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Rethinking Territorial Innovation: World Market Leaders outside of Agglomerations
Acknowledgements

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- Response by Markus Grillitsch  
- Response by Anna Growe  
- Response by Richard G. Shearmur
Abstract

This paper presents the theoretical framework and research design to study the innovation patterns of world market leaders (WML) located in geographically remote regions of Germany. We conceptualize WML as firms that maintain particularly strong translocal relationships with other actors. These firms must be capable not only of marketing their products globally, but also of continuously generating knowledge about the respective technological fields as well as about users, competitors and potential collaboration partners in order to sustain their competitive advantage and market leadership.

Partially contradictory to assumptions in literature on the geography of innovation, these firms do not seem to be primarily reliant on local forms of knowledge creation, and instead maintain translocal and global collaborations to create knowledge for their innovation processes. The aim of this project is thus to understand firm-level conditions and procedures that facilitate and maintain relationships across distance, to create knowledge for innovation processes. In so doing, this project relates to the overarching research interests of the Collaborative Research Centre (SFB 1199) “Processes of Spatialization under the Global Condition”. Through the elaboration of spatial varieties of collaboration and innovation processes, the project will help to better understand processes of spatialization, highlighting the relation of proximity and distance, as well as helping to identify spatial formats relevant to economic actors highly networked in a globalized economy.

Regarding the research design, we propose a standardized survey to investigate spatial aspects of innovation patterns of firms at focus as a first step. This survey will be enlarged by a random sample of WML located in agglomerations, to expose potential differences of the implementation of innovative activities, as dependent on the location. In a second step, qualitative interviews with representatives of selected firms will shed light on the central questions of the project. We want to understand which conditions and procedures enable WML located outside of agglomerations to engage in and utilize translocal knowledge creation processes. The influence of local relationships and factors that bind firms to their locations are questioned and put in relation to translocal collaborations.

1 Simon considers firms to be world market leaders when they have one of the top three positions in a specific market segment and/or technology field in the world, respectively being the No. 1 in Europe (H. Simon, Hidden Champions des 21. Jahrhunderts, Frankfurt: Campus, 2007). The databases we work with list German firms based on this definition.
1 Introduction

It is widely acknowledged that being able to innovate is a key competitive advantage for firms in the global knowledge economy. Since processes of innovation require the combination of different competencies, knowledge sources, skills and technologies, firm-level innovation processes often rely on actors’ interactive learning, which has been conceptualized as open innovation. Thus, the basis to shape successful innovation processes is to combine firm-internal capacities with external sources of knowledge, provided by various actors, including suppliers, lead users and research institutions. Hence, innovation processes produce and are based on specific geographies. We may therefore understand innovation as being interlinked with processes of respatialization under conditions of increasing global interconnectivity.

While external knowledge can be acquired on all spatial scales, literature in economic geography provides strong arguments that the exchange of innovation-relevant knowledge across firms and other actors as well as that of the accompanying learning processes is promoted through geographical proximity. It is argued that due to the partly tacit nature of knowledge and its embeddedness, in particular in sociocultural and institutional contexts, cooperation and knowledge creation processes are enhanced through colocation with other actors. Dense metropolitan areas and clusters are said to offer multiple opportunities for knowledge exchange, for example through periodic face-to-face contact, a common labour pool and shared institutions. These factors seem to provide a basis for local interaction to take place. In contrast, it is argued that firms located in geographically remote areas benefit less from opportunities arising from local interaction. Characterized as organizationally thin, peripheral regions usually seem to lack dynamic clusters of firms and support organizations.

This means that this particular kind of firm has to deal with the challenge of innovation and competition in a peculiar way. It seems, we argue, that they find a specifically spatialized response: as has been demonstrated, apart from local interacting and knowledge sourcing, firms may acquire knowledge by collaboration with non-local actors from outside the region. As a few, mostly quantitative, studies show, firms in peripheral regions make use of interacting at a distance to shape their innovation processes. For example, empirical evidence from Sweden demonstrates that firms in the periphery collaborate more commonly with

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2 For Hansen and Winther, the term knowledge economy refers to an economy where, due to the increasing speed of knowledge diffusion, firms must constantly innovate to remain competitive. For the authors, this is not only the case for certain high-tech industries, but for all industries (T. Hansen and L. Winter, “Manufacturing in the knowledge economy: innovation in low-tech industries”, in: JR. Brydon, J. Clark and V. Vanchan (eds.), Handbook of Manufacturing Industries in the World Economy, Cheltenham: Edward Elgar, 2015). The same applies for knowledge intensity: it is not only a certain type of knowledge (e.g. scientific knowledge) that is affected/demanded. Rather, the economy in general is becoming more knowledge intensive.


distant partners than firms in central locations. Thus, it is expected that these firms do not depend on local opportunities of local knowledge sourcing, and use further sources and channels for knowledge creation. This research strand, however, lacks systematic empirical evidence as well as qualitative studies to answer questions such as how these firms identify complementary, yet distant sources of knowledge, or which possibilities these firms predominantly use to initiate and maintain knowledge flows on a translocal or global scale. In the context of the SFB one might argue: how they create new spatial formats in order to pursue their objective of enhancing their competitiveness on the world market, which means successfully dealing with the challenges of the global condition. Ultimately, it is questioned whether the “pipeline option” may not only complement local buzz, but also compensate it.

With our project, we aim to contribute to these research gaps from a Western European perspective. Methodologically, we follow an integrative approach to understanding innovation processes resulting from dynamic interaction at three interrelated levels: knowledge creation of individuals and communities (in firms), knowledge coordination of firms, and spatial-institutional contextualization of knowledge. In a first step, we propose a standardized survey to investigate innovation patterns of firms at focus. This survey will be enlarged by a random sample of world market leaders (WML) located in agglomerations, to expose potential differences of the implementation of innovation activities depending on the location. In a second step, in-depth interviews with representatives of those WML located in remote areas of Germany, which use different sources for knowledge creation, will be conducted. Since being located in the “knowledge periphery”, we assume that these firms often do not depend on local knowledge sources and are deeply embedded into global networks of partners, counterparts and markets. Hence, we expect that these firms offer a prime example to study translocal and global forms of knowledge creation, collaboration and networking. We aim to put emphasis on how they manage to create and maintain translocal connections in order to generate and utilize knowledge for their innovation processes. Thereby, we also contribute to a more fundamental question, that is, whether or not the characteristics of the region where a firm is located really influence the firm’s propensity to participate in innovation.

Within the Collaborative Research Centre, this project helps to understand the configuration and establishment of spatial formats as a component of present-time business activities. The specific perspective of human geography on all those relationships, forms of cooperation, places for exchange and interrelations between these locations will be employed in order to identify spatial formats within the (global) options for knowledge creation that are manifested and reproduced through interactions of the actors involved.

The remainder of this paper is organized as follows. The next section presents current debates, theoretical concepts and corresponding empirical evidence from the literature on innovation studies and economic geography, as well as stating the research gaps. We then outline the research agenda and intention to study the innovation patterns of WML located in geographically remote areas of Germany. In the conclusion we summarize the theoretical framework and state the expected results.

14 Ibid.; Rodriguez-Pose and Fitjar, “Archipelago Economies”.
17 Grillitsch and Nilsson, “Innovation in peripheral regions”.
18 Jakobsen & Lorentzen 2015, at 81.
2 Theoretical Background: Firm-level Innovation, Knowledge Creation, and Multilocal Interaction

2.1 Firm-level Innovation

2.1.1 Understanding Innovation Processes

In his historical sketch of R&D and innovative activities by firms over the past 100 years, Teece describes how the organizational model of a few, rather isolated corporate research laboratories of certain industries in the late nineteenth century in the United States and Europe completely changed. The result is today’s decentralized innovation model connecting firms with actors from different organizations, technological fields, sectors and regions of the world, to create ideas for new products and processes.19 This change is strongly connected to the growing significance of innovation, which today is a key factor for the competitiveness of firms in a globalizing knowledge economy, especially for firms based in advanced, high-cost.20

Whereas the outcome of an innovation process is usually differentiated and measured through a straightforward typology of product innovation, process innovation, organizational innovation and marketing innovation, underlying processes leading to firm-level innovation reveal a growing complexity and require the combination of different competencies, skills and technologies.21 Innovation is thus a knowledge-driven process that relies on both firm-internal competencies and access to external knowledge sources. These external sources encompass a wide range of actors, including users, customers, suppliers, research institutions, and competitors.22

