# Knowledge Governance in Multinational Enterprises:
## Hierarchical and Network Level Mechanisms Impact on Knowledge Transfer Effectiveness

Ulf Andersson
Center for Strategic Management and Globalization
Copenhagen Business School

Peter J. Buckley
Centre for International Business
University of Leeds

Henrik Dellestrand
Department of Business Studies[1]
Uppsala University
Box 513, SE-751 20 Uppsala, SWEDEN
Phone: +46-18-471 13 67
Fax: +46-18-471 68 10
E-mail: henrik.dellestrand@fek.uu.se

WORK IN PROGRESS – PLEASE DO NOT QUOTE!!!

[1] This paper was developed when the author spent time as a visiting researcher at the Centre for International Business University of Leeds (CIBUL).

# Knowledge Governance in Multinational Enterprises:
## Hierarchical and Network Level Mechanisms Impact on Knowledge Transfer Effectiveness

**Abstract**

This paper explores knowledge transfer effectiveness between a sending and a receiving subsidiary within multinational enterprises. A model based on knowledge governance mechanisms building on hierarchies and networks is tested on a sample of 169 specific knowledge transfer projects. The findings indicate the importance of both these levels and highlight different effects of, and the interplay between, hierarchy and networks thereby contributing to the understanding of knowledge management and governance. Headquarters role and its hierarchical position is tested in terms of its involvement in subsidiary level activities and control and monitoring functions performed by headquarters. The results indicate that headquarters involvement during the development of knowledge does not have any impact on subsequent transfer effectiveness whereas more classical hierarchical forms of governance have a negative impact on transfer effectiveness. This adds to the understanding of different forms of governance mechanisms in the MNE. From a subsidiary network perspective the results indicate that subsidiaries that previously have cooperated and interacted with each other as well as if the subsidiaries involved in the knowledge transfer are similar have a significantly positive effect on transfer effectiveness. These results are of relevance for understanding how transfer capabilities evolve and are developed at the subsidiary level. The findings add to the understanding of transfer project effectiveness and the role of headquarters and subsidiary networks in such projects thus adding insights to the field of knowledge management and how it can be helpful in understanding organizations.

Keywords: Knowledge governance; Knowledge management; Multinational enterprise; Headquarter-subsidiary roles and relations; Control and coordination mechanisms; Networks; Transfer effectiveness

## INTRODUCTION

Of all important resources available and needed for firm survival and prosperity, knowledge has during the last 20 years surfaced as the most prominent of them all, as it is proposed to be the principal resource adding to a firm's sustained competitive advantage (c.f., Foss and Pedersen, 2004; Grant, 1996; Kogut and Zander, 1992; 1993; Martin and Salomon, 2003). A key activity in the firm is thus knowledge governance, i.e., to make sure knowledge is developed and leveraged through out the firm (Argote and Ingram, 2000; Foss, 2007). Managers, at different levels, within firms are to orchestrate knowledge processes and this task is more or less arduous depending on the configuration of the firm. For example, the more geographically dispersed the firm is and the more dissimilar the activities of its sub-units are, the more difficult to transfer and leverage the knowledge developed at different locations (Agrawal, Kapur and McHale, 2008; Tallman and Phene, 2007). The multinational enterprise (MNE), which can be viewed as a bundle of resources that are geographically dispersed in different sub-units, as well as at headquarters, (Bartlett and Ghoshal, 1989; Penrose, 1959) constitutes a particularly important object for studying knowledge governance and its effects. The struggle between internal consistency and local adaptation is likely to be more prominent in MNEs compared to domestic firms, making managers orchestration of knowledge transfer processes more difficult. Managers in MNEs, at both the sub-unit and the headquarter level can employ different forms of organizational mechanisms to influence knowledge transfer processes. The need to understand the different effects of various types of mechanisms at the managers' disposal in the knowledge transfer process is of utmost importance for the governance of the pivotal resource impacting on organizational performance - knowledge.

Firms are not only useful and efficient governance structures, but indeed also a fora for learning (Ghoshal and Moran, 1996; Madhok, 1996; 1997; Teece, 1990) and developing routines (Nelson and Winter, 1982; Williamson, 1999) as coordinative devices. Previous research has primarily focused on factors related to the characteristics of the knowledge transferred or the absorptive capacity of subsidiaries, i.e., cognitive aspects (Mahnke and Pedersen, 2004), whereas hierarchical intervention, or active knowledge governance, in on-going subsidiary activities related to knowledge processes has

attracted less attention, especially taking forces at the subsidiary level under consideration. Hence, there is a need to pay more concerted attention to the specific transfer context irrespective if organizational economics or resource based thinking is used as a theoretical starting point (Oxley, 1999; Priem and Butler, 2000). This paper address the important question, as discussed by Foss and Pedersen (2004), of how MNE managers, at both the subsidiary and headquarters level, can orchestrate knowledge transfer activities in the MNE network and how this affects knowledge transfer performance. This link between organizational processes and knowledge transfer is still underdeveloped in organizational research (Foss, 2006). This paper links processes performed by headquarters with more micro-related features associated with subsidiaries engaged in knowledge transfer, i.e., social structures connected to inter-subsidiary relationships (Szulanski, Cappetta and Jensen, 2004) that can help explain knowledge transfer effectiveness, i.e., how well the knowledge transferred is adopted and used by the receiving unit. Hence, knowledge transfer is used a venue for taking a broader approach to knowledge management and hierarchy vs. relations, an issue of key importance for organizations. The international business setting is a very good testing ground for this (Foss, 2006).

The current paper adds to the literature by dealing with different forms of hierarchical intervention at the disposal of headquarters and subsidiary managers, as well as socialization mechanisms in the subsidiary's network that they can make use of, connecting the findings to transfer performance effectiveness. This is a different approach, and a neglected perspective, compared to previous studies focusing on aggregated knowledge flows. Consequently, the present study is an attempt to bridge this gap by answering the question of how various hierarchical and network mechanisms in MNEs affect knowledge transfer performance in terms of transfer effectiveness. Put differently, what alternatives do managers, at headquarters and in subsidiaries, have in affecting knowledge transfer effectiveness in MNEs? This picks up on Tsai's (2002) observation that social processes underlying transfer effectiveness are a key to success. He suggests that knowledge transfer research should focus on "systematic understanding of the social processes that underlie how organizational units learn from each other" in different dimensions (Tsai, 2002, p. 188).

The contribution of the paper is twofold; First, a more in-depth measure of knowledge transfer performance is employed compared to previous studies which have focused more on aggregated knowledge flows (Adler and Hashai, 2007; Agrawal et al., 2008; Gupta and Govindarajan, 2000; Haas and Hansen, 2005; Schulz, 2001). Second, it integrates reasoning from both organizational economics and knowledge-based theories of the firm by looking at the hierarchical aspects related to headquarters and on network interaction at the subsidiary level. Differences between diverse forms of headquarter intervention in subsidiary activities and their effects are found as well as effects of different social functions at the subsidiary level thus discussing an important issue of organizational strategy, namely the effects of hierarchy and social relations. The findings of differentiated forces linked to organizational mechanisms are novel to the literature and add to the understanding of both the headquarter-subsidiary relationship and the question of which subsidiary activities are important for knowledge transfer effectiveness. The findings are based on a questionnaire administered through structured face-to-face interviews with subsidiary managers involved in 169 specific intra-MNE knowledge transfer projects, i.e., the knowledge transaction is used as the unit of analysis (Foss, 2007, p.44). The specificity of the data from these 169 transfer projects adds to the quality of the findings since research has found that MNEs apply different control strategies depending on the context in which the subsidiaries operate (Nohria and Ghoshal, 1994; 1997). By looking at specific transfer projects a fine grained understanding of both the hierarchical and the social dimension in the network is attained.

The remainder of the paper is organized as follows. The theoretical background is outlined in the next section. This is followed by a section where six hypotheses are developed on how organizational mechanisms affect knowledge transfer effectiveness. Subsequently, the data and methods are presented and this is followed by the results of the study. The results are then discussed and the paper concludes with limitations and suggestions for future research.

## THEORETICAL BACKGROUND

**Transfer of knowledge**

Knowledge management is at the forefront of MNE research (cf., Agrawal et al., 2008; Grant, 1996; Gupta and Govindarajan, 2000; Kogut and Zander, 1992; 1993; Noorderhaven and Harzing 2009; Szulanski, 1996; Tallman, 2003) with the MNE conceptualized as a superior vehicle for knowledge development and transfer owing to the fact that they are social communities (Kogut and Zander, 1993) rather than transacting knowledge on the external market. It has been suggested that the social community idea is applicable at the managerial level (Forsgren, 2008) and perhaps not relevant for all MNE levels, i.e., the individual worker may not feel connected to the overall community to the same extent as managers. However, since it is at the managerial level that many knowledge processes are managed in the MNE, both from the subsidiary and headquarters perspective, reasoning linked to the evolutionary theory of the MNE is still valid and applicable in the current framework of this paper. The study of knowledge has a lot of merits in contributing to organizational theory (Grandori and Kogut, 2002; Holmström and Roberts, 1998).

