Innovation characteristics, transfer management and headquarter involvement in the transfer of innovations between MNE subsidiaries.

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ABSTRACT

This paper explores headquarters involvement in the transfer of innovations between subsidiaries in multinational enterprises (MNEs), i.e. intra-MNE innovation transfer. A model based on innovation types and characteristics as well as different relational modes employed by the sending and receiving subsidiaries is tested on a sample of 169 specific innovation transfer projects in 23 MNEs originating from Europe, Asia and the United States. The results from the analysis indicate that headquarters involve themselves in the innovation transfer when the innovation is perceived as important and complex, the type of innovation subject to transfer is found to have an insignificant impact on headquarters involvement. Instead it is the characteristics of the innovation that is affecting headquarter involvement as well as how the subsidiaries decide to organize the transfer in terms of relational management, i.e. face-to-face meetings or non-personal interaction. These findings have implications for how MNE subsidiaries should interact and communicate with headquarters in order to gain their attention and involvement, and as a corollary this have an impact on subsidiary strategy, how subsidiaries evolve and how MNE resources are allocated.

Keywords: headquarters, subsidiaries, innovation transfer, multinationals, attention, evolution

INTRODUCTION

Innovations, in its many different shapes, have been proposed to constitute a critical resource for the multinational enterprise (MNE) and its subsidiaries (Franko, 1989; Hitt et al., 1996). Innovations are considered to be the basis for economic growth in the long run (c.f. Baumol, 2002). Consequently, innovations are an important area of investigation when studying MNEs. In the MNE innovation process, three main stages can be identified; (1) development; (2) transfer; and (3) exploitation. This study is primarily concerned with the implications of innovation transfer between subsidiaries in terms of when the MNE headquarter involves themselves in the transfer process, i.e. hierarchical involvement in intra-MNE innovation transfer**.** The task of transferring innovations in the MNE network is not an easy one and is associated with substantial costs (Teece, 1977). Therefore it is likely that headquarters have a wish to facilitate innovation transfer by involving themselves in this process taking place between its subsidiaries. The view on the headquarter role have during the past decades developed from one focusing on control and monitoring to new additional perspectives where headquarters acts as a facilitator of resource exchange in the MNE network (Bartlett and Ghoshal, 1989; Hedlund, 1986) where the headquarter function is geared towards more value-adding activities (Uzzi and Gillespie, 1999). Still, the MNE headquarters can be conceptualized as the orchestrator of the MNE network possessing formal power and a holistic responsibility for the overall organization. However, some subsidiaries may be more or less difficult to control and exercise power over due to the fact that they control and have access to specific resources such as knowledge and/or business networks actors (Mudambi and Navarra, 2004; Andersson, Forsgren and Holm, 2007). The role of headquarters in this network organization has received little attention whereas the focus mainly has been on MNE subsidiaries.

In later years, there has been a shift in focus towards knowledge as a source of competitive advantage and a knowledge based theory of the firm (Kogut and Zander, 1992; Grant, 1996). Knowledge is closely connected to the concept of innovation since innovations can be considered as bearers of new knowledge, i.e. they add novelty and value (Kreiner and Mauritzen, 2003; Teece, 1986). Innovations, and thus also knowledge, are to a large extent developed at different subsidiaries located in a multitude of counties, subsequently transferred and exploited elsewhere (Birkinshaw and Hood, 2001; Ghoshal and Bartlett, 1988; Szulanski, 1996; Gupta and Govindarajan, 2000). This triggers a multitude of strategic challenges - such as how to organize MNE resources (structure) and flows between MNE subsidiaries (processes) - for the MNE as a whole, its headquarters and the subsidiaries in order to maximize the competitive advantage. Some of these strategically important questions will be dealt with in this paper building on Bartlett and Ghoshal's (1989) perception of the MNE and locally leveraged innovations and to what degree headquarters then involves themselves at the subsidiary level.

The question addressed in this paper, i.e. when does headquarters decide to involve themselves in specific innovation transfer projects, is important and has not been subject to extensive previous research. For subsidiaries this can be of interest because it may be desirable for them to get the attention and involvement of headquarters since this can mean additional resources allocated to the subsidiary as well as a gained perceived importance of the innovation and a mandate to develop and transfer additional innovations. Attaining the attention of headquarters and getting them involved in the transfer process may be a key to subsidiary evolution (Birkinshaw and Hood, 1998). Headquarter involvement is also an attempt to address the call for research about specifying the meta-construct of headquarter attention in that 'research investigating the unique qualities of effective global leaders should broaden its focus to include their concrete attention practices, rather than focusing solely on the particular cognitive tendencies they demonstrate in strategic decision-making activities' (Bouquet and Birkinshaw, 2008 p. 17). This is done by specifically looking at headquarter involvement in innovation transfer, a strategic activity in the MNE of key importance. The paper also addresses the issue and call for research related to top management's role in intra-firm resource competition (Birkinshaw and Lingblad, 2005) and what can constitute a source for power in the MNE (Andersson et al., 2007) by linking innovations to headquarter involvement. Thus the current paper address the important and understudied phenomenon of headquarters involvement in the innovation transfer process, how subsidiaries can gain headquarter attention and involvement and how different innovations affect the organization of the innovation transfer process in terms of the interplay between headquarters and subsidiaries.