While the prevailing ideas that innovation is open and that a single organization cannot innovate in isolation, are widely accepted, innovation practices of firms reveal various forms and varying degrees of openness.23 In their review of the literature on open innovation, Dahlander and Gann develop a matrix of four types of openness along the two dimensions: inbound vs. outbound open innovation and pecuniary vs. non-pecuniary interactions.24 Each type of openness has both, advantages and disadvantages. While acquiring expertise as input for innovation processes over the market place (inbound/pecuniary) comes with a high degree of control, research shows that similar knowledge bases between the acquiring and acquired firms might decrease the innovative performance. Non-pecuniary knowledge sourcing (inbound/non-pecuniary) on the other hand, describes the scanning of the external environment for available ideas and technologies which can complement internal processes. Unless there is a clear purpose and strategy guiding the scanning process, firms might risk suffering from an overload of information and ineffectiveness. The two outbound types, selling or licensing inventions and technologies (pecuniary) and revealing internal resources (non-pecuniary), both have advantages such as direct financial rewards for R&D efforts or an increased interest of potential partners to collaborate. Possible disadvantages are also obvious: for example, it is difficult for firms to assess the potential value of an invention or new technology when they aim to sell it. When engaging in open exchanges of knowledge, firms might run the risk of leaking information to competitors and other actors without gaining benefits for themselves.25

24 Dahlander and Gann, “How open is innovation?”
25 Ibid. at 703–705.
From another perspective, Lichtenthaler and Lichtenthaler consider knowledge flows in open innovation to approach varying forms and degrees of openness. They distinguish between three processes, namely knowledge exploration, retention, and exploitation. These can be performed either internally or externally and underline the importance of a firm’s ability to successfully manage its own knowledge base, both internally and through external connections, to benefit from open innovation over time.

In doing so, firms have various opportunities to engage in open innovation processes and may develop certain strategies for their management of innovation activities. The next section discusses current research on the coordination of such activities on the firm and managerial level.

2.1.2 Coordination of Internal and External Knowledge for Innovation Activities

Research on how firms can exploit internal knowledge (externally) and internalize external, complementary knowledge for their innovation purposes has led to a rich body of literature. We will focus on those firms putting knowledge at the centre, as it is the key resource for innovation.

Concepts such as dynamic capabilities and absorptive capacity developed in organizational and management studies focusing on firm internal governance structures, to be able to deploy internal knowledge and internalize external knowledge for innovation activities. These abilities include the management of internal social relations of individuals and groups within the firm, to productively use differences in their knowledge bases. This aspect is closely connected to the maintenance of internal routines and organizational capabilities, which are essential for the coordination and integration of knowledge use and exploration processes. Absorptive capacity relates to the exploring of external knowledge and is defined as recognizing, assimilating, and applying external knowledge. It is thus important for firms not only to identify valuable external knowledge, but also to enable the integration of it into its own knowledge base. Accessing external knowledge can generate multiple interactions between economic agents, which are established through various channels and mechanisms, such as alliances and joint ventures, corporate venture capital, licensing contests and tournaments, open source platforms, and participation in various development communities.

However, along the continuum of open and closed innovation, empirical research has shown that there are substantial variations in the degree to which firms collaborate with external actors when innovating. Although in reality, very few firms follow a fully closed innovation approach, in which they would generate their own innovation ideas and then develop, build, market, distribute, service, finance, and support them on their own, some firms pursue more closed approaches and manage to remain innovative with only few external influences. As Felin and Zenger show with their typology of innovation governance, certain innovation "problems" are best managed within the firm internally. Especially if firms face rather complex problems that require theory-guided searches, identifying and flexibly recombining internal knowledge can be beneficial. Accordingly, strong internal knowledge capacities and the ability of its exploitation can reduce the need for external sources of knowledge. In a similar vein, Shearmur and Doloreux differentiate between fast
and slow innovators. Depending on the type of information and knowledge needed (market vs. non-market sourced information), some firms might rely on less frequent interaction compared to others. Also, firms might decide against engaging in open innovation because of associated costs (e.g., costs of searching for relevant knowledge or costs of complex contracting in joint innovation projects) and associated risks and uncertainties about its outcome.

On the other end of the continuum of open and closed innovation, recent research on innovation networks reveals a trend towards a global distribution of innovation activities within and between (multinational) corporations. For example, firms might develop their products together with their key suppliers and knowledge-intensive business services (KIBS), which have different locations and competencies all over the world. Global innovation networks have been studied especially in high-tech industries such as the ICT industry, where the pace of technological advancements and global competition is steadily increasing.

### 2.2 The Geography of Innovation

#### 2.2.1 Territorial Innovation Models, Advantages of Colocation, and Agglomeration Effects

Parallel to the development of the research in firm-level innovation in organizational studies and innovation studies, scholars in economic geography have been developing spatial approaches to innovation since the 1980s. These approaches aim to examine how the innovativeness of firms is influenced by their specific local and regional institutional environments and by relations to other actors. Concepts developed in this context, such as industrial districts, innovative milieus, regional innovation systems, learning regions, and regional clusters are collectively termed territorial innovation models. A common argument rests on the assumption that the exchange of innovation-relevant knowledge between firms is promoted through different forms of proximity, with geographical proximity being emphasized in particular. Common to all approaches is to perceive the regional scale as being most relevant for interaction and learning—conceptualizing the region with fuzzy boundaries, but always between the local and the national scale (SOURCE).

One argument for this focus on geographical proximity stems from the twofold differentiation of knowledge into explicit and codified and implicit, tacit knowledge. Due to the characteristics of implicit knowledge, its reproduction and transfer is only possible through the recurrent interaction of those involved and thus is said to be particularly favoured in spatially limited production structures. In retrospect, Ter Wal and Boschma identify four mechanisms of knowledge flows reflected in territorial innovation models: (1) through

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36. Shearmur and Doloreux, “How open innovation processes vary between urban and remote environments”.
37. Dahlander and Gann, “How open is innovation?”.
43. Unlike explicit knowledge, which can be written down in the form of words and numbers and is thus ubiquitously accessible, implicit knowledge cannot be codified. Implicit knowledge can be learned or transferred through (long-term) observations, adapting patterns of behaviour and processes, developing routines etc. (for an overview, see Gertler, “Tacit knowledge and the economic geography of context”). Precisely in the early stages of the innovation process, there is a large share of implicit knowledge, making a close interaction of knowledge holders and recipients necessary (M. Fritsch, Implizites Wissen, Geographie und Innovation—Widersprüche von plausiblen Hypothesen und mindestens ebenso plausibler empirischer Evidenz, Cham: Springer, 2011).
informal community interaction; (2) through direct links between firms; (3) through knowledge spillover resulting from labour mobility among the firms; and (4) through spin-off firms.\textsuperscript{45}

These effects are especially emphasized for dynamic economic core regions in which agglomeration effects have a reinforcing role and function in the form of localization economies and urbanization economies.\textsuperscript{46} The geographic concentration of related industries provides opportunities for the development of, for example, specialized labour pools and the shared use of (technological) infrastructures (localization effects). On the other hand, urbanization economies describe the geographical concentration of different industries, whereby the availability of complementary economic activities promotes the emergence of diversified job markets, for instance, and opens up access to a heterogeneous range of supplier products and business services.\textsuperscript{47} This not only facilitates access to potential cooperation partners and markets, it also strengthens the dynamic exchange of information and knowledge, described as local buzz.\textsuperscript{48}

\subsection*{2.2.2 From Geographical Proximity to Multilocal Interaction}

For a long time the discourse surrounding territorial innovation models was dominated by the view that dense, local networks of actors in agglomerations would be a particularly advantageous prerequisite for the generation and utilization of knowledge. However, the argumentation pattern of “traditional” territorial innovation models with the central argument of stickiness of tacit knowledge and its related explanatory content for the geographic concentration of innovation processes has been increasingly questioned.\textsuperscript{49} Influenced by a relational turn in economic geography since the 2000s, which is characterized by an increased consideration of social relationships of economic actors, two central arguments have been articulated. These are 1) the rather static view on actors within a given territory and 2) the importance of other forms of proximities (cognitive, organizational, social or institutional, see below) rather than geographical proximity for innovation activities among actors.\textsuperscript{50}

