



Structural social capital evolution and knowledge transfer: Evidence from an Irish pharmaceutical network



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ABSTRACT

Businesses are becoming increasingly involved in collaboration networks to access external knowledge and sustain innovation. In this context, knowledge and knowledge transfer are considered an important source of innovation and competitive advantage. Social capital theory offers a theoretical approach to explain how individuals, groups, and organizations manage relationships and access knowledge resources. The structural dimension of social capital has stimulated debate regarding optimal network configuration to achieve innovation. The extant literature suggests network structures evolve from a bridging configuration to a bonding configuration without examining the details of how the evolution occurs within the network and its stage-by-stage impact on knowledge transfer. This study explores this relationship by analyzing the evolution of a successful Irish pharmaceutical network involving organizations from industry and academia. This research setting encompasses a rare network configuration in an industry known for its lack of collaboration among competing firms. Findings show that structural holes provide access to a set of complementary and heterogeneous knowledge. However, for such knowledge to be exploited, the network configuration has to evolve from a sparse network (small in size and characterized by weak ties across multiple organizational networks), to a large and cohesive network configuration characterized by high levels of commitment, trust, fine-grained information exchange, and joint problem solving. Mechanisms crucial to this evolution include consistently-scheduled meetings, training to communicate tacit knowledge, wide diffusion of knowledge through an on online portal, and relationship specific investments designed to safeguard intellectual property. Surprisingly, industry members appear to transition to a cohesive network faster than do academic members.

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1. Introduction

In order to compete in a global knowledge economy, firms are urged to access and exploit knowledge to generate innovation, where innovation is defined as identifying and using opportunities to create new products, services, or work practices (Van de Ven, 1986). Knowledge helps organizations achieve these objectives (Hargadon & Sutton, 1997). Hence, the process of innovation is commonly equated with an on-going pursuit of new and unique knowledge (Nonaka & Takeuchi, 1995). Indeed, innovation is a knowledge management process (Madhavan & Grover, 1998), and innovative companies are those that create knowledge (Nonaka & Takeuchi, 1995). However, companies may not possess the required knowledge to innovate; therefore, they form strategic alliances and other forms of external partnerships and collaborations with a variety of actors such as suppliers, universities, research centers, and competing firms.

Networks have emerged as the new locus of organizational activity, where firms of different sizes working together generate innovations more effectively and efficiently than previously (Lorenzoni & Lipparini, 1999; Powell, Koput, & Smith-Doerr, 1996). Most of these relationships in knowledge-intensive industries are developed to help companies access the knowledge required to develop new products (Inkpen & Tsang, 2005). Research suggests that the process of transferring knowledge from one organization or person to another is vital for overall organizational effectiveness and innovation generation (Argote & Ingram, 2000; Kogut & Zander, 1992; Powell et al., 1996). The increasing importance of business networks demands a thorough understanding of the way companies manage and leverage such relationships in order to facilitate knowledge flows that can lead to improved innovation outputs.

Social capital is a powerful theory explaining how businesses access knowledge resources through relationships (Adler & Kwon, 2002; Inkpen & Tsang, 2005; Lin, 2001; Nahapiet & Ghoshal, 1998). Social capital has been defined as “the sum of the actual and potential resources embedded within, available through, and derived from, the network of relationships possessed by an individual or social unit” (Nahapiet & Ghoshal, 1998, p. 243). These authors conceptualize social capital as a

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multi-dimensional construct composed of the three components of structural social capital (i.e., relationship configuration), relational social capital (i.e., relationship quality), and cognitive social capital (i.e., shared mental models).

This research focuses on the structural dimension of social capital because prior research yields ambiguous results regarding the optimal social network structure for innovation generation (Alguezaui & Filieri, 2010; Eklinder-Frick, Eriksson, & Hallén, 2011). One view, known as the 'bonding' view of social capital, posits that social capital arises from the network to which a person belongs where strong and reciprocal bonds between most or all members form as a result of frequent interaction (Coleman, 1990). Such cohesive networks support development of trust, norms of reciprocity, and a shared identity among members, facilitating collaboration and knowledge-sharing through informal and trust-based governance mechanisms that enable intense interactions (Hansen, 1999; Kogut & Zander, 1992; Nahapiet & Ghoshal, 1998).

The other view, known as the 'bridging' view of social capital, proposes social capital arises as individuals connect different networks by brokering structural holes (Burt, 1992; Granovetter, 1973), where structural holes are defined as unique ties to others who are otherwise unconnected to each other (Zheng, 2010). Individuals and firms occupying bridging positions experience a number of benefits, such as access to better or more varied resources or information, control of and privileged access to unique knowledge and opportunities (Lin, 2001), and access to novel communities, diverse experiences, and varying ideas (Burt, 1992). Thus, networks with larger ranges of participants exhibit higher capabilities of exploring new ideas and creating new knowledge.

