Chapter 4
The Impact of Proximity Dimensions on the Knowledge Diffusion Process

Antonio Messeni Petruzzelli
Politecnico di Bari, Italy

ABSTRACT

The purpose of this research is to explore how proximity dimensions can favour the diffusion of knowledge between economic actors, focusing on the knowledge relationships established by a knowledge gatekeeper. In particular, the authors formulate several hypotheses regarding the role of proximity dimensions (i.e. geographical, organizational, and technological) in affecting the establishment of gatekeepers' knowledge relationships, taking into account their collaborative-non collaborative type and exploitative-explorative nature. Adopting a patent-based analysis, the authors test their hypotheses on a research sample constituted by 527 knowledge relationships established by two distinct types of knowledge gatekeeper, i.e. an university and a firm.

1. INTRODUCTION

Nowadays, it is generally recognized that the creation of knowledge and its efficient and effective use are fundamental for the development of innovations and high value-added activities, then representing the core of firms and nations' strategies for growth (see also Hamel and Prahalad, 1994; Tallman et al., 2004). The creation of new knowledge and its implementation into innovations can be conceived as an open system which combines pieces of knowledge and information both internal and external to the organizations (Katz and Kahn, 1996). This depends on the fact that organizations are more and more specialized and hence, seldom have all the required resources internally.

Shifting the focus from single organizations to regions or districts, scholars have underlined the importance of knowledge sources external to the geographical areas. In fact, they can "open" these areas through the establishment of global relationships, so avoiding cognitive locking situations at the local level (see also Camagni, 1991; Breschi, 2000; Pouder and John, 1996).

DOI: 10.4018/978-1-61520-721-3.ch004

The process of inter-organizations knowledge transfer is often performed by networks, which can be seen as hybrid organizational structures, alternative to both market and hierarchy (Lambooy and Boschma, 2001; Powell et al., 1996; Williamson, 1999). Networks consist of three components: i) nodes, as individuals or organizations, ii) connections, as communication channels, and iii) the intensity of the transfer of knowledge, in terms of strong or weak ties (Granovetter, 1973; Krackhardt, 1992). In general, it can be contended that these structures perform two main functions. First, they support the co-ordination of decisions made by separate nodes of the network and second the transmission of data, information, and knowledge (Lambooy, 2004). With this regard, nodes can establish relationships aimed at exchanging knowledge (knowledge relationships) based on different types of learning processes, such as interaction and imitation ones (e.g. Malerba, 1992). In particular, processes of learning by interaction are related both to the interaction with upstream/downstream sources of knowledge (such as suppliers, and customers) and to the collaboration with other firms and scientific organizations (such as universities and research centres). On the contrary, processes of learning by imitation are based on the observation of what competitors and other organizations are doing and on the absorption of their developments in science and technology. On the basis of this distinction, it is possible to recognize two main types of knowledge relationships between nodes, such as collaborative and non collaborative ones, created through interaction and imitation learning processes, respectively. In particular, I identify collaborative (non collaborative) knowledge relationships according to the direct (indirect) participation and involvement of two or more actors in designing and/or producing a product or process (see also Polenske, 2004).

Moreover, knowledge relationships can be further distinguished on the basis of their exploitative or explorative nature (Levinthal & March, 1993; March, 1991). The difference between exploration and exploitation has been defined referring to the different type of learning adopted or to the presence/absence of learning. In particular, some scholars have shown that both exploration and exploitation are associated with learning and innovation, albeit of different types. In fact, exploration refers to a learning performed through variation and experimentation processes, involving a shift towards new technological trajectories, whereas exploitation refers to a learning performed through experimental refinement, selection, and reuse of existing routines, reinforcing existing technological trajectories (see also Baum et al., 2000; Gupta et al., 2006; He and Wong, 2004). Differently, other studies (e.g., Rosenkopf and Nerkar, 2001; Vassolo et al., 2004) appear to treat all activities associated with learning and innovation as instances of exploration and to reserve the term exploitation for activities in which the central goal is using past knowledge rather than moving down any type of learning trajectories. Regarding the difference between exploration and exploitation, several works have shown their complementarity and the importance of their balance to fruitfully develop innovations (see also Gilsing and Nootebbom, 2006; McNamara and Baden-Fuller, 1999; Katila and Ahujia, 2002). In fact, explorative activities are important to discover new knowledge domains and opportunities, access to new sources and activate renewal mechanisms. However, once the new knowledge has been acquired, an efficient exploiting capability plays a fundamental role for an effective use of the results of this knowledge searching activity and for the generation of economic returns.

Studies carried out in the field of network theory have clearly shown that nodes can assume different roles, according to their position inside networks (e.g. Dhanaraj and Parkhe, 2006; Hargadon and Sutton, 1997;). With this regard, nodes characterised by a high degree of centrality (Bell, 2005) and absorptive capacity (Cohen and Levinthal, 1990; Giuliani and Bell, 2005), generally known as knowledge gatekeepers (see