In this paper, knowledge is captured by looking at different innovations since they have been said to embody knowledge (Kreiner and Mouritzen, 2003). Teece (1986) conceptualized innovations as bearers of knowledge. By investigating innovations, in the five Schumpeterian (1934) dimensions, it is possible to capture and measure both tacit and explicit dimensions of knowledge. The transfer of knowledge is an attempt to close gaps between what is known, and what is currently being used throughout the organization (Cool, Dierickx and Szulanski, 1997; Pfeffer and Salancik, 1978; Pfeffer and Sutton 2000; Repenning, 2002). A situation of ‘additive complementarity’ (Buckley and Carter, 1999) is at hand, but the knowledge transfer activity needs to be managed and coordinated. This can be done at different levels and through different means in the MNE network, i.e., at the subsidiary and/or at headquarters, with social forms of collaboration and through hierarchical mechanisms. In essence, this implies a framework where both the formal power of headquarters and the informal social relationships formed by subsidiaries - where much of the actual influence in the network may reside (Forsgren, Holm and Johanson, 2005) - are taken into account.

The rationale behind knowledge transfer in MNEs can to some extent be found in the fact that it is costly to develop new knowledge and the organization has an interest in making use of existing knowledge elsewhere in the MNE, although transfer also is associated with a cost (Teece, 1977). This is in accordance with Penrose (1959, p.24) assertion that the distinctive competence of the firm is connected to the ability of making better use of its resources. By transferring knowledge, the performance observed at one location in the organization can potentially be enhanced in another location either by generating new knowledge or by economizing on existing knowledge (Schulz, 2001; Szulanski et al., 2004). All this implies that there is both a cost side and something to gain from knowledge transfer. However, these two sides are dependent on the performance of the transfer process.

**Knowledge transfer performance**

A lot of the literature has focused on knowledge transfer measured as a flow from a sender or inflow to a receiver (Gupta and Govindarajan, 2000; Haas and Hansen, 2005; Norderhaven and Harzing, 2009; Schulz, 2001). However, this perspective offer limited insights concerning whether or not the transfer actually was successful in terms of completeness, i.e., if the knowledge transferred is being used and implemented at the receiving subsidiary. There have been some voices arguing that this might not be the case (Argote and Ingram, 2000; Kostova, 1999), e.g., the knowledge might have only been ceremonially adopted (Kostova and Roth, 2002). Hence, our knowledge is limited regarding whether or not knowledge really is transferred to and adopted at the receiving subsidiary. Put differently, our understanding of the effectiveness dimension of knowledge transfer performance is underdeveloped.

In order to study knowledge transfer performance, individual transfer projects occurring between subsidiaries must be investigated. This allows for the possibility to capture variation in the performance of knowledge transfer projects and explain it in a more in-depth way. This approach is similar to Szulanski (1996) and Kostova and Roth (2002) where knowledge transfer was proposed to be a distinct experience related to specific transfer projects. In this paper, the effectiveness of knowledge transfer is defined as a distinct measure related to the satisfactory implementation and

usage of the knowledge at the receiving subsidiary (Kostova, 1999; Leonard-Barton and Sinha, 1993). This is in line with using the knowledge transaction as the unit of analysis as proposed by Foss (2007, p.44).

Organizational processes at different levels can affect MNE knowledge transfer performance in general. This paper focuses on the effectiveness dimension which is of course closely linked to the efficiency dimension, i.e., the cost of the transfer (Daft, 1992). However, knowledge transfer efficiency is not discussed in this paper since the focus is on factors explaining successful knowledge transfer in terms of adoption and usage of the knowledge. Knowledge that is used by the recipient is key, since it then has implications for the functioning of the recipient subsidiary. The following two sections elaborate on how hierarchical structures and network mechanisms at the subsidiary level can affect knowledge transfer effectiveness in the MNE with the transfer project as the primary focus of the analysis. These are two distinct organizational dimensions at different levels and one does not exclude the other, hence they are not exclusive but complementary forces. Hierarchy and networks can impact transfer effectiveness in a number of ways. The variables included in this analysis were selected since they depict key tenets in the discussion of hierarchy vs. heterarchy (Hedlund, 1993) and the emerging knowledge governance approach (Foss, 2007; Grandori, 2001).

## HYPOTHESES DEVELOPMENT

### Hierarchical mechanisms and knowledge transfer

Ghoshal and Bartlett (1990) and Birkinshaw (2001) argue that HQs are potentially very influential in managing knowledge flows between sister units. Headquarters have a special position within the MNE network as the unit with formal authoritative power. Headquarters have a holistic role which entails a strategic responsibility to identify needs and solutions in the organization, i.e., top management have an important role in identifying, creating and sharing knowledge (Markides, 2002; Markides and Williamson, 1994). This relates to the knowledge transfer process as filling knowledge gaps with knowledge residing at other locations in the organization. For headquarters, this involves participating in activities taking place at the subsidiary level as well as using formal monitoring and evaluation

criteria. The level of hierarchical involvement in subsidiary activities is not equal for all organizations and, even within one organization, the degree to which governance mechanisms are employed can vary (Nohria and Ghoshal, 1994; 1997), i.e., there is a unique configuration of headquarter-subsidiary control problem in every relationship. Hence, by investigating specific innovation transfer projects and processes related to the development of these innovations, as well as subsidiary specific information, a detailed understanding of headquarters involvement in subsidiary activities, and the hierarchical mechanisms used can be obtained, in every observation. This approach also captures the strategic orientation of the MNE in terms of control and autonomy related to every single subsidiary.

**Headquarters role during the development of an innovation**

Headquarters involvement can affect how the knowledge, and the subsidiary developing the knowledge, are perceived within the organization. If headquarters pay attention to specific innovation development projects, i.e., a selective intervention with potentially net gain (Williamson, 1992), a corollary is that the subsidiaries related to this project gain visibility and are perceived as important players on the MNE federative arena (Andersson et al., 2007). This is also true for the knowledge that is being developed, i.e., not only the developing subsidiary is perceived as important but also the knowledge developed by the subsidiary. Consequently, innovations subject to transfer which have received the attention of headquarters through their direct involvement during the development stage are, by that involvement, allocated resources and prioritized, i.e., there is a situation where headquarters has singled out and prioritized different subsidiary innovation projects during the development phase that, at a later stage, can act as a knowledge transfer facilitating mechanism. By involving itself in the innovation development, for instance by specifying requests, the outcome of the development process is affected and the developed innovation is more suitable for other subsidiaries intra-MNE. Headquarters steers the development of knowledge towards internal consistency with the corollary of it being easier for a receiving subsidiary to adopt and integrate the knowledge when transferred if headquarters has been involved during the development stage, this relevance facilitates transfer (Schultz, 2001; Yang et al, 2008). Consequently, the following hypothesis is proposed:

*H1: Headquarters involvement in the development of an innovation will affect knowledge transfer effectiveness positively.*

**Headquarters controlling and monitoring knowledge transfer processes**

If the transfer between two subsidiaries is imposed by a third party, such as headquarters selective intervention, this is likely to have a negative effect on the sending and receiving subsidiaries willingness to engage in knowledge transfer activities and ceremonial adoption of the knowledge is likely to occur (Kostova and Roth, 2002). Headquarters primary objective is to make sure that the transfer takes place in a cost efficient manner, i.e., the focus of headquarters is geared towards efficiency and not effectiveness owing to the fact that this is a dimension more easily measured and monitored. This can act detrimentally to the effectiveness dimension since adoption takes more time and understanding than just transferring knowledge in an efficient manner. When evaluating a transfer process the efficiency dimension thus easily becomes the focus of headquarters (O'Donnell, 2000) whereas the subsidiaries engaged in the transfer are focused on effectiveness, i.e., goal incongruence can be present between headquarters and the subsidiaries (O'Donnell, 2000). Headquarters focuses on the flow of knowledge rather than on the integration of the knowledge subject to transfer. Furthermore, hierarchy can create ill feelings amongst the subsidiaries and instigate ceremonial adoption of the knowledge (Ghoshal and Moran, 1996; Kostova and Roth, 2002). The parties engaged in the transfer process may feel forced into an activity that is costly and time consuming and consequently perceive little value in it.

The knowledge that headquarters possess regarding the subsidiaries' local business network is in many instances not very deep (Forsgren et al., 2005). If headquarters actively involves itself in knowledge transfer and by formal demands and evaluation systems governs this process it can be perceived as ignorant because of its lack of relationship specific knowledge thus creating a negative disposition towards adopting and using the knowledge at the subsidiary level (Forsgren, 2008). Hence, the effects of headquarters governance mechanisms may be detrimental and social activities at the subsidiary level become important for knowledge transfer (Kostova and Roth, 2003). This negative side of

headquarters governance could be mediated by the fact that it possesses formal power to exert influence over subsidiaries and the involvement of headquarters means additional resources allocated to the subsidiary. In line with this reasoning, the following is suggested:

> *H2: Headquarters hierarchical governance mechanisms driving the innovation transfer process will affect knowledge transfer effectiveness negatively.*

**Subsidiary level control mechanisms in knowledge transfer**

One way to directly control and monitor the transfer process is by using expatriates (Minbaeva, 2008; Minbaeva, Pedersen, Björkman, Fey and Park, 2003). The use of expatriates can facilitate the knowledge flows between the subsidiary and other MNE units (Gupta and Govindarajan, 2000). Expatriates facilitate the process of integrating new knowledge at the receiving subsidiary and help to overcome problems during the transfer phase (Tsang, 1999). Using expatriates specifically for a knowledge transfer project is of course costly and can be seen as an investment by the organization, but should have a positive impact on the understanding and adoption of the knowledge subject to transfer. Expatriates can in a better way understand the value added of the knowledge and have a direct experience in handling the knowledge and can help to explain complicated tacit dimensions of the knowledge (Björkman, Barner-Rasmussen and Li, 2004; Moran, 2005). This is one of the underlying reasons for using expatriates in specific knowledge transfer projects, besides gaining control and monitoring possibilities. Hence, the following hypothesis can be formulated:

> *H3: The use of subsidiary expatriates will affect knowledge transfer effectiveness positively.*

**Subsidiary network mechanisms and knowledge transfer**

In MNE networks, less distinct formal boundaries exist between subsidiaries compared to the more formalized headquarter-subsidiary relationship even though headquarters has been advanced as a

player amongst others in the MNE network (Forsgren et al., 2005; Andersson, Forsgren and Holm, 2007). In these more non formalized relationships at the subsidiary level a social interaction takes place, enhancing the social capital in the focal relationship where knowledge transfer takes place (Tsai, 2000). Social capital has been proposed to provide cohesiveness and make the firm strive towards a common goal (Adler and Kwon, 2002). Value is generated by building social capital due to the facilitation of the exchange process of resources and through providing access to extended network relationships (Inkpen and Tsang, 2005; Moran, 2005; Nahapiet and Ghoshal, 1998). This implies that social capital entails both personal connections and network structures at the unit level. However, the relational dimension underlies this assumption which means 'who you know and how well you know them' consequently affects economic activities (Granovetter, 1985; Moran, 2005).

If the actors engaged in knowledge transfer are similar to each other in terms of technological and organizational configuration, this will increase the absorptive capacity in the dyad which will facilitate the learning and the understanding of the underlying assumptions of the knowledge transferred (Lane and Lubatkin, 1998; Tallman and Phene, 2007), in other words the actors have a common basic understanding of the knowledge subject to transfer which acts as a facilitator of transfer effectiveness (Kogut and Zander, 1992; 1993). Similarity will increase the transparency of the knowledge, thus facilitating the integration and adoption (Tallman and Phene, 2007). This leads to the following hypothesis being proposed:

> *H4: Similar subsidiaries involved in the transfer relationship will affect knowledge transfer effectiveness positively.*

In older relationships where the actors have cooperated previously the perceived risk of engaging in a new cooperative project is decreased since knowledge pertaining to the functioning of the relationship has already been built, behaviour has been experienced, and trust has been developed (Inkpen and Tsang, 2005; Uzzi, 1997). By building trust, the interaction in relationships can potentially benefit from this (Tsai and Ghoshal, 1998). Trust can be perceived as the opposite of uncertainty, and here the

link between transaction cost economics and theories based on individual behaviour becomes apparent (Granovetter, 1985; Williamson, 1993). In relationships where the actors previously have cooperated, processes and routines are established for future interaction which will facilitate collaboration and cooperation in general (Kostova and Roth, 2003) and consequently knowledge transfer. A common identity is created through social ties (Håkansson and Snehota, 1995) and since many knowledge transfer processes are complicated to explain during the transfer phase this will take time and is easier done in a transfer where a closeness exists (Moran, 2005) and the actors have a common identity, but it will also affect the amount of resources needed in order to facilitate knowledge transfer effectiveness (Hansen, 1999). Moreover, in a relationship where the actors know each other, the search process for relevant knowledge is facilitated. Consequently, the knowledge transferred in such a relationship will entail more relevant knowledge for the receiver and the sender will be more knowledgeable about the needs of the receiver. This will affect knowledge transfer effectiveness positively (Szulanski et al., 2004; Yang, Mudambi and Meyer, 2008). This line of reasoning implies that social capital can be built by repeated interaction between the actors. If the transfer partners are experienced, their capabilities for conducting such processes are enhanced (Cyert and March, 1963; Eisenhardt and Martin, 2000; Zollo and Winter, 2002) and routines are established for transferring and incorporating knowledge, thus having a positive impact on transfer effectiveness. Therefore, the following hypothesis is postulated:

> *H5: Previous repeated interaction in the sender-receiver relationship will affect knowledge transfer effectiveness positively.*

MNEs are complex organizations, and as such the need for direct governance mechanisms for conducting knowledge transfer between subsidiaries are great (Galbraith, 1973). Dense mechanisms allows for the partners engaged in the transfer to meet in person, set up training opportunities and establish temporary work-teams. Dense transfer mechanisms allows for social capital to be enhanced, where social capital is understood as “the relational resources attainable by individual actors through networks of social relationships” (Tsai, 2000). This density in the interaction has been proposed to be

important when transferring complex knowledge (Gupta and Govindarajan, 2000). It relates to the effectiveness dimension in that the opportunity to explain complex issues and reduce errors during the transfer process is present. Consequently the following hypothesis is proposed:

> *H6: The use of dense social mechanisms in the transfer phase by the sending and receiving subsidiary will affect knowledge transfer effectiveness positively.*

**The Model**

The six hypotheses are summarised in Figure 1. In the following section the model is confronted with the empirical data.

***Insert Figure 1 here***

## DATA AND METHODS

The data used in this research was collected between 2002 and 2005 and captures 169 specific intra-MNE innovation transfer projects in a very detailed fashion. When investigating innovation transfer it is possible to study this phenomenon, in 169 dyadic transfer projects, with detailed information about the innovation, the development process, the developing subsidiary, the sender-receiver relationship and the transfer process.

Innovations in subsidiaries were identified through snowball sampling. Different industries are represented in the sample, e.g., manufacturing, telecommunications, transportation and the steel industry. The sending and receiving subsidiaries are geographically dispersed throughout the world. The selection criterion for the innovations studied was based on the novelty and value of the specific innovation to the organization. This follows the OECD (2005) definition, i.e., “the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations” (p. 47).

This selection was done by the innovating/developing subsidiary. Moreover, the innovations had to have the potential of being transferred and they also had to have been completed one to ten years prior to the interview. Sampling innovations that have the potential of being transferred means that the dataset contains some innovations that have not been subject to transfer. These innovations are excluded in the present analysis. One potential bias with the sample is that it only contains successful innovations, in terms of having been developed. However, given the question at hand – what role do hierarchy and networks play in the transfer process – this bias is almost intrinsic since the transfer of unsuccessful innovations is highly unlikely to occur and would not add anything to the MNE competitive advantage. Successful in this sense does not imply market success at a later stage.

The data was collected through face-to-face interviews on site at the subsidiaries where the person deemed to be the most appropriate respondent answered a structured questionnaire, i.e., an approach similar to surveys with the advantage of being able to target the respondent in person, thus knowing who answers the questionnaire. The respondents had been involved in the development of the innovation and usually had the role of R&D managers, project managers or subsidiary CEOs. Typically, more than one interviewer was involved in the interview process. The questionnaire used had been pre-tested in two pilot interviews and minor changes were made in order to eliminate ambiguous questions and phrasings as well as to exclude erroneous indicators. By having access to specific managers with detailed knowledge of the innovations investigated, a deeper understanding of the specific innovations could be gained, an important issue in studies of knowledge management (Denrell, Arvidsson and Zander, 2004), as well as the possibility to discuss the questions with the respondents. This approach allows for the opportunity to target the appropriate respondent and detect inconsistencies in the answers during the interview, hence increasing reliability and face validity.

**Measures**

The advice of Boyd, Gove and Hitt (2005) is followed and single measure indicators are avoided. Multiple indicators are used in both the dependent and independent variables. This approach minimizes measurement error, is parsimonious and offers a multifaceted representation of the

underlying construct (Hair, Black, Babin, Anderson and Tatham, 2006). Additionally, as recommended by Cox (1980), 7-point likert type scales were used to obtain the data on innovation transfer in MNEs. Besides the estimations by the respondents, objective measures such as GDP, patenting and size are included as control variables in the model. The constructs were identified in an iterative process where coefficient alphas as well as theoretical issues were considered (Churchill, 1979; Nunnally, 1978). Hence, constructs developed can be claimed to be theoretically valid and empirically verified. Subsequently, factor analysis was used in order to confirm the discriminant validity of the constructs.

**Dependent variable**

The dependent variable was developed in relation to previous research on knowledge transfer. Previously the focus has then been on the flow of knowledge and less attention has been on the actual performance of knowledge transfer. A measure taking performance under consideration was developed starting with a number of indicators under consideration and further developed in an iterative process considering theoretical implications and coefficient alphas. Additionally, results from a factor analysis were considered (Churchill, 1979). Transfer performance entails both an effectiveness and efficiency dimension and the measure developed here captures the effectiveness dimension. How well the innovation and the new knowledge it consists of was adopted and used at the receiving subsidiary as well as a more general measure of satisfaction related to the transfer performance is captured (Pfeffer and Salancik, 1978).

*Transfer performance effectiveness* is measured as a four item construct where the respondents were asked to indicate on a scale from 1 (totally disagree) to 7 (totally agree) if:<*The performance of the innovation transfer was very satisfactory*>, <*The counterpart adopted the innovation very quickly*> and <*The innovation has been very easy to adopt by this counterpart*>. One final item was included in this construct and was measured on a similar scale from 1 (not at all) to 7 (very high): <*To what extent the innovation transfer has been completed*>. The internal reliability of the underlying construct was good with a coefficient alpha of 0.817, exceeding the recommended level of 0.7 (Nunnally, 1978).

