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A Simple Criterion to Locate a Multinational Corporation Resulting from Optimization of Technological Knowledge Transfer

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ABSTRACT

The aim of this study is to formulate both a conceptual and a mathematical model giving a criterion of choice for the location of an MNC in search of new technological knowledge and the means to optimize it. On the basis of a bibliographical study, we develop a conceptual argument in order to formulate hypotheses regarding the impact of distances and motivation on knowledge transfer and the acquisition's resulting performance. The assumptions thus formulated make it possible to justify the mathematical expression of performance in a function of the architectural distance, the knowledge transfer, and the motivation. The resolution of this optimization problem makes it possible to obtain the optimal architectural distance and the optimal motivation corresponding to the best choice of localization of an MNC. The authors deduce a simple criterion aiming at helping a manager confronted with the problem of localization choice. The presented model helps to define the typology of MNC units: isolating and exploiting a MNC's knowledge or using the local knowledge and transferring it to other units.

KEYWORDS

Distance, Mathematical Model, Multinational Company, New Knowledge Transfer, Performance Acquisition, Technological Knowledge

INTRODUCTION

This work deals with the problem of MNC (Multinational Companies) seeking a location as a source of new knowledge. As clusters concentrate geographically knowledge-intensive, innovative, and entrepreneurial activities, MNC likely locates in these clusters for network externalities (Marshall, 1920; Mudambi, 2008). Entry mode must be chosen between keeping (acquisition) or sharing control (venture) of the local subsidiaries. It must also decide to build a new plant (greenfield or greenfield venture). An acquisition is also preferred when the investor want to acquire new technological knowledge for example a product's manufacturing process.

Agglomerations or clusters are places where close inter-firm communication, socio-cultural structures and institutional environment may stimulate socially and territorially embedded collective learning and continuous innovation. Much of the regional capability found in clusters is rooted in inter-firm networking, inter-personal connections, local learning processes and knowledge embedded in social interaction (Malmberg, 1997). The most valuable knowledge includes a high degree of tacit knowledge (Polanyj, 1958). It is generally not possible to transfer it through codification and de-codification (Ancori et al., 2000). Tacit knowledge can only be transmitted by peers and is embedded

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in communities of practice (Brown & Duguid, 1991). MNCs must become part of these communities in order to access this kind of knowledge (Lam 1997; Jenkins & Tallman, 2010). The fact that this knowledge is embedded in the tacit knowledge structures and work system makes it difficult to successfully transfer since it first requires the adaptation and integration of routines and organisational practices, allowing the knowledge linked to various functions (production, marketing, design…) to be transferred and exploited. Tallman and Chacar (2011) described the direct transfer mechanisms of this type of knowledge integrated within a local context, identifying the duality between specific and architectural knowledge (Matusik & Hill, 1998; Tallman et al., 2004). Tallman and Chacar (2011) and Nooteboom (2000) argued that to directly transfer architectural and specific knowledge, it is essential to initially share a certain degree of architectural knowledge. The transfer of specific knowledge is then conditioned by prior sharing of practices and routines (Cohen & Levinthal, 1990) in the MNC (Lam, 1997).

As the transfer of perfectly codified explicit knowledge is well known and does not pose a problem, the present paper examines the transfer of specific tacit knowledge incorporated in the structure of knowledges of local partners. In order to take the most general case possible into account, this specific knowledge is also considered as embedded within the architectural knowledge (e.g., in organisational practices or routines). In other words, specific knowledge can only be used if there is prior sharing of a minimum degree of architectural knowledge between an MNC and cluster (Pinch et al., 2003). Distance between firms plays an important role in the process of knowledge transfer (Cantwell and Zhang, 2011; Werker et al., 2016). The empirical study of Choudhury (2017) highlights the importance of geographical distance for MNC since intrafirm mobility facilitates transfer of knowledge and innovation outcome. Werker et al. (2016) suggest that personal proximity affects the formation, maintenance and output of collaborations. All these distances between an MNC and the localization, as well as its local partners, offer a good indication of the way the architectural and technological knowledge is shared (Knoben & Oerlemans; 2006, Boschma, 2005).

When distances are too great, the expected benefits of knowledge transfer are annihilated by the excess transfer costs required. In other words, a certain level of shared architectural knowledge is necessary for the exchange of specific knowledge. Tacit knowledge transfer is also strongly influenced by motivation of business players (Osterloh & Frey, 2000).

The aim of this study is to formulate both a conceptual and a mathematical model giving a criterion of choice for the location of a MNC in search of new technological knowledge and the means to optimize it. To our knowledge, the only work aimed at that goal is the one of Asmussen et al. (2013).

On the basis of a bibliographical study, in the first part we develop a conceptual argument in order to formulate hypotheses regarding the impact of distances and motivation on knowledge transfer and the acquisition's resulting performance. The assumptions formulated in the first part of this work make it possible to justify, in the second part of this study, the mathematical expression of performance in a function of the architectural distance, the knowledge transfer, and the motivation. We formulate the mathematical problem by considering that the maximization of the performance is a selection criterion for the localization of an MNC within a cluster. In order to take into account the conceptual framework of Pinch et al. (2003), a minimum level of transfer of architectural knowledge is required for the transfer of component knowledge. The resolution of this optimization problem makes it possible to obtain the optimal architectural distance and the optimal motivation corresponding to the best choice of localization of an MNC within a cluster. We therefore deduce a simple criterion aiming at helping a manager confronted with the problem of localization choice.

In effect, investigating the case of technological knowledge, Asmussen et al. (2013) find that external knowledge is accommodated below a critical point relative to internal knowledge, while above the critical point, the external knowledge is assimilated. The condition obtained in this study regarding architectural distance suggests a similar result. Finally, the presented model helps to define the typology of MNC units, i.e. isolating and exploiting a MNC's knowledge or using the local knowledge and possibly transferring it to other units.