As was shown by studying the actions of individual firms, firms’ social relationships and networks are usually not tied to a certain geographical scale or region.\textsuperscript{51} Thus, the rather static view on the characteristics of a given space (e.g. a local cluster or a region) and the activities of firms and other actors therein is insufficient to study innovation processes.\textsuperscript{52} Rather, it is evident that during the process of generating and diffusing knowledge, individuals and organizations combine and traverse a variety of scales and thereby also create new spaces of action.\textsuperscript{53} On the basis of this finding, Rutten and Boekema conclude the following regarding the concept of the learning region: \textsuperscript{54}

\begin{thebibliography}{9}
\bibitem{54} A. Rodri
\bibitem{58} G. De Vita and M. Bello, "The micro-determinants of meso-level learning and innovation: evidence from a Chilean wine cluster", \textit{Knowledge Networks as Channels and Conduits: The Effects of Spillovers in the Boston Biotechnology Community}
\bibitem{61} This also means that the relevance of the regional scale is overestimated and the effect of actions of individual firms is underestimated (S. Beugelsdijk, "The Regional Environment and a Firm’s Innovative Performance: A Plea for a Multi-level Interactionist Approach", \textit{Economic Geography} 83 (2007) 2, pp. 181–199).
\bibitem{62} Among others, Lorentzen, Crevoisier and Jeannerat and Ter Wal & Boschma offer an overview of further critical points with respect to assumptions of territorial innovation models (Crevoisier and Jeannerat, "Territorial knowledge dynamics", A. Lorentzen, "Knowledge networks in local and global space", \textit{Entrepreneurship & Regional Development} 20 (2008) 6, pp. 533–545.
\bibitem{63} Ter Wal and Boschma, "Co-evolution of Firms, Industries and Networks in Space")
\bibitem{64} Lorentzen, "Knowledge networks in local and global space": Malecki, "Everywhere? The Geography of Knowledge".
\bibitem{65} Rutten and Boekema, "Beyond the Learning Region", at 723.
\end{thebibliography}
"Fundamentally, we argue that the regional level is the wrong starting point to conceptualize the relation between space and learning. This is because learning is not a regional phenomenon; instead, based on the recent literature on learning, we argue that learning is a process of social interaction between individuals in networks."

This criticism and the associated shift in perspective are reflected in several discussions that are relevant for further research in the field, sharing a focus on processes of knowledge creation and dissemination. One major argument refers to the simplifying dualism of implicit, local knowledge and explicit, ubiquitously accessible knowledge. As research on innovation patterns of firms show, they often engage in innovation-relevant collaborations with actors outside their region and thus generate knowledge across geographic distances. Based on these findings, it is increasingly recognized that, first of all, it should not be presumed as a matter of course that important interactions mainly take place on a local level and, secondly, that local interactions automatically have a higher priority than translocal ones.

In this context, the buzz-and-pipelines model from Bathelt, Malmberg, and Maskell expands the understanding of the relationship between local and translocal knowledge flows. Strategically planned linkages to actors outside of the region, conceptualized as (global) pipelines, enable translocal knowledge flows. Because pipelines, unlike local buzz, often provide access to new knowledge pools, they can be of central importance for firms’ competitiveness and innovation capabilities. Empirical research based on this understanding has documented significant effects of global pipelines for firms and regions. Translocal knowledge flows are not only brought about through strategic partnerships of firms, as described in the model by Bathelt et al. They can, for example, also be initiated within multinational firms, through transnational communities, through the participation of firms in international trade fairs or conferences, by way of digital networks and associations, through the practices of born global firms, or through individual personal relationships. With the goal of ‘structuring the elements and characteristics of those geographies that link distant settings through regular-occasional, periodic, or frequent-temporary face-to-face meetings’, Bathelt and Henn develop a typology of knowledge transfer over distance along the three dimensions context, that is the framing of knowledge exchange, cognitive focus and goals of face-to-face meetings, and risks of interactions and associated trust requirements. These dimensions help to distinguish between three main categories of knowledge transfer over distance that involve temporary face-to-face meetings: international community gatherings (e.g. at trade fairs), international business travel (e.g. intrafirm business coordination or user-producer meetings) and transnational network relations arising, for example, through new transnational firms and entrepreneurs. These configurations of knowledge transfer are complemented and enabled by virtual communication. Recent research on virtual teams demonstrate the various fields of application

55 Faulconbridge, “Stretching tacit knowledge beyond a local fix?”, Owen-Smith and Powell, “Knowledge Networks as Channels and Conduits”.
57 Bathelt, Malmberg and Maskell, “Clusters and knowledge”.
59 Bathelt, Malmberg and Maskell, “Clusters and knowledge”.
62 The entirety of this brief meeting of experts at one place is discussed under the keywords of temporary proximity (A. Torre, “On the Role Played by Temporary Geographical Proximity in Knowledge Transmission”, Regional Studies 42 [2008] 6, pp. 869–889) and temporary clusters (Maskell, Bathelt and Malmberg, “Building global knowledge pipelines”).
64 Knight 2004
66 Bathelt and Henn, “The geographies of knowledge transfers over distance”.

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as well as the growing importance of communication technologies, especially within multinational firms and teams, but also between firms (and other actors) to enable knowledge transfer over distance.

These examples of translocal/global modes of interactions and knowledge exchange are closely connected to a second debate, which questions the focus of territorial innovation models on the geographical proximity of actors to one another by analysing other forms of proximity and their impacts on innovation processes (Proximity School).

In addition to geographical proximity, Boschma suggests four other dimensions of proximity, which are key facilitators to collaboration and network formation between partners: cognitive proximity, organizational proximity, social proximity, and institutional proximity. As is made evident in empirical studies, firms from the same region and industry show different patterns of interaction in terms of innovation activities and knowledge exchange with non-local actors. These findings indicate that factors such as a shared knowledge base (cognitive proximity) or the degree of integration in a specific personal environment (social proximity) are the predominant qualities of knowledge-related interactions and that the location to potential cooperation partners is insufficient as an explanatory factor for knowledge dynamics to take place.

Based on the literature on firm-level innovation in organization and innovation studies and research on the geography of innovation, an intermediate conclusion is that the relation between innovation and space is a complex one. Individuals and firms may combine various sources, spatial scales, and channels during the innovation process without general priorities. Questions such as which factors affect the use by firms of partners at different geographical distances, or whether the use of partners in different geographical locations depends only or mainly on factors internal to the firm or on the regional environment, remain unanswered.

A firm's potential to innovate might be strongly affected by its internal capabilities and less by external collaboration and knowledge exchange. Likewise, it might be strongly embedded into its local/regional context and maintain links for knowledge exchange with actors of the region. It is also possible that firms do not predominantly rely on local interaction and instead use opportunities of knowledge transfer over distance, for instance via connections to their own subsidiaries, suppliers and customers [see figure 1].

### 2.2.3 Innovating Outside of Agglomerations

A rich body of literature claims that being located in agglomerations is advantageous for innovation activities. As the empirical focus of many studies is on urban agglomerations as “hotspots” of the globalized knowledge economy, research on the geographical characteristics of knowledge dynamics paints a picture in which predominantly urban centres—serving as networked hubs in a globalized world—are highlighted as

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67 Gupta et al., “Use of collaborative technologies and knowledge sharing”.


70 Boschma, “Proximity and innovation”.


72 Rallet and Torre also differentiate between permanent colocation and (temporary) co-presence. While colocation describes the physical-geographical proximity, temporary co-presence describes the actual meeting and interaction at one place, including, for instance, participation at a trade fair (A. Rallet and A. Torre, “Is geographical proximity necessary in the innovation networks in the era of global economy?”, GeoJournal 49 (1999), pp. 373–380).

73 Bathelt and Cohendet, “The creation of knowledge”; Griliches and Tripl, “Combining Knowledge from Different Sources, Channels and Geographical Scales”.


catalysts for innovation processes. This research, however, lacks comparative perspectives on rural, peripheral or non-metropolitan areas. Most research has therefore been criticized as being urban-centric and only little attention has been given to research on firm-level innovation outside of agglomerations, which is related to a general tendency to assume a negative correlation of innovation and peripheral localization of firms per se.

To study firm-level innovation outside of agglomerations, the definition of peripheral areas as regional economies located outside core (or metropolitan) regions by Lagendijk and Lorentzen is useful. Lagendijk and Lorentzen overcome conventional arguments such as longer distances to target markets (agglomerations) and higher transaction and transportation costs stemming from pure spatial distance by emphasizing the distance of actors to sources of knowledge creation and transfer. This distance can be explained with two linked arguments: firstly, according to Tödtling and Trippl, peripheral regions are usually organizationally thin. Through a comparatively low density of innovation-relevant actors, such as specialized service providers or research organizations, locally fragmented networks of actors are viewed as one of the main causes for little local knowledge exchange and weak innovation capabilities of firms in peripheral regions. Secondly, it is also argued that firms located outside of agglomerations, and thus not benefiting from local buzz, also find it more difficult to access non-local knowledge (e.g. from core regions). Thus, “knowledge peripheries” are characterized as having little endogenous innovation potential and limited capacities of firms to connect to core regions.