These four items were summed and averaged to form the dependent variable in the following statistical analysis. The dependent variable is distinct from other variables in the analysis, see Table 1.

**Independent variables**

The first dimension of headquarters influence connected to subsidiary level innovation activities is whether or not they have been involved with the development of the innovation subject to transfer. *Headquarter involvement in innovation development* is captured in a four item construct where the respondents were asked to indicate, on a scale from 1 (totally disagree) to 7 (totally agree) if: <*The MNE HQ has participated closely in developing this innovation*>, <*The MNE HQ has brought competence of use for the development of this innovation*>, <*The MNE HQ has been important through specifying requests*> and <*The MNE HQ has taken important initiatives for developing the innovation*>. The four indicators were summed and averaged in order to form the construct used in the regression analysis. Internal reliability of the scale was high, with a coefficient alpha of 0.908.

*Headquarter hierarchy* is captured by four items. The respondents were asked to indicate, on a scale from 1 (totally disagree) to 7 (totally agree), to what extent: <*The MNE HQ has formally instructed you to share this innovation with the counterpart*> and <*The transfer of the innovation has occurred without any sanctions by HQ with the counterpart (Reversed)*>. Moreover, the respondents were asked to indicate on a scale from 1 (not at all) to 7 (very much) whether the transfer of the innovation was driven by: <*Requirement from HQ*> and <*HQ evaluation system*>. These four items were summed and averaged to form the construct. The coefficient alpha of this construct is 0.632, which is below the recommendation as set by Nunnally (1978). Since this is a construct employing few indicators it is not uncommon to find that alpha tests, given that they generally are conservative, return with a lower coefficient than the recommended level. Reliability increases the more items a scale contains (Nunnally, 1978). With the same average inter-item correlation and the inclusion of additional variables the alpha value will increase (Carmines and Zeller, 1979, p.45). When a low alpha is found it is appropriate to check the mean inter-item correlation (MIC). The optimal range for the MIC is 0.2-0.4 (Briggs and Cheek, 1986). The MIC for this construct was 0.295 thus meeting the stipulated

criterion. This and the fact that the construct was identified as distinct from others in a principal component factor analysis, see Table 1, where both the factor loadings and communalities extracted for the items were adequate, indicate the appropriateness of using this construct.

The use of *subsidiary expatriates* is reflected in a two item construct. The respondents were asked to indicate, on a scale ranging from 1 (not at all) to 7 (very high): <*To what extent, with regard to the transfer of the innovation exchange of managers was used*>. The respondents were also asked to indicate, on a scale from 1 (not at all) to 7 (very much): <*To what extent the transfer of the innovation was driven by moving personnel between the developer and the receiver*>. The indicators were added and averaged to form the scale. A coefficient alpha of 0.743 indicates a good internal reliability of this construct.

The *similarity of the subsidiaries* involved in the innovation transfer is a two item construct capturing how similar the sender and receiver are regarding technological and organizational features. The respondents were asked to indicate, with regard to the receiver, on a scale from 1 (totally disagree) to 4 (neither) up to 7 (totally agree) if: <*Technical difference makes the transfer problematic*> and <*Organizational difference makes the transfer problematic*>.[2] The indicators were summed and averaged, thus forming the construct. Internal reliability was good, with a coefficient alpha of 0.738.

*Previous repeated interaction*, i.e., dyadic transfer experience in the sender-receiver relationship, is a two item construct were the respondents indicated to what extent (besides the focal innovation discussed during the data collection) on a scale from 1 (not at all) to 7 (very much): <*They previously had cooperated with the receiver*> and <*They previously had shared knowledge*>. The indicators were summed and averaged in order to form the construct, which had a coefficient alpha of 0.738.

[2] These items were reverse coded in order to capture the similarities between the subsidiaries involved in the knowledge transfer.

Finally, *dense social network mechanisms* employed by the sending and receiving subsidiaries during the innovation transfer were captured using a three item construct. The respondents were asked to indicate on a scale from 1 (not at all) to 7 (very high) the level of use of: <*Temporary training at partner sites*>, <*Cross-unit teams, project groups etc.*> and <*If face to face meetings were used in the communication regarding the innovation transfer*>. The indicators were summed and averaged. The construct has adequate internal reliability with a coefficient alpha of 0.732.

**Control variables**

In order to control for unobserved heterogeneity six variables were introduced as controls in the model. *Age* was included since older subsidiaries are more established in their business networks and have a tendency to be more autonomous (Forsgren, 1990). Older subsidiaries, with old and stable relationship partners, can exhibit a higher innovative capability as well as a tendency to exploit innovative opportunities since this is dependent on past experiences (Cohen and Levinthal, 1990; Foss and Pedersen, 2002). Older subsidiaries are likely to be more experienced in transferring knowledge, thus this can have an effect on knowledge transfer performance. To control for age, the logarithm of the number of years the subsidiary had been operating on the market was included in the regression equation. *Size* measured as the natural logarithm of the number of employees in the developing subsidiary is used as a proxy for many subsidiary related characteristics. It is an indicator of intra-MNE importance and research has shown that large subsidiaries have greater intra-firm bargaining power (Mudambi and Navarra, 2004) and size can also affect knowledge transfer even if the knowledge has a low relevance (Yang et al., 2008). Larger subsidiaries possess more resources that can be employed in order to facilitate the transfer process. Research has also used size as one indicator for valuable knowledge stock, which can be of greater overall value for the MNE (Gupta and Govindarajan, 2000). *Basic research* is captured with the help of a dummy variable pertaining to if the subsidiary conducted research considered to be core or not, if so the variable was coded 1, and if the subsidiary did not conduct any basic research the observation was coded 0. Knowledge developed by a subsidiary performing core activities are likely to be more easily adopted building on absorptive capacity logic. In order to control if *knowledge sharing* activities is stimulated in the MNE this was

included as a single item variable. The respondents were asked to indicate, on a scale from 1 to 7 how important knowledge sharing was in the performance evaluation made of them. This has been shown to have a positive impact on knowledge transfer flows in previous studies (Björkman et al., 2004). A dummy variable relating to if the specific innovation subject to transfer is *patented* or not was included in the model. Patents have been used as indicators of high versus low technological innovations (Trajtenberg, 1990) and as a marker of technological importance (Albert, Avery, Narin and McAllister, 1991). Patents can thus have an effect on knowledge transfer performance since high technological innovations are likely to be more difficult and costly to transfer and receive. Another indicator of the value of the sending subsidiary's stock of knowledge is the economic level of the home country of that subsidiary (Björkman et al., 2004; Gupta and Govindarajan, 2000). Hence, *GDP* of the sending subsidiary's home country measured as the total GDP in 2005 U.S. dollars is used as a control variable and a proxy for the value of the sending subsidiary's knowledge as well as for the munificence of the local technological and business environment. This data was collected from the GGDC Total Economy Database. The rationale behind this is that valuable knowledge is more likely to attract attention and, as a consequence, facilitate knowledge flows (Davenport and Prusak, 1998; Gupta and Govindarajan, 2000; Rugman and Verbeke, 2001).

**Common method bias and multicollinearity**

The use of perceptual measurements can be problematic because of social desirability and self-assessment bias. This is mediated by the face-to-face interviews. In order to check for common method bias augmenting the relationships, Harman's one factor test was used (Podsakoff and Organ, 1986). All relevant indicators were included in a principal component factor analysis (principal component with Varimax rotation and Kaiser normalization), see Table 1. The KMO-value exceeded the recommended 0.6 level with a value of 0.642 (Tabachnick and Fidell, 2001). The Bartlett's test of sphericity was at a 0.000 significance level indicating sufficient correlations between the indicators (Hair et al., 2006). This indicates the appropriateness of a factor analysis procedure. The factor analysis indicated validity of the data and reported good properties. If high common method variance is a problem, only one factor will emerge with an eigen value exceeding 1, or alternatively one of the

factors extracted will account for a majority of the variance. In the principal component analysis, seven factors were extracted with an eigen value above 1. The eight factor returned with an eigen value of 0.835, thus being far from meeting the latent root criterion and consequently not included in the analysis. None of the factors explain a majority of the variance, ranging from 4.875 per cent to 18.505 per cent. The cumulative variance explained by the seven factors was 73.486 per cent. In the rotated factor solution a cut off value of 0.32 was employed and only two cross-loadings appeared above this level. Factor loadings below 0.32 can be considered poor since the overlapping variance then is below 10 per cent and a factor loading of 0.45 represents 20 per cent of the overlapping variance and can be considered to be fair (Comrey and Lee, 1992). The first cross-loading occurred for the item of headquarters instruction to share the innovation with the counterpart on the construct of headquarters participation during the development with a value of 0.444. The second cross-loading relates to the item where the respondents reported if the counterpart adopted the innovation quickly with a value of 0.507 on the construct of subsidiary similarity. However, the item loaded with a higher value on the effectiveness construct and the items in the similarity construct also returned with higher loadings. These two cross-loadings can not be considered to raise any major concerns when interpreting the data, even though the presence of common method bias can not be excluded.

