the above introduced theoretical perspectives on innovation, I derive the following guiding research question:

- **Which practices do businesses in regions affected by peripheralisation processes adopt in order to generate innovations (and to overcome potential shortcomings of their environment)?**

On a smaller and more tangible scale, I further develop a set of more specific sub-questions which relate to the proximity discussion that has been briefly outlined, thereby implicitly addressing the three focal characteristics of innovation processes (knowledge foundation, interactivity and evolutionary development):

- What is the role of multi-dimensional proximity configurations in constellations of knowledge exchange and acquisition?
- Does the importance of proximity dimensions alter throughout innovation processes? If so, which dimensions do these changes relate to?
- What is the role of temporary co-presence (i.e. formats such as trade fairs) in innovation processes?

3 Methodology

In order to meet the above mentioned research objectives and to adequately address the related research question set out above, I intend to adopt a methodological framework which somewhat demarcates itself from contemporary research approaches which are largely quantitative in nature and focus either on the firm or the outcomes of innovation processes as the central analytical unit. The approach adopted within this project will be micro-foundational and actor-centred in nature.

3.1 Innovation biographies

Innovation biographies (Butzin, 2012; Butzin & Widmaier 2015) will be a methodological reference point. By focusing on concrete innovation processes as the central analytical unit, Innovation biographies specifically address the micro-level and allow emphasize the role knowledge and interactivity play in innovation. Additionally, the methodological procedure allow to integrate static as well as dynamic considerations, thereby addressing the evolutionary aspects of innovation processes. *Ex post* reconstructions of specific innovation project are a relatively novel field within innovation related economic geography and innovation studies. Existing studies have generated insights into the time-space dynamics of innovation processes and have approached the phenomena from different conceptual lenses such as territorial knowledge dynamics (Butzin, 2013; Butzin & Widmaier, 2015), multidimensional configurations of closeness and distance between actors (Ibert et al., 2014, Stein, 2014) and communities of practice (Müller & Ibert, 2014).

Inspired by the 'follow-the-thing' tradition in geographical research using multi-site ethnographies (e.g. Cook, 2004), innovation biographies follow specific development processes throughout time and space, thereby exploring relational actor and knowledge configuration associated with concrete innovation processes. Innovation biographies expand the idea of 'follow-the-thing' to 'follow-the-idea' while keeping the open and explorative direction of research (Ibert et al., 2014, p.53). Innovation processes are traced back starting from when the idea for a specific project/process first emerged until the outcome of the

development process is exposed to the market. However, as innovation processes are largely evolutionary in nature and often depart from incremental developments, determining the start and end of development processes not trivial and these phases are characterised by a significant degree of fuzziness.

3.2 Methodological building blocks

As a methodological research approach innovation biographies combine different research methods:

- **(narrative) interviews,**
- **ego-centred network analysis** and
- **triangulation.**

Narrative interviews form the central mode of data collection and entry point into research on innovation biographies. The goal of the opening narrative interview with a/the key actor of the innovation process under investigation (e.g. CEO, R&D representative, etc.) is to collect sufficient information for establishing a first draft of a biographic text. Following the guiding criteria of innovation biographies, the opening narrative interview seeks to collect information on the innovation's time-line and sequence of key events, the essential actors as well as locations involved and the knowledge provided/acquired/exchanged.

Based on this initial interview, an ego-centred network, of which the innovation process itself is the central node, is established and used for identifying further interview partners (via snowball sampling). Identifying central actors and their contribution to the innovation process is essential in order to record the determining structural elements (nodes and ties) of the network. The procedure intends to conduct further interviews with individuals that had decisive functions in the innovation process. They can either be from the same (innovating) organisation, but also be from organisations that provided external expertise. Based on subsequent interviews the initial biographic narrative aims to be enriched. The objective *'is to get a full picture of the main actors, what they have contributed in terms of expertise and competence, when they entered the development and where they were located.'* (Butzin, 2013, p.42). Combining these research methods, along with the micro-level unit of analysis, allows to construct micro-level innovation networks which do not only capture static aspects but also integrate dynamic changes. Therefore, the approach significantly expands existing approaches on studying actor configurations in knowledge exchange and innovation networks which predominantly rest on static perspectives (e.g. Dubois, 2013; Krätke, 2010; Plum & Hassink, 2013).

In order to establish a coherent innovation biography and to make it accessible for analysis according to the proximity-related research perspectives, data from interviews, desk research, ego-centred and spatial analysis need triangulation. The result should be thick and comprehensive story of the innovation biography and entails all relevant aspects. Based on a set of innovation biographies, comparative analyses and the construction of typologies, reflecting patterns of similar observations across different organisational innovation contexts, intend to be established.

3.3 Qualities and limitations

Adopting a micro-level perspective of analysis which moves actual innovation processes into the centre of analysis certainly opens novel research perspectives that have only been rarely applied. The research procedure addresses the micro-process level and is therefore in capacity to explore the evolutionary, dynamic and complex time-space relations and configurations that innovation is concerned with. One specific strength is that the approach allows to explore the dynamics of innovation processes – it is therefore clearly in capacity to investigate the evolutionary nature of innovation, for instance by shedding light on how knowledge and actor configurations but also proximity dimensions change as innovation processes evolve from infant to more mature stages. Furthermore, innovation biographies allow to investigate significant events that occurred during the innovation process and how these events affected its further dynamics. Such events can for instance be firm-internal but also related to external events such as trade fairs etc.

However, there are also specific drawbacks related to the innovation biographies research procedure. One of these drawbacks is generally shared with qualitative approaches and relates to interviews being the central mode of data collection. Therefore, the research process largely depends on the interviewees, their willingness to share information and their subjectivity on what is reported, omitted and how certain events within the process are described. Coherent innovation biographies draw on information provided by multiple key informants, most likely from different organisations. Therefore, the quality and richness of the final biography also depends on the willingness of the innovating organisation to provide access to external informants (via snowballing). The ex post perspective by which innovation processes are reconstructed acts as a further potential bottleneck. By reporting about processes that have been completed in the past, sometimes years ago, certain informative details may simply be forgotten, or potential interview partners not be available anymore.

Beside these rather practical hurdles one frequently articulated weakness is that innovation biographies look at successfully completed development projects, therefore a specific best-practice perspective is taken on. In this sense innovation biographies may lead to skewed findings as failures are usually not addressed. However, a particular interest will also be to investigate critical phases during the development path and how these phases have been overcome. Hence, perspectives beyond the success bias can at least be partially integrated. Another issue relates to the comparability of different innovation processes and the fact that such processes are individually unique. The contextuality of innovation processes limits the scope for comparison.

4 References

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