A few, mostly recent, empirical research studies, however, show that innovative firms can also be found in knowledge peripheries. One major explanation is that firms in peripheral regions use opportunities for

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76 Malecki, “Everywhere? The Geography of Knowledge”, Rodriguez-Pose and Crescenzi, “Mountains in a flat world”; Shearmur, “Are cities the font of innovation?”


78 Due to its normative charging and discursive character as well as the oversimplification of urban-rural or core-periphery dichotomies (cf. PoSCoPP, “Research Group Production of Space in the Context of Polarization and Peripheralization. Understanding New Geographies of Central and Eastern Europe”, in T. Lang et al. [eds.], Understanding Geographies of Polarization and Peripheralization, Basingstoke: Palgrave Macmillan, 2015, pp. 1–21), we suggest leading the debate about the relation of innovation and company location using the terminology within and outside of agglomeration. It is, however, not to be neglected that all definitions of central and peripheral, urban and rural as well as definitions of agglomerations will always be specific to particular (national) contexts. As our research is bound to Germany, we will operationalize a definition of location according to population density and distance to major cities, adopted to the German context (see below, section 3.4).


80 Tödtling and Trippl, “One size fits all?”

81 Grillitsch and Nilsson, “Innovation in peripheral regions”.

82 Ibid.
knowledge creation across geographic distance and are integrated in the globalized knowledge economy in a way similar to firms located in agglomerations.\textsuperscript{83} For example, Fitjar and Rodríguez-Pose show that innovative firms in a certain region in southwestern Norway don’t rely predominantly on their local contexts.\textsuperscript{84} Instead, collaboration with international partners is most conducive to innovation activities. A similar finding by Grillitsch and Nilsson, based on a sample of more than 2000 Swedish firms, shows that innovative firms in peripheral regions tend to collaborate more with distant partners than similar firms in agglomerations.\textsuperscript{85} Based on this finding, they argue that firms might not only be able to complement local buzz but may also “compensate” for a lack of local knowledge sourcing through distant linkages. With another study on Norwegian firms, Fitjar and Rodríguez-Pose argue that innovation partnerships to other actors emerge as a result of purpose-built searches, irrespective of whether firms are located in dense urban environments or outside of agglomerations.\textsuperscript{86} This finding makes us reconsider the question of whether the advantages of colocation in cities and clusters, such as random face-to-face interaction and serendipity of casual exchange, are of such great importance for innovation activities as assumed in previous literature.

All these findings point towards the assumption that possibilities of local interaction in dense metropolitan areas are not a prerequisite for firms to innovate. Yet as well as a need for more empirical evidence from different geographical contexts, several open questions remain, specifically in the context of translocal knowledge dynamics. When firms in knowledge peripheries are able to compensate for a lack of local knowledge sourcing through translocal knowledge generation, how do they identify non-local sources of complementary knowledge and how do they establish collaborations? What kind of strategies and opportunities do they predominantly use to initiate and shape mutual learning in translocal and global relations? In a broader context, answers to these questions would help clarify which factors lead firms to collaborate with distant actors or, by contrast, to interact predominantly locally. Hence, further questions need clarification, such as which factors affect the firms’ use of partners at different geographical distances, or whether connections to partners in different geographical contexts depend only or mainly on firm-internal factors or rather on the regional environment.\textsuperscript{87}

In addition to these open questions about the role of translocal knowledge dynamics, it maybe also be the case that not all types of innovators rely to the same degree on possibilities of local interaction and knowledge exchange available in cities and clusters. As stressed by Shearmur “some types of innovation may be developed internally, at a slower pace, relying on research and development, secrecy, a stable workforce, and controlled interactions with the outside.”\textsuperscript{88} Shearmur and Doloreux suggest that slow innovators depend less on fast-decaying market-sourced information and frequent interaction. Therefore, they have less need to be located in buzzing metropolitan areas than fast innovators, and can therefore be located outside of agglomerations. Hence, types of innovators might differ according to location.

\begin{footnotes}
\item[84] Fitjar and Rodriguez-Pose, “Innovating in the Periphery”.
\item[85] Grillitsch and Nilsson, “Innovation in peripheral regions”.
\item[88] Fitjar and Rodriguez-Pose, “The geographical dimension of innovation collaboration”.
\item[89] Shearmur, “Are cities the font of innovation?” at 14.
\item[90] Shearmur and Doloreux, “How open innovation processes vary between urban and remote environments”.
\end{footnotes}
3 Rethinking Territorial Innovation and Firm Behaviour: a Research Agenda

Based on the research gaps addressed above, we propose to supplement previous research by focusing on sources, spatial scales and channels of knowledge creation processes in innovative firms in geographically remote areas. Whereas we do acknowledge broad empirical evidence on the relevance of knowledge dynamics within regional networks, we suggest that there is a lack of empirical research on translocal collaboration and global networking, particularly relating to firms located outside of the major agglomerations. We claim that a lack of local buzz does not automatically imply disadvantages in terms of innovation capabilities and knowledge dynamics. Living in a highly networked and transnational society, we should even avoid perceiving opportunities for local knowledge dynamics as something which needs to be compensated for, if these dynamics are not well developed. We would rather propose that local sources and channels for knowledge creation are only one option amongst many different spatial formats relevant for knowledge creation.

As well as addressing unanswered questions with regard to the forms of translocal knowledge dynamics, it is of particular interest for us to gain in-depth empirical findings concerning the extent to which translocal interactions are relevant for knowledge creation processes in localities outside of agglomerations.

In our study, we supplement research on translocal knowledge creation processes and dynamics by studying WML located outside of agglomerations. These firms offer a prime example for the study of translocal and global forms of knowledge creation, collaboration and networking for at least two reasons: firstly, we assume that due to their market position, these firms are a) innovative and b) translocally connected to a particularly high degree. Secondly, with our focus on firms that have fewer opportunities for local and regional forms of knowledge exchange, we suggest that we are better able to observe translocal forms of knowledge exchange when examining these firms.

Before presenting the research agenda of our project in detail, it is necessary to state our understanding of the social production of knowledge more precisely, which also has implications for the methodological approach. Subsequently, we will present our research questions and goals. The explanation of our empirical approach will be followed by the work programme of the project.

3.1 A Changing Conceptualization of Knowledge: towards Knowledge Creation Processes and Knowledge Dynamics

The literature reviewed shows that economic geographers have only recently started to investigate the interplay of local embeddedness and translocal interrelations influencing innovation activities of firms. Further, discussions on the buzz-and-pipeline model, forms of knowledge transfer over distance, and the role of different forms of proximity expose the variety of different terminologies and conceptual approaches to the topic. However, many scholars of the field highlight the need to enlarge analysis embracing not only the macro level of territories and aggregates of actors, but also the micro level of agents. Since firms increasingly need to integrate knowledge from different contexts, for example from different locations and levels, from various sectors and technologies, as well as from different partners (such as customers and users), it is argued that an analysis at the micro level is important to be able to address certain important questions. How concrete is knowledge generation and application in such diverse contexts? What role does the geographical dimension play in such innovation collaborations? What are the social processes and interactions of actors with diverse backgrounds who participate in collaborative innovation activities?

To find answers to these questions, a reconceptualization of knowledge is needed. Advanced by more practice-oriented approaches, this reconceptualization connects to the critique on the above-mentioned dualism of tacit (local) and explicit (ubiquitous) knowledge inherent in TIMs. It is argued that all knowledge is fundamentally context-dependent, that is, embedded in social relations between individuals (“knowing in practice”). Thus, as opposed to the conceptualization of knowledge as a transferable artefact, which was predominant until the 2000s, knowledge should rather be conceptualized as being ultimately embodied in persons and social practices, and as being collectively produced. As such, knowledge always has both tacit and explicit dimensions. Empirical studies following this conceptualization often focus on concrete collaborative actions of individuals and communities, either within single (innovation) projects or during events such as trade fairs, to understand practices of knowledge creation and their spatiality. These practices reveal that new knowledge is produced increasingly by a variety of actors in complex problem-oriented situations in a cross-disciplinary way (combinatorial knowledge dynamics). Knowledge dynamics describe these multi-actor and multi-location practices as transforming and diffusing knowledge into new products and processes, for instance.

Both knowledge creation processes and knowledge dynamics as well as their theoretical and methodological implications have recently gained increasing attention in literature on the geographies of innovation. Within our research project, we will follow the conceptualizations of these terms.