***Insert Table 1 here***

To investigate if there is a correlation between two or more predictor variables augmenting the estimated $R^2$ of the model, the Variance Inflation Factor (VIF) was calculated. Different acceptable sizes of the VIF-value have been proposed and there does not seem to be a consensus of what cut off value to use, although 5 has been suggested as a reasonable number (Stedenmund, 1992) or even as high as 10 (Hair et al., 2006; Marquardt, 1970). No VIF-values in any of the models exceeded 5. In the final model, model 4, the highest calculated VIF-value was 1.552, with a mean of 1.229. Consequently multicollinearity does not seem to threaten the estimates of the models and there is no reason that this causes misinterpretation of the predictive ability of the regression model results.

***Insert Table 2 here***

## RESULTS

The mean values, standard deviations and the correlation matrix for all the variables are presented in Table 3. The variables show only modest correlations, the highest being Pearson r of 0.465 ($p<0.01$) between subsidiary similarity and transfer performance effectiveness.

The paper examines how different organizational mechanisms affect knowledge transfer performance in the effectiveness dimension. In order to estimate the models, Ordinary Least Squares (OLS) regressions were conducted in four steps using hierarchical regression analysis. Building on Hoffman (1997) hierarchical regressions are appropriate when testing effects of different levels in complex organizations and in line with the knowledge governance approach it is reasonable to test the effects of the hierarchical mechanisms initially since they influence the subsidiary level activities (Foss, 2007). In the first model specification, only the control variables were entered. Secondly, the main effects for hierarchical mechanisms were included. In the third specification the subsidiary expatriate variable was entered and in the fourth and final model specification the subsidiary network variables were entered. In Table 4, the standardized parameter estimates of all models are reported. The first model returned significant with an F-value of 3.181 ($p<0.01$) and the control variables explained 10.1 per cent of the variance. Model 2, examining the hierarchical mechanisms is significant with an F-value of 2.996 ($p<0.01$) and an adjusted $R^2$ of 0.121. The third model had an F-value of 4.251 ($p<0.001$) and explained 20.1 per cent of the variance. The fourth and final model was highly significant ($p<0.001$) with an F-value of 6.115 explaining 34.6 per cent of the variance. Hence, every model is significant and the explanatory value increased with every model specification, see diagnostics in Table 4. This supports the chosen model specifications and no VIF-values are abnormally large in any of the models, indicating that multicollinearity does not augment the $R^2$ value or the predictive capability of the model results.

The findings indicate a very small influence of headquarter involvement during the development of the innovation and the relationship is insignificant. Hence, no support is found for hypothesis 1. Hypothesis 2, which relates to if the transfer was driven by headquarter hierarchy, show a significantly ($p<0.05$, $p<0.05$ and $p<0.01$) negative relationship to transfer performance effectiveness in model 2, 3 and 4 respectively. Thus, hypothesis 2 is supported. Contrary to what was postulated in hypothesis 3, the use of subsidiary expatriates indicates significantly ($p<0.001$ and $p<0.01$) negative relationships to transfer performance in both model 3 and 4. Hence, hypothesis 3 is not supported. Consistent with hypothesis 4, subsidiary similarity is positively related to transfer performance effectiveness ($p<0.001$). Previous repeated interaction is positively ($p<0.05$) related to knowledge transfer effectiveness, thus lending support to hypothesis 5. Finally, a small positive effect related to the density of the social mechanisms employed in the dyadic transfer relationship to transfer performance is found. However, this relationship is not significant and hypothesis 6 is consequently not supported. In all models, GDP returned as significantly positive in relation to knowledge transfer effectiveness.

***Insert Tables 3 and 4 here***

## DISCUSSION

This paper set out to fill the gap in research related to how different hierarchical functions, and subsidiary network characteristics, affect knowledge transfer effectiveness. The knowledge governance approach (Foss, 2007) tells us that an organizational action to try to influence knowledge transfer should start with formal mechanisms since these are readily available to managers. However, informal mechanisms also affect the transfer. The idea is that the formal mechanisms influence behaviour, and thus the goal of satisfactory transfer performance can be attained, hence hierarchical OLS regression is an appropriate analytical approach. This paper deals with two different formal mechanisms employed by headquarters, one control feature employed in the sending receiving relationship (subsidiary expatriates), and three subsidiary level network mechanisms of a more informal nature. The results suggest that activities at different levels affect transfer effectiveness in

different directions. A major contribution of this study is the focus on effectiveness studied in specific transfer projects related to hierarchy and networks within the MNE.

**Hierarchy in the MNE**

An interesting finding is the almost unrelated and insignificant effect of headquarters involvement during the development to transfer effectiveness. The involvement of headquarters can be perceived as a distinctly different governance form of hierarchical intervention compared to monitoring and control and hence have a different effect on the performance. The reasons why headquarters get involved may be different compared to when they exert a more traditional form of control and monitoring role. In some cases headquarters need to involve itself and support promising subsidiary developments by intervention (Rugman and Verbeke, 2001). Even though involvement does not have a direct effect on transfer performance effectiveness, the indirect effects of headquarter involvement for the subsidiary may be great. The concept of involvement can be said to pick up on the call for specification of the meta-construct of headquarters attention (Bouquet, Morrison and Birkinshaw, 2009; Occasio, 1997). By capturing the attention of headquarters and getting them involved, this can mean that a mandate for developing or for transferring knowledge is attained. The visibility of the knowledge subject to transfer is heightened due to the involvement of headquarters and this might at least have indirect effects on transfer performance. Additionally, knowledge can be seen as a critical resource and as a source for power within the MNE (Pfeffer, 1981; Pfeffer and Salancik, 1978) which in turn has implications for subsidiary autonomy and bargaining power. However, the foundations for this organizational influence can partially be traced back to the involvement of headquarters in subsidiary level activities. Additionally, the perception of the subsidiary as an important player in the MNE network is increased due to the formal recognition and increased legitimacy attained by having headquarters involved in subsidiary level activities. By being perceived as an important subsidiary, it is not unlikely that this specific subsidiary evolves into a Centre of Excellence. Headquarters involvement can be seen as a critical resource that is scarce. This means that headquarters has to pick different transfer projects as winners and allocate resources to these specific projects.

A negative effect is found when headquarters is driving the transfer process through more classical governance mechanisms. This may be due to the fact that actors feel forced into action without any real motivation and it might be irrelevant knowledge that is being transferred to the receiver, i.e., the motivational disposition of the subsidiaries towards the transfer is low. This can lead to ceremonial adoption of the knowledge (Kostova and Roth, 2002). Headquarters rationale for transfer is more focused on the efficiency dimension since it is easier to monitor and is more measurable (Daft, 1992). Thus, headquarters focus is more likely to be on efficiency than on effectiveness and offers one explanation of the negative result in the effectiveness dimension. For managers, this result points in the direction that the classical control instruments easily available are not appropriate if they want to make sure the knowledge is integrated and used at the receiving subsidiary.

**Subsidiary expatriates**

A more surprising finding relates to the negative effect of expatriates for transfer effectiveness. As discussed by Björkman et al. (2004) the expatriate role needs to be further researched. In their study they found no effect of expatriates on knowledge outflow. One reason behind the negative effect on transfer effectiveness found in the present study may be the expatriate evaluation system. It is easier to evaluate financial performance and cost, i.e., the efficiency dimension, compared to the extent knowledge is used and integrated, i.e., the effectiveness dimension. Hence, the incentives for expatriates can be to focus more on efficiency than on effectiveness and the expatriates are more likey to have a headquarters focus rather than a subsidiary focus (Björkman et al., 2004). This finding is in line with Minabaeva (2008) who found both positive and negative effects of HRM practices on knowledge transfer.

**Subsidiary Networks in MNEs**

Turning to the more informal mechanisms, the results indicate that it is important to cooperate with partners that the actors already know and trust and have experience working with compared to investing a lot of time and effort in training and meetings. In this respect, the study contributes to social capital theory by highlighting the importance of prior collaboration compared to dense transfer

mechanisms. Hence, it becomes a matter of selecting the transfer counterparts carefully if success is to be achieved, not just to transfer the knowledge to anyone. By selecting the transfer counterparts carefully this makes better use of available resources. Transfer performance effectiveness allows for a deeper understanding of this which not is captured by the flow perspective. By cooperating with known counterparts the subsidiary builds specific dyadic experience and knowledge for conducting knowledge transfer. The relationship partners learn how to organize and conduct knowledge transfer within the dyadic relationship, i.e., an evolutionary process of tacit capability development takes place (Nelson and Winter, 1982). This capability is connected to specific dyadic relationships and lends support to the idea of the MNE as a social community (Kogut and Zander, 1992; 1993).

The strong positive relationship between GDP and transfer effectiveness supports the notion that the value of the source-subsidiary's knowledge is important. Hence, subsidiaries in countries with a high GDP should be encouraged to develop and transfer knowledge. This is in line with the reasoning by Andersson, Forsgren and Holm (2002) that embedded subsidiaries contributes to sister subsidiaries' competence development.

