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Network dynamics in constellations of cultural differences: Relational distance in innovation processes in legal services and biotechnology

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ABSTRACT

The aims of this article are first to scrutinize the effects of cultural divergence within knowledge networks on innovation and second to explore how these relations change during the process. Using qualitative case-study data from innovation biographies in legal services and biotechnology research and development services the paper develops a phase model of innovation – induction, validation, mobilization and concretization – that allows synchronizing the longitudinal time-spatial data. It then identifies types of relations within knowledge networks that have been critical for the creation and unfolding of the core idea and positions them into the phase model. The notion "relational distance" is employed to specify what forms of cultural differences are enacted in each of these relations and what effects these differences have on the outcomes of the innovation processes. The proposed framework affords the in-depth interpretation of each type of relation, a lateral analysis of how different types of relations work together at specific stages of the innovation processes and a longitudinal dynamic analysis of how relations evolve during innovation processes.

1. Innovation and relationality

The resources and knowledge required to implement novel and valuable solutions (innovation) are usually socially and spatially distributed. Extensive relational work has to be undertaken in order to identify the needed expertise and to combine it in a surprising yet meaningful and effective way (Bathelt and Glückler, 2011). An extensive body of literature deals with the relationship between qualitative and structural network features on the one hand and innovative performance on the other (e.g. Nahapiet and Goshal, 1998; Gilsing et al., 2008). Central matters in this field are network density, size, strong and weak ties, direct and indirect linkages, structural holes, path lengths and the positioning of companies in networks. In economic geography the spatiality of such networks has received much attention over the last decades—with a pronounced tendency to see proximity as a prerequisite for innovation (Grabher and Ibert, 2006).

More recently, a 'cultural turn' has taken place in network research (Mische, 2011). Increasingly, the degree of cultural differences emergent in network linkages is seen as important, as well as the question to what extent network structures correspond with cultural dissimilarity (Pachucki and Breiger, 2010; Vedres and Stark, 2010). In economic geography other measures of proximity in networks were introduced to complement an exclusively spatial view. Technological, organizational, cultural, institutional, cognitive or social proximity became prominent topics (Boschma, 2005). Still these notions do not account for the multiplex, multifaceted nature and individual quality of relationships which contain within them aspects of both proximity and distance (Ibert, 2010; Menzel, 2013). Neither do they make transparent how combinations of proximity and distance are made productive for innovation. Therefore we argue for a detailed qualitative study of relationships and the specific functions they have in innovation processes. The empirical study presented in this article is thus motivated mainly by an interest in exploring how cultural differences in social networks affect innovation processes.

Furthermore, in this article we are concerned with introducing the dimension of time (Hautala and Jauhiainen, 2014) into the relational analysis of innovation processes. It is widely accepted

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that innovation is a complex process in which the nature and direction of knowledge work changes in the course of the process (Pavitt, 2005; Moodysson, 2008). However, despite this shared acceptance, developing a research design which addresses the complexities of the procedural nature of innovation adequately remains highly challenging. In this article we wish to emphasize the dynamic aspects of innovation processes and provide tentative and exploratory insights into how the mobilization of cultural diversity for innovative purposes through social networks changes during the innovation process.

Starting from preliminary concepts that have combined successfully ideas of social networks with concepts closely related to cultural differences (Nahapiet and Goshal, 1998; Gilsing et al., 2008; Vedres and Stark, 2010; Pachucki and Breiger, 2010; Powell and Owen-Smith, 2012), in this article we use "relational distance" (Ibert, 2010) as a heuristic notion to assess the extent of cultural diversity within social relations and the effects of cultural differences on innovative outcomes. In an explorative and qualitative research process we conducted case studies on innovation processes in two service sectors in order to identify recurrent forms of social interaction in which cultural strangeness (Schütz, 1964) is enacted on the basis of shared commonalities.

To introduce the dimension of time we propose an idea-centered and dynamic network approach. An idea-centered network, as we understand it, is a focal network that encompasses all egos who have been involved in creating and developing the core idea of an innovation. To capture the procedural nature of innovation we obtained longitudinal network data from seven "innovation biographies" (Strambach, 2012; Butzin, 2013), three of them from legal services (for a detailed analysis see: Stein, 2014) and four additional ones from bio-technology. Each biography encompasses the process of the "unfolding" (Knorr Cetina, 2001) of a core idea from pre-conceptual status to market entry. We frame the rather idiosyncratic accounts of innovation processes, covering different times, places, topics and actors, with a self-generated phase model.