3.2 Research Questions and Goals

So far, there are only insufficient findings about the specifics, conditions and procedures that facilitate and maintain relationships across geographic distance for translocal knowledge creation. Some authors perceive forms of translocal knowledge creation as a means to supplement local opportunities for interaction and have raised the question of which settings or channels and sources emerge and are used in the innovation process.

Against this background, we suggest further examination of how globally networked firms located in remote regions shape their innovation processes with regard to the generation and utilization of knowledge. We will focus our investigation on WML outside of agglomerations, since it can be assumed that these firms maintain particularly strong translocal relationships. They must be capable not only of marketing their products globally, but also of continuously generating information about the respective technological fields and sales markets as well as about collaboration partners and competitors in order to sustain their competitive advantage and market leadership. As they are located outside of agglomerations, these firms are capable of acquiring knowledge about new technologies and cross-regional markets without principally relying on sparsely available local interaction opportunities. In addition, and to show the potential differences of the implementation of innovative activities depending on location, we also aim to compare these WML with those located in agglomerations. We do so via a standardized survey. In a second step, qualitative interviews will shed light on concrete practices. For this second step, we want to avoid studying larger multinational
enterprises (MNEs) with multiple opportunities for firm-internal knowledge dynamics, for example through connections to subsidiaries across the globe. Instead, we are interested in translocal knowledge dynamics of single-location, globally active WML located in Germany and outside of agglomerations (see figure 2).

We suggest the following questions to guide further research in this context:

- How and where do the firms gain relevant knowledge for their innovation processes?
- What search strategies do they pursue to identify specific opportunities for knowledge generation in different geographical contexts?
- What role do relationships across geographical distance play for the generation and use of knowledge?
  - Which role do internal capabilities in contexts with sparsely available local knowledge pools play?
  - What kind of institutional arrangements and processes of knowledge creation are used?
  - What forms of proximity and distance dominate these relationships and what kind of permanent and temporary settings for knowledge creation can be observed in this process?
- What conditions, procedures, and means facilitate and affect relationships of firms to collaboration partners at other locations?
- What role does the firms’ own location and their interrelations with actors within the region play in relation to translocal knowledge creation, and to what extent can geographically distant relationships replace or supplement local opportunities for knowledge exchange?
  - How do these firms perceive their location, in particular in contrast to other locations?

3.3 Coping with the Complexity of Firm-level Innovation in Space: an Integrative Approach

Being able to acknowledge the complexity of firm-level innovation and the underlying knowledge dynamics in space has been subject to scientific debates for many years. However, the dilemma of integrating aspects of agency of individuals and firms, institutional structures, and socio-spatial contexts in analyses of innovation activities is prevailing in economic geography, innovation studies, and organization studies.

While there have been several calls for an engaged pluralism and more integrative approaches to the study of innovation, the complexity of firm-level innovation and the underlying knowledge dynamics in space has been subject to scientific debates for many years. However, the dilemma of integrating aspects of agency of individuals and firms, institutional structures, and socio-spatial contexts in analyses of innovation activities is prevailing in economic geography, innovation studies, and organization studies.

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of spatial economic systems across disciplines, research in economic geography still can be situated “between the methodological individualism of narrowly individual-centric approaches and the strong sense of structural determinism that is evident in macro-process studies”\textsuperscript{107}

The above research questions tackle structural differences according to company location as well as qualitative aspects of individual agents involved in the creation of knowledge. While questions of concrete practices enabling knowledge dynamics at the individual / firm level, as well as the managerial strategies influencing them, call for a more qualitative approach via interviews, broad empirical evidence for socio-spatial configurations of actors, which affect knowledge creation processes and thus innovation of firms, call for a quantitative approach using survey data. For example, contextual factors comprise the firms’ relational embeddedness into the knowledge networks and concrete geographical contexts in which firms act. To conduct further research on the relation between space, innovation and the firm, we adapt a framework developed by Manniche, Moodysson, and Testa.\textsuperscript{108} They propose studying the often separately analysed dynamic interactions influencing innovation processes at three levels: knowledge creation of individuals / communities, knowledge coordination of firms, and the spatial-institutional contextualization of knowledge (see figure 3 and 4). By covering different levels of agency as well as their geographical contexts, this integrative approach allows for inclusion of the increasing social and spatial mobility of professionals along with the growing connectivity among firms (and other actors).

To cover all three dimensions, we adopt a mixed method design, combining standardized, quantitative methods with qualitative methods.\textsuperscript{109} In a first step, we propose a standardized survey to investigate innovation patterns and contextual factors affecting knowledge dynamics of firms at focus. This survey will be enlarged by a random sample of WML located in agglomerations, to show potential differences of the implementation of innovation activities depending on the location. The survey will be followed by qualitative interviews with firm managers, to gain in-depth knowledge of the collaboration practices and effects. In addition, the interviews will support an understanding of the constitutive conditions, dynamic processes and chronological variations of the interrelations that firms have initiated with other actors.

\textsuperscript{107} Manniche, Moodysson and Testa, “Combinatorial Knowledge Bases”, at 3.
\textsuperscript{108} Ibid.
3.4 Peripheral but Global: Work Programme

In preliminary work, two databases on WML in Germany were analysed in terms of the location of the firms. Contrary to common assumptions about the economic potential of peripheral regions, it is surprising that this is where a good share of WML in Germany are located (see figure 6). Thus, clear preferences of these firms to be located in agglomerations cannot be determined.

At this stage, it is unclear whether this is a German particularity, as compared to other countries with a more pronounced concentration of innovation activities in agglomerations (cf. Rodriguez-Pose and Wilkie, "Understanding and learning from an evolving geography of innovation", at 73).
The two databases on WML in Germany include about 1,600 firms. An analysis of their locations showed that, of these firms, 21.1% are located in peripheral or very peripheral municipalities. This share varies only slightly from the percentage of the population (25.5%) and jobs (21.5%). An initial analysis indicates that these firms predominantly belong to the manufacturing industry. Firm processes in this sector, such as the development, production and sale of goods, are believed to particularly respect nature compared with other sectors. Building on this work, the implementation of the research project will take place in five stages:

Stage 1: Preliminary Work

In order to enhance the information already acquired about WML and their locations in Germany through previous studies, work in stage 1 aims to generate more in-depth information about the firms and initially screen them with regard to their location. Database and descriptive statistical analyses (incl. the MARKUS database, a firm database from provider Bureau von Dijk, and the Community Innovation Survey of the German economy (CIS) from the Centre for European Economic Research (Zentrum für europäische Wirtschaftsforschung, ZEW)) are used to gain general information about structural factors relating to innovation patterns and knowledge sourcing activities of firms in Germany. Further, these initial analyses shall help to better qualify the WML data and their innovation activities, as opposed to broader innovation surveys covering a broader set of the economy. Along with general descriptive information such as the number of employees, firm revenue and internal organization, these analyses should provide insights into the underlying sectoral structure of the firms at focus and what kind of innovation activities they are pursuing. The CIS data will also be analysed to gain general information on differences in innovation activities according to the firm location. This helps to form the foundation for a survey of all WML located outside of agglomerations in stage 2 and serves as an initial starting point for the selection of the firms to be examined in stage 3. The data obtained also enables comparison with the findings obtained in stage 4.

Stage 2: Conceptual Development, Implementation, and Assessment of the Survey on Innovation Activities

Based on the findings from stage 1, a survey complementary to the work of the CIS will examine the innovation activities of approximately 300 firms located outside of agglomerations. The survey will be enlarged by a random sample of WML located in agglomerations in order to investigate potential differences of the implementation of innovative activities depending on the location. Goals include, firstly, gaining a general picture of the cooperative behaviour of these firms and the significance of translocal knowledge dynamics and, secondly, comparison of their innovation patterns with results of the CIS data. Thirdly, it will be decided which firms will be more closely examined as part of the interviews in phase 3 upon analysis of the results. Once the questionnaire has been generated and tested, the firms will be contacted by telephone to take the standardized survey (CATI: computer aided telephone interview). More specifically, the interviews will obtain information on the types of innovation activities pursued, the motives for collaborations, and the different cooperation partners depending on their geographic locations as well as the forms of knowledge creation processes that are used. The results of the survey will then be combined and analysed using descriptive statistics. Based on the results of the analysis, firms will then be categorized according to certain criteria (e.g. R&D activities, degree of internationalization and cooperation behaviour). It is expected that the firms can be categorized into three or four types, depending on the scope of innovation activities, the scope of their linkages to other actors, and the role of each firm’s location.