## CONCLUDING REMARKS - LIMITATIONS AND FUTURE RESEARCH

This study set out to investigate transfer effectiveness and is an attempt to link and further investigate hierarchical views on the MNE with subsidiary level factors with relevance for knowledge governance in MNEs. One major limitation of the study is that the data only originates from the sending subsidiary. In order to estimate the transfer performance in a more holistic way dyadic data needs to be collected. However, since the sending subsidiary is actively involved during the transfer, it is reasonable to assume that the targeted respondents can give an accurate estimation of both headquarters role, the dyadic relationship and how well the knowledge was implemented and adopted at the receiving subsidiary. Some of the measurements consist of subjective estimations made by the respondents. The usage of perceptual measurements can be problematic because of social desirability and self-assessment biases. However, this is mediated by the fact that our data is collected from key informants through face-to-face interviews. In terms of future research, the interplay between the

efficiency and effectiveness dimension needs to be better understood as well as the indirect effects of headquarters involvement in subsidiary level activities. The role of expatriates, incentive systems and their potential contribution to transfer performance needs to be further investigated since mixed results have been found in different studies (c.f., Björkman et al., 2004; Gupta and Govindarajan, 2000). Furthermore, dimensions of external knowledge transfer, reverse knowledge transfer and secondary knowledge transfer needs to be investigated by researchers.

## REFERENCES


Adler, P.S. and Kwon, S-W. (2002) 'Social Capital: Prospects for a New Concept', *Academy of Management Review*, 27(1): 17-40.

Agrawal, A., Kapur, D. and McHale, J. (2008) 'How do spatial and social proximity influence knowledge flows? Evidence from patent data', *Journal of Urban Economics*, 64(2): 258-269.

Albert, M.B., Avery, D., Narin, F. and McAllister, P. (1991). 'Direct validation of citation counts as indicators of industrially important patents', *Research Policy*, 20(3): 251-259.

Andersson. U., Forsgren, M. and Holm, U. (2002) 'The Strategic Impact of External Networks: Subsidiary Performance and Competence Development in the Multinational Corporation', *Strategic Management Journal*, 23(11): 979-996.

Andersson, U., Forsgren, M. and Holm, U. (2007) 'Balancing Subsidiary Influence in the Federative MNC – a Business Network Perspective', *Journal of International Business Studies*, 38(5): 802-818.

Argote, L. and Ingram, P. (2000) 'Knowledge Transfer: A Basis for Competitive Advantage', *Organizational Behaviour and Human Decision Processes*, 82(1): 150-169.

Bartlett, C.A. and Ghoshal, S. (1989) Managing Across Borders. The Transnational Solution. Harvard Business School Press: Boston Massachusetts.

Björkman, I., Barner-Rasmussen, W. and Li, L. (2004) 'Managing Knowledge Transfers in MNCs: The Impact of Headquarters Control Mechanisms', *Journal of International Business Studies*, 35(5): 443-455.

Bouquet, C., Morrison, A. and Birkinshaw, J. (2009) 'International attention and multinational enterprise performance', *Journal of International Business Studies*, 40(1): 108-131.

Boyd, B.K., Gove, S. and Hitt, M.A. (2005) 'Construct measurement in strategic management research: Illusion or reality?', *Strategic Management Journal*, 26(3): 239-257.

Briggs, S.R. and Cheek, J.M. (1986) 'The role of factor analysis in the development and evaluation of personality scales', *Journal of Personality*, 54(1): 106-148.

Buckley, P.J. and Carter, M.J. (1999) 'Managing Cross-Border Complementary Knowledge: Conceptual Developments in the Business Process Approach to Knowledge Management in Multinational Firms', *International Studies of Management and Organization*, 29(1): 80-104.

Carmines, E.G. and Zeller, R.A. (1979) Reliability and Validity Assessment. Sage, Beverly Hills, CA.

Churchill, G.A.J. (1979) 'A paradigm for developing better measures of marketing constructs', *Journal of Marketing Research* 16(1): 64-73.

Cohen, W.M. and Levinthal, D.A. (1990) 'Absorptive Capacity: A New Perspective on Learning and Innovation', *Administrative Science Quarterly*, 35(1): 128-152.

Comrey, A.L. and Lee, H.B. (1992) A First Course in Factor Analysis. 2nd ed. Hillsdale, NJ: Lawrence Earlbaum Associates.

Cool, K.O., Dierickx, I. and Szulanski, G. (1997) 'Diffusion of Innovations Within Organizations: Electronic Switching in the Bell System 1971-1982', *Organization Science*, 8(5): 543-559.

Cox, E.P. (1980) 'The Optimal Number of Response Alternatives for a Scale: A Review', *Journal of Marketing Research*, 17(4): 407-422.

Cyert, R.M. and March, J.G. (1963) A Behavioral Theory of the Firm. Englewood Cliffs, N.J.: Prentice Hall.

Daft, R.L. (1992) Organization theory and design. 4ed, West Publishing Company, St. Paul.

Davenport, T.H. and Prusak, L. (1998) Working Knowledge. Harvard Business School Press, Boston, M.A.

Denrell, J., Arvidsson, N. and Zander, U. (2004) 'Managing Knowledge in the Dark: An Empirical Study of the Reliability of Capability Evaluations', *Management Science*, 50(11): 1491-1503.

Eisenhardt, K.M. and Martin, J.A. (2000) 'Dynamic Capabilities: What are they?', *Strategic Management Journal*, 21(10-11): 1105-1121.

Forsgren, M. (1990) 'Managing the International Multi-Centre Firm: Case Studies from Sweden', *European Management Journal*, 8(2): 261-267.

Forsgren, M. (2008) Are Multinationals Superior or Just Powerful? A Critical Review of the Evolutionary Theory of the MNC. In J. Dunning and P. Gugler (eds). Foreign Direct Investment, Location and Competitiveness, Amsterdam, Elsevier.

Forsgren, M., Holm, U. and Johanson, J. (2005) Managing the Embedded Multinational. Edward Elgar Publishing, Cheltenham, UK.

Foss, N. (2007) 'The Emerging Knowledge Governance Approach: Challenges and Characteristics', *Organization*, 14(1): 27-50.

Foss, N.J. and Pedersen, T. (2002) 'Transferring knowledge in MNCs: The role of sources of subsidiary knowledge and organizational context', *Journal of International Management*, 8(1): 49-67.

Foss, N. and Pedersen, T. (2004) 'Organizing Knowledge Processes in the Multinational Corporation: An Introduction', *Journal of International Business Studies*, 35(5): 340-349.

Galbraith, J. (1973) Designing complex organizations. Reading, Massachusetts: Addison-Wesley Publishing Company.

Ghoshal, S. and Moran, P. (1996) 'Bad for Practice: A Critique of the Transaction Cost Theory', *Academy of Management Review*, 21(1): 13-47.

Granovetter, M.S. (1985) 'Economic Action and Social Structure: The Problem of Embeddedness' *American Journal of Sociology*, 91(3); 481-510.

Grant, R.M. (1996) 'Towards a Knowledge Based Theory of the Firm', *Strategic Management Journal*, 17: 109-122.

Gupta, A.K. and Govindarajan, V. (2000) 'Knowledge Flows within Multinational Corporations', *Strategic Management Journal*, 21(4): 473-496.

Haas, M.R. and Hansen, M.T. (2005) 'When using Knowledge Can Hurt Performance: The Value of Organizational Capabilities in a Management Consulting Company', *Strategic Management Journal*, 26(1): 1-24.

Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. and Tatham, R.L. (2006) Multivariate Data Analysis. 6$^{ed}$. Upper Saddle River, New Jersey: Prentice Hall.

Hansen, M.T. (1999) 'The Search-Transfer Problem: The Role of Weak Ties in Sharing Knowledge across Organization Subunits', *Administrative Science Quarterly*, 44(1): 82-111.

Håkansson, H. and Snehota, I. (1995) Developing Relationships in Business Networks. Londoun: Routledge.

Hoffman, D.A. (1997) 'An overview of the logic and rational of hierarchical linear models', *Journal of Management*, 23(6): 723-744.

Inkpen, A. and Tsang, E.W. (2005) 'Networks, Social Capital, and Learning', *Academy of Management Review*, 30(1): 146-165.

Kogut, B. and Zander, U. (1992) 'Knowledge of the Firm, Combinative Capabilities, and the Replication of Technology', *Organization Science*, 3(3): 383-397.

Kogut, B. and Zander, U. (1993) 'Knowledge of the firm and the evolutionary theory of the multinational corporation', *Journal of International Business Studies*, 24(4): 625-645.

Kostova, T. (1999) 'Transnational Transfer of Strategic Organizational Practices: A Contextual Perspective', *Academy of Management Review*, 24(2): 308-324.

Kostova, T. and Roth, K. (2002) 'Adoption of an Organizational Practice by Subsidiaries of Multinational Corporation: Institutional and Relational Effects', *Academy of Management Journal*, 45(1): 215-233.

Kostova, T. and Roth, K. (2003) 'Social Capital in Multinational Corporations and a Micro-Macro Model of its Formation', *Academy of Management Review*, 28(2): 297-317.

Kreiner, K. and Mouritzen, J. (2003) Knowledge Management as Technology: Making Knowledge Manageable. In B. Czariewska and G. Sevón (eds). The Northern Lights – Organization Theory in Scandinavia. Trelleborg, Copenhagen Business School Press.

Lane, P.J. and Lubatkin, M. (1998) 'Relative absorptive capacity and interorganizational learning', *Strategic Management Journal*, 19(5): 461-477.

Leonard-Barton, D. and Sinha, D.K. (1993) 'Developer-User Interaction and User Satisfaction in Internal technology Transfer', *Academy of Management Journal*, 36(5): 1125-1139.

Manke, V. and Pedersen, T. (2004) Knowledge Governance and Value Creation. In Mahnke, Volker and Pedersen, Torben, editors, Knowledge Flows, Governance and the Multinational Enterprise. Palgrave MacMillan, New York.