A central question in social capital research regards how the bonding and bridging views operate in knowledge transfer for innovation. Some suggest that the benefits of one configuration can only be achieved at the expense of the other, while others view the two configurations as complementary (Ahuja, 2000). It may be that a static picture of a network is ineffective in capturing networks' dynamic natures as relationships and knowledge transfer processes evolve within it (Huggins, 2010). This might be the cause of inconsistent and sometimes contradictory results in the literature. The problem is that the extant research does not explain how this evolution occurs. Further research is needed to specify the conditions under which networks of firms benefit by moving from one configuration to one another, and how this impacts knowledge transfer. Phelps, Heidl, and Wadhwa (2012) identify the need to understand the complementary nature of bridging and bonding to be one of the most urgent in social capital research.

In order to address this gap, this study adopts an evolutionary approach and investigates the development of an Irish pharmaceutical network comprised of organizations from industry and academia. The pharmaceutical sector is as an example of a knowledge-intensive sector where knowledge is a critical source of competitive advantage (Powell et al., 1996). This network is a rare example of competing pharmaceutical multinationals and academia collaborating successfully to share knowledge and advance innovation. The network studied is a research collaboration involving local subsidiaries of nine multinational pharmaceutical companies and five universities conducting research in the area of solid states (i.e., pills) production. The pharmaceutical industry faces significant technical and regulatory challenges impacting production: batch production processes are inefficient, uniform dispersion of active ingredients throughout the compound is difficult, and the highly regulated environment complicates changes to manufacturing processes. The pharmaceutical industry collaboration studied here aims to optimize the manufacturing process. As pharmaceutical firms typically do not collaborate with each other, this is a rare case study context that is highly appropriate for examining how these knowledge-dependent firms and universities created and availed of such a collaborative network.

The research question investigated here is: How does the structure of this industry–university network evolve and influence knowledge transfer for innovation? Specifically examined is: How do the network ties evolve over time from bridging to bonding across multiple sub-groups, and how does this structural evolution impact knowledge transfer?

Based on our analysis of interview and archival data, we suggest that innovation networks among established organizations initially employ bridging configurations. In terms of network configuration, a small number of influential actors in diverse networks build on their weak ties to communicate the value of creating a cohesive network. Given the business purposes of such networks, relationship specific investments play a crucial role in safeguarding intellectual property (IP) and enabling network development, thus reflecting the importance of integrating multiple theoretical approaches when examining interorganizational relationships (Palmatier, Dant, & Grewal, 2007). Eventually, however, such networks transition to bonding configurations to enable the fine-grained information transfer and joint problem solving necessary for achieving objectives (Uzzi, 1996). In terms of the evolution of network configurations, networks grow in size while ties become strengthened through consistently-scheduled meetings, training to communicate tacit knowledge, and wide diffusion of knowledge through an on online portal. Surprisingly, industry members appear to transition to a cohesive network faster than do academic members.

This article begins with a summary of the relevant literature relating to knowledge transfer and social capital, then proceeds with an explanation of the research context. The results regarding how the complementary views of network structures are implemented over time are explained and discussed, and finally the academic and managerial implications are reviewed.

2. Literature review

Recently, marketing and strategy studies have shifted focus from investigating value chains to examining value network configurations (Corsaro, Ramos, Henneberg, & Naude, 2012). The importance of external value networks (e.g., strategic alliances) in sharing knowledge and supporting innovation generation has been highlighted in several studies (Lorenzoni & Lipparini, 1999; Powell et al., 1996). Innovation networks are designed to provide quick access to unique resources such as technology, knowledge, and markets (Inkpen & Tsang, 2005), which enable firms to innovate more effectively and efficiently. In this research, we examine how a strategic alliance network formed and developed to transfer knowledge to improve operational efficiency and, ultimately, develop future radical innovations.

2.1. Knowledge transfer

The competitive environment evolves rapidly and the capacity to manage knowledge-based information is a critical ability in a knowledge-based economy (Quinn, 1992). In order to adapt to a fast-changing environment, firms see themselves as learning organizations trying to continuously improve their knowledge capital (Senge, 1990). The importance of knowledge is particularly evident in technology-based firms where its creation and exploitation requires knowledge to be constantly updated and renewed (Lane & Lubatkin, 1998). Davenport and Prusak (1998, p. 5) define knowledge as:

...a fluid mix of framed experiences, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and it is applied in the mind of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms.

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