114 Venohr and Lang, “Deutsche Weltmarktführer”, Ermann, Lang and Megerle, “Weltmarktführer abseits der Agglomerationsräume”. 
Stage 3: Case Studies: Innovation Patterns of Selected World Market Leaders

Based on the typology of innovators, a maximum of ten firms will be selected for a more in-depth examination of their innovation patterns. In addition to requesting in-depth information about the structure and quantitative relevance of relationships, semi-structured in-depth interviews with the firm management (CEOs, department heads of technology and innovation management or research and development, innovation managers) will be conducted, where strategies and motives for collaborations, qualities of the relationships formed and further topics will be examined from a geographical perspective. At the centre of the analysis is the issue of spatializations of these relationships, that is, the issue of city, territory, pipeline or other geographically structured formats. Up to five interviews per firm are planned, during which the software VennMaker115 will be used, so that the relationships can be interactively visualised, evaluated, and discussed while the interviews are taking place.

Stage 4: Analysis and Evaluation of Results with regard to Translocal Knowledge Dynamics

In a first evaluation step, the quantitative and qualitative data obtained in stages 2 and 3 is comparatively evaluated and analysed on the level of individual firms. The qualitative data is analysed as part of a qualitative content analysis using appropriate software (e.g. MaxQDA). In doing so, the focus of the analysis is on the geographical characteristics of relationships and on the types of settings and practices used to generate knowledge. Categories will thereby be formed based on the interview questionnaire developed from the theoretical discussion, and will be assigned quotes from the interviews. As part of the analysis procedure, these categories are inductively extended into subcategories and relevant interview sequences are assigned.

In a second evaluation step, the data is comparatively analysed. Differences and commonalities of the firms are addressed. For the purpose of a triangulation of data obtained through different means, the results of the interviews will be compared to the survey results of each firm, in order to develop a broad, multi-layered and comprehensive understanding of the firms’ innovation patterns.

Stage 5: Final Presentation of Results, Conclusions regarding Theory, Policy Implications

The results of the individual phases are subsequently merged and combined with regard to the central questions of the project. In addition, the following questions should be answered with the goal of identifying the project’s contribution to the policy debate:

- Do firms rely on and benefit from translocal knowledge dynamics equally?
- Through which conditions are firms able to generate and use translocal knowledge dynamics?

115 VennMaker is a software-based tool that can be used in the communicative surveying and validation of personal networks or in the visualisation of internal and external relations in workgroups, councils or projects or in client-centred consulting. (see www.vennmaker.com, accessed 13 June 2016)
• How can these conditions be improved in order to drive interrelations of firms outside of their respective regions?
• Can comparable conditions and approaches be adopted by other firms and regions?

4 Conclusion

Our theoretical framework refers to current debates in innovation studies and economic geography on innovation and space. For a long time, assumptions of territorial innovation models on positive effects of colocation for knowledge exchange dominated the discourse. Current debates on the role of different forms of proximity and distance between actors and on the role of translocal knowledge dynamics for innovation processes have realigned the discourse. Firms are increasingly understood and researched as organizations that interact with other actors within multiple and multi-scalar interrelations to shape their innovation processes. As Shearmur and Doloreux put it, a "shift from exploring innovation in clusters to exploring how firms in different types of environments innovate" is one way to deal with this geographical complexity. 116

Through the research on highly innovative firms located outside of agglomerations, we aim to contribute to the theoretical debate through:
• the characterization of structure and quality of translocal linkages of the assessed firms, allowing them to access knowledge;
• gaining insights about the use of different forms of knowledge creation and the relation of proximity and distance in innovation processes;
• investigating the use of different spatial formats in knowledge creation processes and how these formats relate to each other in changing spatial orders;
• evaluating the relevance of the assessed firms’ own locations in the context of their global actions;
• evaluating results with regard to transferability to other firms and locations.

116 Shearmur and Doloreux, “How open innovation processes vary between urban and remote environments”.
Response Papers

Response by Olivier Crevoisier
Research Group in Territorial Economy, University of Neuchâtel, Switzerland

The Distinction Between Innovation and Knowledge / Learning

Many approaches in economic sociology, in innovation studies and economic geography consider knowledge mostly as an input of innovation. In other words, knowledge is embodied in products, services, and activities during the production phase and then sold on markets with a monetary counterpart. This view is, of course, still valid; it is typical of the industrial society. However, it should be challenged in several ways in a post-industrial economy and society.

Firstly, it supposes that knowledge and learning occur upstream of production and only in the production sphere. However, today many authors insist on the active involvement of customers in a culture-based and knowledge-based society (see for instance literature about open innovation or about the experience economy). Florence would have no value if pupils all around the world didn’t know anything about Rinascimento. Young people tend to have a great ability to build a big use value from their smartphones, while older people, who pay a similar amount of money, profit less from them.

Secondly, with the growing importance of communication, internet, media, and so on in a culture-based and knowledge-based economy, value construction processes take the form of social interactions aimed at 1) evaluating goods, activities, and places, amongst other things 2) valorizing them (this refers to the “valuation” literature). Academics, chefs, football players, artists, and others are first acknowledged as “authors” in their respective communities. The more they are cited, seen on TV or on the internet and so on, that is, the more they are praised by peoples’ “opinions”, the more valuable they are. The more widely shared their knowledge is in their community, the more “worth” they have. Here, value is not embodied in goods or in services, it is embedded in communities and places. It is not “owned”, or exclusively “controlled” by a company; it is “shared” and valued in a community.

Thirdly, there are many ways in which monetary income can be generated in a post-industrial economy (see the growing literature about business models). The traditional model of goods sold on the market with a direct monetary counterpart still matters, but it is one way among many other ways to make money today. Acknowledged “authors” who share their knowledge, whether they be people, companies, or places, can make money by selling goods at very high prices (for instance, the jerseys of famous football players), but they can also be sponsored, they can associate their name to products, services, works, and places, so that customers will spend their money directly or indirectly.

The Form of Knowledge Dynamics

The link between knowledge dynamics and space is traditionally thought of through the distinction between codified and tacit knowledge. The latter refers to the question of the cost of moving knowledge in space (tacit knowledge would not be mobile) and to the social appropriation of knowledge: codified knowledge could be appropriated by companies and capitalists, whereas tacit knowledge would literally be in the bodies of workers. Moreover, it postulates that knowledge is something scarce. Today, however, we are overwhelmed by knowledge from everywhere. There is internet access for a huge and rapidly growing amount of codified knowledge and there are video conferences for face-to-face learning. Moreover, workers, customers, students, and researchers have become highly mobile. In my opinion, this distinction never convinces and should definitely be dropped. In such a context, knowledge dynamics have a dramatically changed form.

Over the last ten years, the possibilities of remote learning have evolved tremendously. Thanks to the internet, it is possible to exchange complex information and to interact in a face-to-face context, even in a multilateral way. Physical mobility has also developed and now allows highly selective meetings. All these aspects open the field. In such a context, what has changed regarding centres and peripheries? Do remote peripheries really exist in Germany?
Literature about territorial innovation models (TIMS) was based on the assumption that regional knowledge clusters were developing along trajectories. In such a paradigm, the winning regions/companies are those who are first to develop the cutting-edge knowledge in their specialized field. Today, given the huge increase in accessibility, the exploitation of complementary knowledge existing somewhere else is an important affair for companies and regions! Combinatorial territorial knowledge dynamics are the crucial source of competitiveness.

Of course, the capacity to interact and to mobilize distant/mobile knowledge also depends on the knowledge accumulated in the past. Today, however, territorial knowledge dynamics develop mostly across companies, sectors and regions.

Literature


CREVOISIER O. and JEANNERAT H. (2009), ‘Territorial knowledge dynamics: from the proximity paradigm to the multi-location paradigm’, European planning studies (17)8, pp. 1223-1241.

Response by Michael Fritsch

Professor of Business Dynamics, Innovation and Economic Change, University of Jena, Germany

The project “Peripheral but Global: World Market Leaders outside of Agglomerations” is definitely important research for at least two reasons. Firstly, it studies a phenomenon that we do not know much about. Secondly, it investigates a counterexample to the widespread prejudice that successful innovation requires agglomeration economies and is hardly possible outside larger cities.117 Although this prejudice may more or less hold true for countries like the US, I suspect that it does not apply in the same way to more decentralized spatial structures such as Germany. Hence, the results of this research may lead to a more balanced and realistic assessment of the role of cities for innovation.