Markides, C.C. (2002) Corporate Strategy: The Role of the Centre. In A. Pettigrew, H. Thomas and R. Whittington (eds). Handbook of Strategy and Management. London, SAGE Publications.

Markides, C.C. and Williamson, P.J. (1994) 'Related Diversification, Core Competencies and Corporate Performance', *Strategic Management Journal*, 15(2): 149-165.

Marquardt, D.W. (1970) 'Generalized inverses, ridge regression, biased linear estimation and non-linear estimation', *Technometrics*, 12(3): 591-612.

Martin, X. and Salomonson, R. (2003) 'Knowledge Transfer Capacity and its Implications for the Theory of the Multinational Enterprise', *Journal of International Business Studies*, 34(4): 356-373.

Minbaeva, D.B. (2008) 'HRM Practices Affecting Extrinsic and Intrinsic Motivation of Knowledge Recievers and Their Effect on Intra-MNC Knowledge Transfer', *International Business Review*, 17(6): 703-713.

Minbaeva, D., Pedersen, T., Björkman, I., Fey, C.F. and Park, H.J. (2003) 'MNC knowledge transfer, subsidiary absorptive capacity, and HRM', *Journal of International Business Studies*, 34(6): 586-599.

Moran, P. (2005) 'Structural vs. Relational Embeddedness: Social Capital and Managerial Performance' *Strategic Management Journal*, 26(12); 1129-1151.

Mudambi, R. and Navarra, P. (2004) 'Is knowledge power? Knowledge flows, subsidiary power and rent-seeking within MNCs', *Journal of International Business Studies*, 35(5): 385-406.

Nahapiet, J. and Ghoshal, S. (1998) 'Social Capital, Intellectual Capital, and the Organizational Advantage', *Academy of Management Review*, 23(2): 242-266.

Nelson, R.R. and Winter, S.G. (1982) An evolutionary theory of economic change. Cambridge, MA: Harvard University Press.

Nohria, N. and Ghoshal, S. (1994) 'Differentiated Fit and Shared Values: Alternatives for Managing Headquarters-Subsidairy Relations', *Strategic Management Journal*, 15(6): 491-502.

Nohria, N. and Ghoshal, S. (1997) The Differentiated Network: Organizing Multinational Corporations for Value Creation. Jossey-Bass, San Francisco, California.

Nunnally, J. (1978) Psychometric theory. 2nd ed. New York, Mc-Graw Hill.

Ocasio, W. (1997) 'Towards an Attention-Based View of the Firm', *Strategic Management Journal*, 18(summer special issue): 187-206.

O'Donnell, S.W. (2000) 'Managing Foreign Subsidairies: Agents of Headquarters, or an Interdependent Network?', *Strategic Management Journal*, 21(5): 525-548.

OECD (2005) Oslo Manual. Guidelines for Collecting and Interpreting Innovation Data., 3rd ed. OECD Publishing.

Penrose, E.T. (1959) The Theory of the Growth of the Firm. Basil Blackwell, Oxford.

Pfeffer, J. (1981) Power in Organizations. Marshfield, MA: Pitman.

Pfeffer, J. and Salancik, G.R. (1978) The External Control of Organizations: a Resource Dependency Perspective. Stanford business books. New York: Harper & Row.

Pfeffer, J. and Sutton, R.I. (2000) The Knowing-Doing Gap: How Smart Companies Turn Knowledge Into Action. Harvard Business School Press, Boston, M.A.

Podsakoff, P.M. and Organ, D. (1986) 'Self-Reports in Organizational research: Problems and Prospects', *Journal of Management* 12(4): 531-544.

Repenning, N.P. (2002) 'A Simulation-Based Approach to Understanding the Dynamics of Innovation Implementation', *Organization Science*, 13(2): 109-127.

Rugman, A.M. and Verbeke, A. (2001) 'Subsidiary-Specific Advantages in Multinational Enterprises', *Strategic Management Journal*, 22(3): 237-250.

Schulz, M. (2001) 'The Uncertain Relevance of Newness: Organizational Learning and Knowledge Flows', *Academy of Management Journal*, 44(4): 661-681.

Schumpeter, J.A. (1934) The Theory of Economic Development. Cambridge, MA. Harvard University Press.

Stedenmund, A.H. (1992) Using economics. A practical guide, 2nd edition. New York: Harper Collins.

Szulanski, G. (1996) 'Exploring Internal Stickiness: Impediments to the Transfer of Best Practice Within the Firm', *Strategic Management Journal*, 17: 27-43.

Szulanski, G., Cappetta, R. and Jensen, R.J. (2004) 'When and How Trustworthiness Matters: Knowledge Transfer and the Moderating Effect of causual Ambiguity', *Organization Science*, 15(5): 600-613.

Tallman, S. and Phene, A. (2007) 'Leveraging Knowledge Across Geographic Boundaries', *Organization Science*, 18(2): 252-260.

Teece, D.J. (1977) 'Technology Transfer by Multinational Firms: The Resource Cost of Transferring Technological Know-how' *Economic Journal*, 87(346): 242-261.

Teece, D.J. (1986) 'Profiting from technological innovation: implications for integration, collaboration, licensing and public policy', *Research Policy*, 15(6): 285-305.

Tratjenberg, M. (1990) 'A Penny for Your Quotes: Patent Citations and the Value of Innovations', *The RAND Journal of Economics*, 21(1): 172-187.

Tsai, W. (2000) 'Social Capital, Strategic Relatedness and the Formation of Intraorganizational Linkages', *Strategic Management Journal*, 21(9): 925-939.

Tsai, W. (2002) 'Social Structures of "Coopetition" within a Multiunit Organization: Coordination, Competition, and Intraorganizational Knowledge Sharing', *Organization Science*, 13(2): 179-190.

Tsai, W. and Ghoshal, S. (1998) 'Social Capital and value Creation: The Role of Intrafirm Networks', *Academy of Management Journal*, 41(4): 464-476.

Tsang, E.W. (1999) 'The Knowledge Transfer and Learning Aspects of International HRM: an Empirical Study of Singapore MNCs', *International Business Review*, 8(5-6): 591-609.

Uzzi, B. (1997) 'Social Structure and Competition in Interfirm Networks: The Paradox of Embeddedness', *Administrative Science Quarterly*: 42(1): 35-67.

Williamson, O.E. (1993) 'Calculativeness, Trust, and Economic Organization', *Journal of Law and Economics*, 36(1): 453-486.

Yang, Q., Mudambi, R. and Meyer, K. (2008) 'Conventional and reverse knowledge flows in multinational corporations', *Journal of Management*, 34(5): 882-902.

Zollo, M. and Winter, S.G. (2002) 'Deliberate Learning and the Evolution of Dynamic Capabilities', *Organization Science*, 13(3): 339-351.

