Knowledge Integration in Global R&D networks

Key words: Specialization-Integration; Relative absorptive capacity; Relational embeddedness; Knowledge embeddedness; Global R&D networks

In recent years, multinational corporations have increasingly adopted a global approach to research and development initiatives, offshoring these activities towards different parts of the world and establishing global R&D networks. By doing so they aim to acquire highly skilled science and engineering talent (Lewin et al. 2009), increase proximity to their customer bases (Trefler, 2005), and respond to mounting cost pressure (Pro Inno Europe, 2007). Most of the units in such global R&D networks tend to be highly specialized in certain tasks, becoming 'centers of excellence' capitalizing on specific talents, product efficiencies, or market knowledge (Bardhan and Jaffee, 2005).

Somewhat contrasting to this specialization of globally dispersed R&D units, R&D managers try to integrate knowledge from different units in global R&D networks so as to reap the benefits from specialization in practice. This is in line with the Knowledge-Based View of the firm (Grant, 1996), which argues that effective knowledge creation relies on *specialization* by individuals or units (leading to a collection of heterogeneous knowledge assets), with the goal of the firm being to establish *integration* of these knowledge assets. Correspondingly, Singh (2008) argues that the geographical distribution of R&D does not necessarily increase the quality of a company's innovative output in itself; it is the integration of knowledge of multiple locations which can make specialization valuable. Our study focuses on this paradox of specialization vs. integration. Although specialization can be seen as the motive for global R&D, it is the integration between specializations that makes global R&D successful in practice.

In this paper, we explore which factors may have a significant influence on the integration of knowledge between R&D units. In doing so, we regard knowledge (in line with the practice based perspective) as intrinsically linked to practice, subjective, and embedded in people's practices and social contexts (Brown & Duguid, 1991; Orlikowski, 2002).

Since we aim to build theory on the relatively new subject of integration of dispersed R&D activities, we rely on semi-structured, in-depth interviews with managers and key informants directly involved with Global R&D (see also Kumar and Anderson, 1993), aimed at investigating which factors considerably influence the integration of knowledge between distinct units in global R&D networks. Hitherto, we have conducted ten interviews with representatives of three organizations possessing and developing global R&D networks. The interviews have been fully transcribed, after which they were coded in Atlas.ti.

Our preliminary findings illustrate the tension between specialization of different units in the R&D network, and the need to integrate the knowledge of different units to fully capture the benefits of specialization in practice. Moreover, specialization across units can be achieved by defining strategy and

scope, whereas integration of knowledge amongst units calls for a more practice-based approach to the management of global R&D networks. More specifically, the results reveal three factors influencing the integration of specialized knowledge amongst R&D units.

First, findings reveal that knowledge integration in global R&D networks is largely dependent on the *relative absorptive capacity* of different units, which is reflected in the similarities and differences amongst their knowledge bases, organizational structures, and dominant logics (Lane and Lubatkin, 1998). Each R&D unit develops specific knowledge and capabilities (i.e. specialization). Other units are more likely to benefit from these, when there is some form of mutual understanding between the units, and when management tries to overcome differences in for example knowledge bases, cultures, communication patterns and ways of working.

Second, the findings reveal the importance of *relational embeddedness*, direct cohesive ties between units as a mechanism for gaining valuable information and knowledge from other R&D units. Where a lower level of embeddedness between units is vital for the development of different knowledge sets, a higher level of embeddedness positively influences knowledge integration. However, taking relational embeddedness to its extremes can cause either a lack of understanding because the units' knowledge bases are too diverse, or a lack of knowledge value because knowledge of the units is too similar. Units are likely to benefit from each other's knowledge by creating a kind of optimal strength in the embeddedness of their relation (Hansen, 1999).

A third important factor influencing integration is the *embeddedness of knowledge*. As a consequence of specialization, knowledge becomes more embedded in the people, tools, routines and sub networks of one unit, whereas in order to understand the value of knowledge of other units, knowledge should be partly embedded in the relation between units (Nielsen, 2005). Thus, for the purpose of knowledge integration a common context is preferable. Accordingly, global R&D networks are more likely to benefit from specialized knowledge when it is both embedded in the units and the relationship level.

Summarizing, although managers involved in geographically dispersed R&D organizations aim at specialization of distinct R&D activities in various centers of excellence, they also have to facilitate knowledge integration amongst these globally dispersed R&D units. This requires them to balance tendencies towards specialization and integration in a way that optimizes the performance of global R&D networks. The main contribution of this paper lies in bringing forward a number of factors influencing the integration process between R&D units, providing researchers and practitioners with new insights into the mechanisms through which the value inherent to the organization of R&D in global networks can be unleashed.

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