I have two main comments that I believe to be very important at this early stage of the project. My first point is that the empirical investigation should not be entirely focused on firms outside agglomerations but should include a sufficient number of observations in the centre of large agglomerations. The reason for this is that in order to be able to identify the special features of innovation activities outside agglomerations, a counterfactual is needed. Innovators outside agglomerations need to be compared with those located inside large agglomerations, simply to find out in how far they are different.

My second point concerns the selection of cases studied that are located outside of agglomerations. I propose to have a sufficient number of innovators in the sample that are in extremely peripheral places, such as remote valleys of the Black Forest. Comparing innovators in extremely different spatial environments, such as large cities vs. rural periphery, may show the relevant differences most clearly. In this regard, it would be important to find out how these firms deal with factors that are often regarded as important bottlenecks for innovation, such as access to knowledge and availability of qualified workforce and external

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finance. In particular, the type of innovation activities and of entrepreneurship in these locations may be rather different. Moreover, the project should investigate locational choices. Why is a firm located in a certain place? Should we consider the history of the firm? Why do firms in peripheral places not relocate to centres of economic activity?

Response by Markus Grillitsch
Researcher at the Department of Human Geography, University of Lund, Sweden

I would like to point out the centrality of the question of how firms in the periphery “manage to create and maintain translocal connections to generate and utilize knowledge for their innovation processes.” Your preliminary statistical results, our findings in Sweden and other research that you cite clearly show that there are innovative firms in the periphery. This suggests that they are able to develop strong in-house capacities and to acquire knowledge non-locally. Furthermore, we have also found that internal competences are essential to overcome locational disadvantages.118 Hence, I encourage you to pay particular attention to this interplay between internal and external knowledge creation. Furthermore, it would be important to see how firms can attract and retain highly qualified staff, who are essential in this process.

One aspect that you could discuss more extensively is that of negative knowledge externalities. The literature that you refer to considers knowledge spillovers in principle as something positive, and thus being deprived of local knowledge spillovers is something you need to compensate for. However, the management literature especially also emphasises potential negative effects of knowledge spillovers in the form of labour poaching and knowledge leakage. There are even some studies suggesting that strong firms may want to locate outside clusters, as strong firms have more to lose than to gain from knowledge spillovers. I have added some more detailed comments below:

While local knowledge spillovers may be especially important for small firms, large multinational enterprises are less dependent on them, have multiple locations, and operate globally. Maybe the most interesting case is that of small / medium-sized firms that are leading in a small market niche.

I would add to the definition of dynamic capabilities the capability to change routines and create new ones as a response to changes in the competitive landscape.

We should also be cautious when linking the “extra-regional” with “transnational”. A focus on transnational practices would suggest the need to engage more with the global innovation networks literature. For example, the hypothesis that WML outside agglomerations maintain particularly strong transnational relationships would need to be confirmed in your study. It could also be that they do not have more transnational relationships but instead have more national ones (with Munich, Hamburg, Stuttgart, and so on).

As regards the survey, it makes sense of course to orient it towards the CIS. In addition, however, I would like to encourage you to find ways to collect better network data. Working on global network data with the CIS shows that this is really restricted in the world regions, of which there are only few. Hence, if you could capture the countries and not only the few world regions, as well as more data about the intensity (which partners; how many; what type of relationship), this would be a good addition.

Response by Anna Growe
Jun.-Professor for Regional Governance, University of Heidelberg, Germany

Temporary Spatial Settings as a Means of Creating Innovations?

The research outline “Peripheral but Global: World Market Leaders outside of Agglomerations” presents the aims of the project with the objectives of better understanding how firms obtain relevant knowledge for their

innovation process, as well as investigating what role relationships across geographical distance and inter-relations with actors within the firm’s own region play in that context.

Part of the outline is the assumption that interlinkages of different nature must enable world market leaders located outside of agglomerations to participate in global knowledge flows, to facilitate and maintain relationships across distance and to create knowledge for innovation processes. Behind this explicit assumption is the implicit assumption that—although world market leaders may be located outside agglomerations—a significant number of knowledge holders who should be interacted with are located inside agglomerations.

My response will focus on one aspect related to this implicit assumption: the different possibilities of temporary settings as a means of knowledge exchange and to create innovations.

Why Temporary Spatial Settings as a means of Knowledge Exchange and to Create Innovations?

The outline refers to a well-known argumentation: the argument of facilitating the exchange of knowledge through face-to-face contact due to specific advantages of such contacts.¹¹⁹

1. Firstly, face-to-face interaction is an effective communication technique that is rich in content. The observation of one’s counterpart facilitates the exchange of both verbal and non-verbal direct feedback, in addition to substantive information.

2. Secondly, it facilitates the development of trust. Trust reinforces incentives for genuine commitment and reduces the occurrence of free-riding in partnerships.

3. Thirdly, face-to-face interaction makes it possible to check the viability of partners and become acquainted with them. This facilitates the assessment of work activities and the development of mutual values.

4. Fourthly, face-to-face interaction creates motivation and enthusiasm (rush) for working on a joint project.

These positive effects of face-to-face communication arise from colocation, that is from the immediate spatial proximity of the stakeholders. Since the mid-2000s, however, it has been pointed out that colocation must by no means be permanent, for example, in terms of communication between geographically proximate firms. Stakeholder constellations in temporary spatial proximity can also facilitate face-to-face interaction and the positive effects of this type of communication.¹²⁰

Based on this, I would like to draw attention to two aspects that could be helpful for an analysis both of the role that relationships across geographical distance play and of the role that the firms’ own locations and their interrelations with actors within the region play: these aspects are (1) the interplay of organized and geographical proximity and (2) different forms of temporary spatial proximity that can be used to exchange knowledge.

Interplay of Organized Proximity and Geographical Proximity

According to Torre, when carrying out collaborative work processes, both permanent geographical proximity and organized proximity play a central role.¹²¹ With the aid of information and communications technologies (ICT), interaction can be guaranteed in collaborative work processes of longer duration in spite of distance


(organized proximity). However, temporary geographical proximity is indispensable for specific phases of the work process.\textsuperscript{122}

One important question is therefore that of how phases of temporary spatial proximity are embedded in the entire work process. At what stages of the work process from initiation to completion is temporary spatial proximity used for knowledge exchange? What kind of knowledge is exchanged in a face-to-face context during different phases of the work process of world market leaders? Are there reasons to meet during different phases of the work process of world market leaders, other than to exchange knowledge?

These questions concern the interplay between phases of colocation and concern all the advantages of traditional agglomeration effects as well as those of the phases of long-distance collaboration, during which other forms of proximity (e.g. cognitive proximity and/or social proximity) are used.\textsuperscript{123}

One concept dealing with the complementarity of organized proximity and geographical proximity, as is also mentioned in the research outline, is the concept of “local buzz and global pipelines”.\textsuperscript{124} This particular concept assumes not only that exchange through face-to-face interaction in permanent local clusters plays a large role in the case of economic processes and knowledge exchange, but also that companies use various strategies to set up “pipelines”, so that they can participate in the “buzz” of other spaces. Organizational connections to locations in other regions can be interpreted as “pipelines”.\textsuperscript{125}

However, the setting up and maintaining of permanent “pipelines” is associated with high costs. For this reason, “pipelines” are not always realised as permanent constellations, such as the opening of a branch office. Temporary measures, such as business trips to the premises of partners in other regions or participation in temporary clusters\textsuperscript{126} also enable companies to enjoy the advantages of collocation in geographical proximity.

This is the starting point for the second aspect that I would like to draw attention to: the different forms of temporary spatial proximity that can be used to exchange knowledge (or for other purposes) in working processes.

Different Forms of Temporary Spatial Proximity

A huge body of literature dealing with temporary spatial proximity focuses on “temporary clusters”,\textsuperscript{128} but a wide variety of forms in which temporary spatial proximity could be achieved exists. Rychen and Zimmermann make a distinction between temporary clusters and the mode of movement.\textsuperscript{129} They differentiate two primary types of temporary spatial proximity, which are (1) temporary clusters and (2) “moving”\textsuperscript{130}

These two basic types represent different characteristics that may be focal points of temporary spatial proximity. When participating in temporary clusters, the openness of the situation and the possibility of making new contacts are priorities. Of course it is still the case in temporary clusters that business transactions are concluded and interactions with existing partners are deepened. The fundamental characteristic of temporary clusters, however, is the joint opportunity to exchange information with a previously undefined number of stakeholders and to meet new stakeholders.\textsuperscript{132}

\begin{thebibliography}{99}
\bibitem{123} Torre, "The role of proximity during long-distance collaborative projects”.
\bibitem{128} Bathelt, Malmberg and Maskell, “Clusters and knowledge”, Maskell, Bathelt and Malmberg, “Building global knowledge pipelines”.
\bibitem{130} Bathelt, Malmberg and Maskell, “Clusters and knowledge”, Maskell, Bathelt and Malmberg, “Building global knowledge pipelines”.
\end{thebibliography}
In contrast, the “moving” model is geared towards a particular place and/or stakeholder. The focus here-in is on bilateral and multilateral exchanges with predetermined stakeholders targeting a predetermined objective. The “moving” model occurs as a basic type of temporary spatial proximity in almost all business processes.