These data are analyzed with respect to the following research questions: What recurring kinds of relations can be observed? What is the nature of cultural difference enacted in these relations? What are the functions of cultural similarity and dissimilarity in achieving innovative ends? In the following sections we first situate our approach in the existing literature and briefly explain the research design. We then present our phase model of innovation. In the main parts of the article we present empirical findings on the types of relations we identified in idea-centered networks and from this basis we develop a broader framework that allows the analysis of relational dynamics in innovation practices.

2. Accessing cultural diversity in connectivity and its dynamics

During the past decades many attempts have been undertaken to conceptually deepen aspects of the relational work around innovation. Research on the connectivity between agents in innovation builds either on the seminal work of Burt (1992) or Granovetter (1973, 1985). In the former tradition they theorize on network structures conducive for innovation (e.g. Ahuja, 2000; Gilsing et al., 2008). In the latter tradition the quality of the social relation is emphasized. Nahapiet and Goshal (1998) provide a framework in which they relate "social capital" to "intellectual capital". In their approach they combine structural aspects with the relational qualities of networks.

In the discussion on structural network analysis theorists highlight knowledge asymmetries in wider social networks that offer entrepreneurial opportunities. Most notably, these opportunities reside in so called "structural holes" (Burt, 1992)—the gaps within network structures that separate internally cohesive groups from each other. Brokers are network members who are able to bridge structural holes and thereby gain access to non-redundant knowledge. Competitive brokerage strategies ('tertius gaudens', Burt, 1992, 2004) as well as cooperative ones ('tertius iungens', Obstfeld, 2005) can be integral to achieving innovative ends. More recent research unveils that brokerage practices might shift between competitive and cooperative approaches and combine them to achieve creative outcomes (Long Lingo and O'Mahony, 2010). However, these accounts on learning within networks appear rather limited without being augmented with information on the cultural context. For instance, structural holes are only helpful for innovation when they exist between sectors rather than within the same sector (Ahuja, 2000). Further, most compelling are empirical cases in which information gaps are sufficient to trigger lasting entrepreneurial success (like arbitrage in financial markets). Information gaps alone seem hardly sufficient to explain the complex process of new practicable solutions emerging under uncertain conditions (Vedres and Stark, 2010).

The network governance strand of research centers on the distinction between strong and weak ties (Granovetter, 1973). Within innovation networks strong and weak ties have both advantages and disadvantages. Strong ties help to reduce uncertainty about outcomes of innovation. However, over-embedded networks offer little or no inspiration for new ideas. Weak ties, by contrast, are more likely to open access to non-redundant resources. However, in such under-embedded networks it is much more challenging to coordinate the actions of different actors (Obstfeld, 2005). Hence, Uzzi (1997) suggested "integrated networks" in which a few strong ties are complemented by selected weak ties as the variant most conducive for innovation (Boschma, 2005). By associating strong ties with redundant resources and weak ties with non-redundant ones, the network governance approach addresses the socio-cultural contexts of network partners, yet it does so only indirectly.

Simultaneously, the discourse on "communities of practice" also offers a relational account on organizational learning and innovation. The involved practitioners mutually engage each other in the same practice, adhere to collective norms, share the same repertoire of skills and reify their knowledge in commonly used artifacts and tools (Wenger, 1998). Innovation and creativity can occur, it is argued, where divergent practices interpenetrate (Brown and Duguid, 2001; Amin and Roberts, 2008). The resulting "dissonance" (Stark, 2009) gives rise to "boundary practices" (Wenger, 1998:114) that recombine elements of practices in a novel and inventive way. However, in this discourse it remains unclear why some communities interpenetrate each other and others not (Swan et al., 2002).

2.1. Approaches to integrate social connectivity and cultural diversity

An integrated framework in which network thinking is combined with a cultural view on knowledge practices is yet to be fully developed in the literature. In an extensive review Pachucki and Breiger (2010) show that a growing body of literature has advanced the idea that networks and culture are mutually constitutive (Mische, 2011). Yet the respective reviews discuss the topic at a rather general level and are not focused on knowledge networks and innovation practices.

Pachucki and Breiger (2010:215) introduce the relevant notion "cultural hole" to denote "contingencies of meaning, practice and discourse that enable social structure". The concepts "structural folds" and "inter-cohesion" (Vedres and Stark, 2010) provide further useful examples of how network terminology and cultural practice terminology can be integrated to better understand the nature of innovation. Unlike a broker, who bridges otherwise