



Competing explanations for knowledge exchange: Technology sharing within the globally dispersed R&D of the multinational enterprise [☆]

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ABSTRACT

This paper explores five competing theories for technological knowledge sharing within the globally dispersed R&D function of the multidivisional, multinational firm. These five broad explanations for why a knowledge transaction occurs are: (1) economic, (2) technological, (3) organizational, (4) geographic, and (5) sociological. In addition to occurrence, likelihood of knowledge exchange success prompted by various explanations is considered. Ultimately the determination of which argument—or combination of arguments—offers the greatest explanatory power for the sharing of intermediate technological knowledge may be answered empirically.

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With regard to knowledge, the issue of transferability is important, not only between firms, but even more critically, within the firm. (Grant, 1996: 111)

Bringing different perspectives to bear on a single, overriding issue is one way to try to improve our understanding of observed phenomenon, however complex they may be. (Hagstrom & Chandler, 1999: 12)

1. Introduction

The organization and management of innovative activities in the multidivisional, multinational firm is the setting for this paper. A growing interest in this issue is at least partly related to the importance of technology in the present competitive environment.¹ For a firm with globally distributed R&D operations, issues of coordination and control are of major significance (Ensign, 1999). “In high-technology environments, rapid technological change means that the value of a firm’s existing knowledge is quickly eroded” (Hayton & Zahra, 2005: 256). The need to optimize and/or leverage technological knowledge that resides in different individuals or groups is vital. The sharing of resources such as scientific know-how is a major contributor to the achievement of firm growth and survival (Santoro & Saporito, 2006; Tarn, 2006).

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¹ It should be noted that this is not an entirely recent concern, Dunning (1958) observed the two-way exchange of technological knowledge within the multinational enterprise.

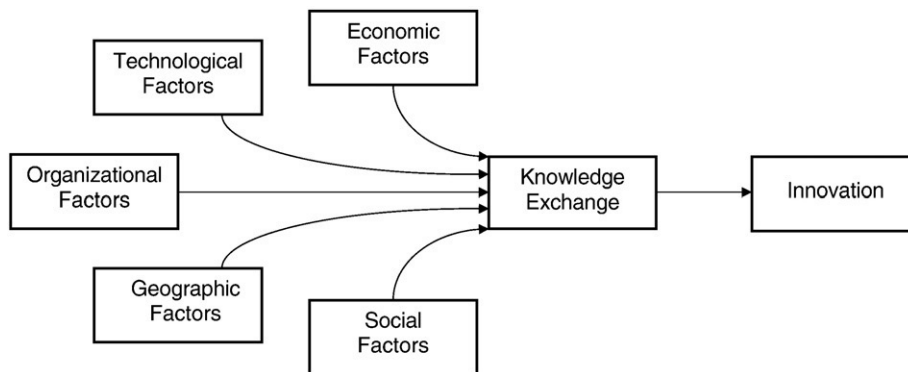


Fig. 1. Conceptual model.

Based on a review of literature, the multidivisional, multinational firm can be conceptualized as a network of transactions.² Gupta and Govindarajan (1991: 770) describe these transactions as: capital flows; product flows; and knowledge flows. Bartlett and Ghoshal (1991: 169–170) also describe three flows in the multinational enterprise (MNE): flow of goods; flow of information; and flow of resources (including the transfer of technology and movement of personnel). The flow of technological knowledge between different R&D groups in an MNE is described here as technological knowledge sharing rather than technology transfer. Technology transfer has usually been used to indicate an exchange involving a finished product, a completed or self-contained parcel of technology (cf. Gopalakrishnan & Santoro, 2004). Technological knowledge sharing is used to represent an exchange of an intermediate good—the transmission or communication of scientific know-how from one context to another.

As Grant (1996: 114) states “*transferring knowledge is not an efficient approach to integrating knowledge ...*” Iansiti (1998: 2) too insists integration is the proper description; noting that “a technology cannot be separated from other technologies. Technologies act in conjunction with one another”—value is added through integration. Leonard-Barton (1990) indicates that there are shortcomings in the term transfer. Transfer connotes *movement* from one place to another. In the case of capital flows and product flows there is movement and no change in properties. The same cannot be said of knowledge flows, with the exception, perhaps, of simple explicit knowledge.³ Knowledge flows involve sharing—defined as using, participating in, joining with others, taking part in, and receiving equally or together—which goes beyond where transfer or diffusion leave off (Collins & Hitt, 2006). A knowledge transaction involves *improvement* in knowledge.⁴ Our focus is on technological knowledge transactions, described as an exchange involving a source and a recipient. Technological knowledge is conceptualized as intermediate technology, scientific know-how, skills, and capabilities.

The focus of this paper is on understanding the explanations or reasons for technological knowledge sharing between dispersed R&D workers and groups. These are often described as motivations, needs, desires, or reasons why the sharing of technological knowledge occurs in the MNE. We suggest that there are five major competing theories or explanations for the occurrence and success of technological knowledge sharing. These are: (1) economic explanations, (2) technological explanations, (3) organizational explanations, (4) geographic explanations, and (5) sociological explanations (see Fig. 1). In each case, there is recognition of potential benefits that may result from sharing scientific know-how. Though this paper centers primarily on the intra-firm sharing of technological knowledge (Table 1) inter-firm sharing of technological knowledge was considered (Table 2).

Based on a review of the literature, technological knowledge sharing must be viewed as a process. This process includes: recognition of a need or opportunity; a search for a source that can help meet this need or opportunity; and an exchange involving a source and a recipient facilitated by management decisions and appropriate coordination/integration mechanisms. Understanding this process helps to explain the complexities involved in a technological knowledge transaction. Hagstrom and Chandler (1999: 1) indicate partial theories abound and that “more complete theories” to explain the functioning of the firm in an ever increasing international environment remain elusive. “Perhaps we have reached the limit of approaches firmly anchored in one [perspective]” (Hagstrom & Chandler, 1999: 1).

2. Economic explanations for knowledge exchange

Economic explanations focus on knowledge being shared to create economic value through greater efficiency. In the context of an R&D task, such efficiencies may be realized through improvements in cost and time. From an economic perspective, the constraints (cost and time) within an R&D group may provide the motivation for accessing technological knowledge in other R&D groups located elsewhere in the MNE. Lower cost and completion of the R&D task on time (or in less time) may be compelling reasons why an R&D group will initiate a search (internal and/or external) for the scientific know-how it needs to accomplish its R&D task goals. In many

² As Williamson (1975: xi) states in support of Commons' (1934) view, “the transaction is the ultimate unit of microeconomic analysis.”

³ Thrift (1985: 368) allows no such exceptions: “no two actors can communicate knowledge perfectly.”

⁴ Strictly speaking, it is quite imaginable that a knowledge transaction could result in a situation in which the knowledge received was altered in such a manner that it became less valuable or even detrimental. Clearly this would not be improvement in knowledge—though, it would result in new knowledge.

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