The “moving” model can be subdivided further into two main perspectives, namely (1) the focus on project work as a working context; and (2) the focus on travelling to the premises of work partners (clients, suppliers and collaborators).

Temporary Spatial Proximity in Project Work

Face-to-face communication with remotely located partners occurs in the everyday working context to facilitate work organization and interaction during the work process. Therefore, the first perspective covers interaction within a project that is determined by the target-oriented tasks undertaken by all stakeholders working together.

Project work is characterized by the fact that different parts of the work process, for example production and research, are carried out at different sites, which may be located in different regions. However, the joint work requires regular, face-to-face exchanges, and communication through information technology is insufficient. Rallet and Torre cite six situations leading to temporary work constellations in spatial proximity, which are of different importance in different phases of the joint work. The participating partners must (1) be known to each other, (2) develop a common concept regarding the technical bases for the project, (3) align their existing concepts with each other as the project develops, (4) develop mutual trust, (5) come to an agreement regarding the next steps, and (6) reach an agreement on the distribution of the expected costs and benefits of the project.

Therefore, the importance of face-to-face interaction may change during the work process and is often particularly crucial in the beginning phase of the project. After work on the project is completed, the employees involved return to work at their respective companies.

Temporary Spatial Proximity through Travelling to the Premises of Partners

The second perspective concentrates on travelling. Papers discussing travelling specify the “moving” model through business trips to visit partners or clients. Here, the need for face-to-face communication is covered by business travel, on the part of individuals or groups of employees. In this case, large firms with extensive financial and human resources can deploy employee groups for extended periods more easily than small firms can.

This perspective also brings physical mobility in an increasingly digital working environment, as well as specific settings where meetings take place into focus. In this context, workplaces are not just specific sites in companies, but relational contexts in which people work.

134 Rallet and Torre, “Temporary Geographical Proximity for Business and Work Coordination”.
Implications

Based on these comments, I would like to encourage the project organisers to strengthen their focus on temporary spatial settings during the work processes of the world market leaders outside of agglomerations. In which phases of their work processes is face-to-face interaction — be it to exchange knowledge or for other purposes — important? With whom is face-to-face interaction important? How is this face-to-face interaction organized? How is the interplay of face-to-face interaction and interaction via telecommunication technologies organized?

Working on these questions could help to understand the role that relationships across geographical distance and the in firms’ own location play to participate in global knowledge flows. The comment above give hints on a variety of possible ways to organize face-to-face interaction in work processes.

Response by Richard G. Shearmur

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In light of our discussions about innovation and space in July 2016, some conceptual questions emerge. These can be classified under three headings: the conceptualization of innovation, the conceptualization of space, and how we think the two are linked.

Conceptualization of Innovation

Firstly, we come to innovation. This can be of many different types, but I will assume for now that the focus is on private-sector innovation (i.e. innovations introduced by companies in view of gaining market share and generating profit). A first distinction needs to be made between single-establishment and multi-establishment firms. A single-establishment firm can — in theory — be located, whereas locating a multi-establishment firm is far more problematic. Given this first distinction, another distinction is the one between the scopes of the innovations being studied: are we only interested in world-firsts or market-firsts, or are we interested in incremental innovations? The former make more headlines and are well-publicized, but the latter are often crucial to the survival and development of firms. Another distinction needs to be made between world-leading firms — which are not necessarily innovative, for example in cases where their world leadership rests upon reputation, quality or a traditional design — and innovative firms. A further distinction is that of firm size: small firms are mobile, and when they innovate they may easily be bought by other firms. Larger firms, even if they are perhaps less able to relocate, can open production facilities in other places if their innovation requires it.

A final distinction, of course, exists between different types of innovation. Even if we claim that the innovation process is broadly similar for all types of innovation — it consists in taking an initial idea, researching and developing it (possibly in collaboration), prototyping or applying it (again, possibly by collaborating with others), and implementing or marketing it — the outcome of innovation can be a new product (which can often be patented), a new process (far more risky to patent), or a new organizational structure. If we allow for the fact that innovation processes may differ between innovators — some may rely more on internal resources, some more on collaborative work, some more on market information, some more on technological knowledge — and that there is not necessarily a connection between the process and the outcome, matters become even more complicated.

The purpose of highlighting this complexity is not to conclude that the study of innovation is futile. However, given this wide variety of possible innovators, innovation scopes, innovation processes and innovation types, any study of the geography of innovation needs to be very clear about its main focus, as it is likely that each type of innovation and innovator will tend to be more attuned to particular types of geographic context. Indeed, it is perhaps more productive to concentrate on the ways in which innovators adapt to their

environment than to start with a rigid understanding of innovation, which may only be applicable to certain innovators in certain contexts.\textsuperscript{141} I would argue that there has been an overemphasis on the importance of openness, buzz and clustering, because the understanding of innovation that has often prevailed in literature has been derived from work by (urban) researchers studying (agglomerated) innovators.\textsuperscript{142} Their work has been good at describing how clustered innovators interact and generate certain types of innovation (often reduced to patents and/or technological innovation), but has entirely overlooked other types of innovator and innovation emerging in other, less visible, contexts.

**Conceptualization of Space**

This brings us to context, to geography itself. Here too, things need to be thought through carefully. Firstly, the centre/periphery distinction is not absolute: there are, of course, towns and cities that are more central in every country and region: they are large, networks converge there and a major infrastructure (airports, ports, rail terminals) exists. A periphery is a region or location that is “far away” from these centres. Yet, in some countries — such as the Netherlands — a periphery may be a relatively dense area with many small towns, which may be 100km from a global city. In other countries — Canada, for example — it may consist of a sparsely populated region with one small town, which is 1,000km from a minor world city. “Periphery” is a relative concept: it consists of areas within a geographic system of settlement that are of relatively low density and that are relatively far from major centres.

A second point is that geography can be thought of in terms of accessibility, where each location is more or less accessible to others and geographic space is a surface of accessibility, or in terms of regions, where each region has borders, has some internal cultural, institutional or administrative processes, and provides a local context for the firm. These two conceptualizations are not mutually exclusive, but need to be thought of separately.\textsuperscript{143}

**Conceptualizing the Link between Geography and Innovation**

When considering the geography of innovation, a fundamental question is that of whether or not the geographic location of an establishment (i.e. the location of its physical buildings) tells us much about the context it is operating in. I have already evoked the problem of multi-establishment firms. But consider a single-establishment firm: its employees may travel extensively,\textsuperscript{144} they may be well connected via the internet and other communication technologies to people across the globe, and they may of course share non-geographic proximities with many other actors.\textsuperscript{145} This leads to the key question of “where” is the establishment? If its employees are away, and if those sitting in the office are connected via communities of practice to interlocutors across the globe,\textsuperscript{146} then can we really locate it? The idea that innovation can be imputed to a location presupposes that we can locate the establishment that is innovating; yet if we consider the difficulties inherent in deciding where an establishment (i.e. its employees) is located, we may be less confident in assigning innovation to particular places.

The alternative is to conceptualize the establishment as being an intersection of trajectories, much in the same way that Massey\textsuperscript{147} conceives regions: for her a region consists of a gathering of people. Each person is mobile, and spends some time in the “region” and some outside of it. Thus, each person — when in the


\textsuperscript{143} R. Shearmur, “Innovation, Regions and Proximity: From Neo-regionalism to Spatial Analysis”, Regional Studies 45 (2011) 9, pp. 1225–44.


region—is simultaneously part of the local regional dynamics and part of global and/or a-spatial dynamics. Likewise, an establishment is composed of employees who are simultaneously part of the establishment and situated on trajectories that take them in and out of the establishment’s physical location. This way of thinking has yet to be thought through as regards its empirical consequences, but ties in with the growing work on the sociology of mobility spearheaded by Urry.148

In short, the proposed project—to study the geography of world leaders in Germany’s peripheral areas—is an innovative project that can begin to explore some of these ideas. Needless to say, it would be difficult to tackle them all at once, but at the very least, when choices are made they need to take into account the types of questions and problems raised, and be clear on how each choice positions the project relative to these wider questions.

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