**Figure 1 The Hypothesized Model**

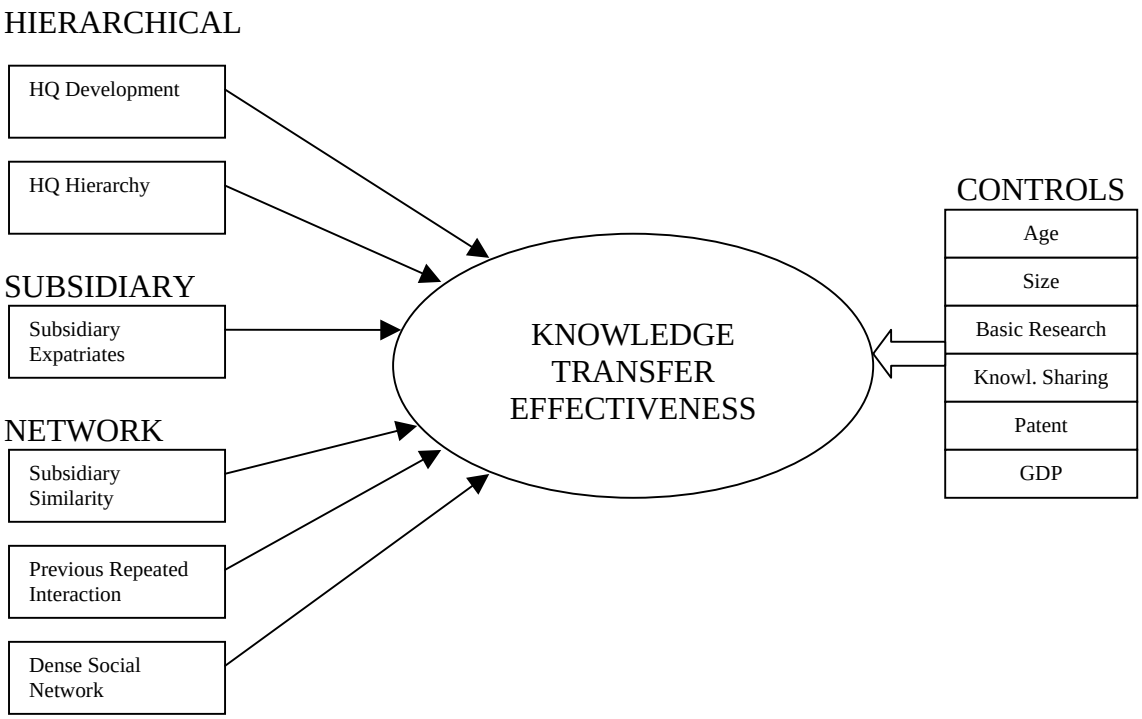

**Table 1 Factor analysis with Varimax rotation**

| Variable | Factor loading | | Communality |
|---|---|---|---|
| **Factor 1: HEADQUARTER DEVELOPMENT** | | | |
| The MNE HQ has participated closely in developing this innovation | 0.902 | | 0.869 |
| The MNE HQ has brought competence of use for the development of this innovation | 0.868 | | 0.820 |
| The MNE HQ has been important through specifying requests | 0.904 | | 0.843 |
| The MNE HQ has taken important initiatives for developing the innovation | 0.769 | | 0.668 |
| Eigenvalue | | 3.886 | |
| % Variance | | 18.505 | |
| **Factor 2: TRANSFER PERFORMANCE EFFECTIVENESS** | | | |
| The counterpart adopted the innovation very quickly | 0.528 | | 0.591 |
| The innovation has been very easy to adopt by this counterpart | 0.800 | | 0.709 |
| The performance of the innovation transfer was very satisfactory | 0.799 | | 0.698 |
| To what extent the innovation transfer has been completed | 0.827 | | 0.727 |
| Eigenvalue | | 3.662 | |
| % Variance | | 17.438 | |
| **Factor 3: HEADQUARTER HIERARCHY** | | | |
| The MNE HQ has formally instructed you to share this innovation with the counterpart | 0.516 | | 0.522 |
| The transfer of the innovation has occurred without any sanctions by HQ with the counterpart (Reversed) | 0.569 | | 0.624 |
| Requirement from HQ | 0.804 | | 0.714 |
| HQ evaluation system | 0.691 | | 0.581 |
| Eigenvalue | | 2.363 | |
| % Variance | | 11.251 | |
| **Factor 4: DENSE SOCIAL NETWORK** | | | |
| Temporary training at partner sites | 0.790 | | 0.739 |
| Cross-unit teams, project groups etc. | 0.791 | | 0.786 |
| Face to face meetings were used in the communication regarding the innovation transfer | 0.767 | | 0.681 |
| Eigenvalue | | 1.886 | |
| % Variance | | 8.983 | |
| **Factor 5: SUBSIDIARY SIMILARITY** | | | |
| Technical difference makes the transfer problematic (Reversed) | 0.851 | | 0.797 |
| Organizational difference makes the transfer problematic (Reversed) | 0.776 | | 0.744 |
| Eigenvalue | | 1.330 | |
| % Variance | | 6.333 | |
| **Factor 6: PREVIOUS REPEATED INTERACTION** | | | |
| They previously had cooperated with the receiver | 0.827 | | 0.801 |
| They previously had shared knowledge | 0.865 | | 0.862 |
| Eigenvalue | | 1.281 | |
| % Variance | | 6.101 | |
| **Factor 7: SUBSIDIARY EXPATRIATES** | | | |
| To what extent, with regard to the transfer of the innovation exchange of managers was used | 0.895 | | 0.859 |
| To what extent the transfer of the innovation was driven by moving personnel between the developer and the receiver | 0.802 | | 0.797 |
| Eigenvalue | | 1.024 | |
| % Variance | | 4.875 | |
| Total variance explained | | 73.486 | |

**Table 2 Variance Inflation Factor Scores and Cronbach alphas**

| | Model 1 VIF | Model 2 VIF | Model 3 VIF | Model 4 VIF | Cronbach alpha |
|---|---|---|---|---|---|
| 1. Transfer performance effectiveness | - | - | - | - | 0.817 |
| 2. Age | 1.240 | 1.376 | 1.377 | 1.510 | - |
| 3. Size | 1.234 | 1.484 | 1.490 | 1.552 | - |
| 4. Basic research | 1.289 | 1.316 | 1.381 | 1.395 | - |
| 5. Knowledge sharing | 1.158 | 1.163 | 1.164 | 1.191 | - |
| 6. Patent | 1.147 | 1.169 | 1.169 | 1.241 | |
| 7. GDP | 1.126 | 1.149 | 1.172 | 1.223 | |
| 8. Headquarter development | - | 1.395 | 1.395 | 1.449 | 0.908 |
| 9. Headquarter hierarchy | - | 1.459 | 1.461 | 1.478 | 0.631 |
| 10. Subsidiary expatriates | - | - | 1.075 | 1.167 | 0.743 |
| 11. Subsidiary similarity | - | - | - | 1.301 | 0.738 |
| 12. Previous repeated interaction | - | - | - | 1.296 | 0.738 |
| 13. Dense social network | - | - | - | 1.170 | 0.732 |
| Mean | 1.199 | 1.314 | 1.298 | 1.229 | |

**Table 3 Correlations and descriptive statistics**

| | MEAN | S.D | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Transfer performance effectiveness | 5.211 | 1.312 | 1 | | | | | | | | | | | | |
| 2. Age | 3.528 | 0.903 | 0.036 | 1 | | | | | | | | | | | |
| 3. Size | 5.414 | 1.590 | 0.041 | 0.112 | 1 | | | | | | | | | | |
| 4. Basic research | 0.555 | 0.498 | 0.132 | 0.402** | 0.224** | 1 | | | | | | | | | |
| 5. Knowledge sharing | 4.148 | 1.774 | 0.147 | 0.081 | 0.272** | 0.173* | 1 | | | | | | | | |
| 6. Patent | 0.569 | 0.496 | -0.111 | -0.102 | -0.212** | 0.019 | -0.240** | 1 | | | | | | | |
| 7. GDP | 9.914 | 0.144 | 0.286** | -0.032 | 0.161* | -0.016 | -0.022 | -0.166* | 1 | | | | | | |
| 8. Headquarter development | 2.110 | 1.580 | -0.147 | -0.350** | -0.149* | -0.182* | 0.005 | 0.024 | -0.001 | 1 | | | | | |
| 9. Headquarter hierarchy | 2.601 | 1.569 | -0.039 | 0.056 | 0.324** | 0.228** | 0.169 | -0.180* | 0.202* | 0.348** | 1 | | | | |
| 10. Subsidiary expatriates | 1.893 | 1.472 | -0.390** | -0.042 | -0.064 | -0.137 | 0.032 | 0.034 | -0.227** | 0.081 | -0.098 | 1 | | | |
| 11. Subsidiary similarity | 5.557 | 1.553 | 0.465** | -0.213** | -0.158 | -0.060 | 0.002 | 0.093 | 0.249** | 0.099 | -0.054 | -0.264** | 1 | | |
| 12. Previous repeated interaction | 4.777 | 1.660 | 0.289** | 0.085 | 0.046 | 0.007 | 0.151 | 0.074 | 0.151 | -0.039 | 0.108 | -0.028 | 0.255** | 1 | |
| 13. Dense social network | 4.025 | 1.753 | -0.004 | 0.000 | -0.016 | -0.020 | -0.056 | 0.012 | -0.110 | 0.241** | 0.093 | 0.175* | -0.037 | 0.256** | 1 |

Spearman's correlation

**. Correlation is significant at the 0.01 level (two-tailed).

*. Correlation is significant at the 0.05 level (two-tailed).

**Table 4 Results from the hierarchical regression analysis [a]**

| Regressor | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| | β | s.e. | β | s.e. | β | s.e. | β | s.e. |
| Age | 0.016 | 0.142 | 0.021 | 0.148 | 0.028 | 0.142 | 0.026 | 0.134 |
| Size | -0.107 | 0.081 | -0.035 | 0.088 | -0.013 | 0.084 | 0.044 | 0.077 |
| Basic research | 0.186† | 0.263 | 0.215* | 0.263 | 0.142 | 0.257 | 0.153† | 0.234 |
| Knowledge sharing | 0.097 | 0.070 | 0.107 | 0.069 | 0.119 | 0.066 | 0.072 | 0.061 |
| Patent | -0.062 | 0.249 | -0.089 | 0.248 | -0.087 | 0.237 | -0.168* | 0.221 |
| GDP | 0.338*** | 0.852 | 0.366*** | 0.851 | 0.322*** | 0.819 | 0.254*** | 0.757 |
| Headquarter development | - | - | 0.042 | 0.085 | 0.048 | 0.081 | 0.006 | 0.075 |
| Headquarter hierarchy | - | - | -0.218* | 0.088 | -0.232* | 0.084 | -0.262** | 0.076 |
| Subsidiary expatriates | - | - | - | - | -0.296*** | 0.077 | -0.221** | 0.072 |
| Subsidiary similarity | - | - | - | - | - | - | 0.340*** | 0.072 |
| Previous repeated interaction | - | - | - | - | - | - | 0.169* | 0.068 |
| Dense social network | - | - | - | - | - | - | 0.047 | 0.061 |
| *Diagnostics* | | | | | | | | |
| N | 169 | | 169 | | 169 | | 169 | |
| $R^2$ | 0.148 | | 0.182 | | 0.263 | | 0.414 | |
| Adj.$R^2$ | 0.101 | | 0.121 | | 0.201 | | 0.346 | |
| Δ $R^2$ | 0.148 | | 0.034 | | 0.081 | | 0.151 | |
| F-statistics | 3.181** | | 2.996** | | 4.251*** | | 6.115*** | |

[a] Values are standardized parameter estimates

†p<0.1, *p<0.05, **p<0.01, ***p<0.001