In this paper the involvement of headquarters is evaluated in relation to specific innovation types but also in relation to the underlying features of the innovations such as the complexity and the importance of the innovation. This approach has the advantage of enabling the analysis to distinguish between the innovation types and the innovation characteristics relating the effects these different features have on headquarter involvement in the transfer process. Additionally, different transfer mechanisms can be used by subsidiaries when an innovation is transferred between a sender and a receiver. In this paper a distinction between different relational transfer modes used by focal subsidiaries when dealing with the issue of when headquarters involve themselves in the transfer process is made. Three different relational transfer management modes are tested, i.e. exchange of personnel, temporary personal meetings and non-personal interaction. This adds to the literature by empirically eliciting different relational management forms and reporting their effect on headquarter involvement in the transfer process. The findings are based on data collected through structured interviews with subsidiary managers involved in 169 specific intra-MNE innovation transfer projects. These transfer projects stems from 62 subsidiaries belonging to 23 MNEs from Europe, Asia and the U.S. Hence, the specificity of the data from these 169 transfer projects taking place between a sending and receiving subsidiary in the MNE and detailed information related to the innovations subject to transfer add to the quality of the findings.

The article is structures as follows. In section two a theoretical background is given. In the third section, the theoretical arguments are developed and five hypotheses are introduced. This is followed by a fourth section dealing with data, methods and the different measures used in the analysis. In the fifth section, the results of the statistical analysis are presented. This is followed by a discussion of the results in the sixth section. Finally, conclusions encompassing further research, managerial implications and limitations of the present study are presented in the seventh section.

THEORETICAL BACKGROUND

Contemporary MNEs do not only exploit home country advantages in foreign markets. Instead the MNE consists of geographically dispersed subsidiaries with different resources derived from the local environment or network, i.e. MNE capabilities and resources are dispersed throughout the network of subsidiaries. By taking advantage of these resources and capabilities and combining them MNEs can increase their competitive advantage. One critical resource for MNEs are innovations, which are costly to develop. The literature highlights the potential for MNEs to enhance their innovation development processes and create capabilities by stimulating flows between subsidiaries in order to make better use of fragmented knowledge dispersed throughout the organization (Buckley and Carter, 1999; Gupta and Govindarajan, 1991; 2000). Consequently, the issue of innovation transfer is strategically important and a challenge both for headquarters and the subsidiaries embedded in the MNE network, and the development and dispersion of innovations has been identified as primary strategic challenges facing MNEs (Bartlett and Ghoshal, 1989) especially since innovations often evolve at the subsidiary level and not at the headquarter level (Birkinshaw and Hood, 2001). This paper follows the OECD (2005) definition of innovations and they are defined as “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 is a broad definition encompassing many innovation possibilities, and the important criteria’s are newness or significantly improved. Thereby minor changes or changes with a minor degree of novelty are excluded.

The Headquarter Role in MNEs in Relation to Innovation Transfer and Subsidiaries

In MNEs, headquarters can fulfil many different strategic roles. According to a hierarchical view on the headquarter-subsidiary relationship, headquarters monitor, coordinate and control subsidiaries. The control mechanisms used by headquarters have evolved towards more informal mechanisms (Martinez and Jarillo, 1989). Following this, and building on the concept of the MNE as a differentiated network, this implies that some aspects such as innovation development and transfer can be delegated to the subsidiary level (Nohria and Ghoshal, 1997). The MNE use the network to develop innovations and to coordinate activities (Forsgren et. al., 2005) which means an increase of competence at the subsidiary level, thus limiting the feasibility of headquarter control (Hedlund, 1986). The MNE subsidiaries can take on the role of Centres of Excellences (CoE) and can also be assigned a specific competence creating or exploiting mandate over a certain activity (Holm and Pedersen, 2000; Birkinshaw, 1996; Birkinshaw and Hood, 1998; Cantwell and Mudambi, 2005). Hence, the increasing responsibility of subsidiaries and the creation of innovations throughout the MNE network have loosened and changed the hierarchical structure of MNEs. However, headquarters is still a player possessing formal power on what has been conceptualized as the MNE federative arena (Andersson et al., 2007). The MNE headquarter can give attention to subsidiaries (Ocasio, 1997; Bouquet and Birkinshaw, 2008). Following Bouquet and Birkinshaw (2008, p. 579) attention is defined as “the extent to which the parent company recognizes and gives credit to a subsidiary for its contribution to the MNE as a whole”. This type of attention is a meta-construct and a more tangible way of giving strategic support to subsidiaries is to participate in subsidiary level activities and add value to these activities, for instance through involvement in innovation transfer projects. This is also a way for headquarters to attain information of the focal subsidiary and its business network.

This design created by headquarters does not mean that innovation transfer will take place automatically or unproblematic since research has shown that for instance motivational factors influence subsidiary innovation transfer even though corporate socialization and a closeness between the transferring parties are positively related to knowledge flows (Szulanski, 1996; Gupta and Govindarajan, 2000). It has been claimed that headquarters have the potential to influence the management of knowledge flows between subsidiaries (Ghoshal and Bartlett, 1990; Birkinshaw, 2001). By involving themselves in the innovation transfer process, the MNE headquarters increase the visibility and attention of the transfer project and also gives a hierarchical legitimacy in the MNE. Furthermore, the involvement of headquarters will mean that additional resources are leveraged to the focal innovation transfer project, and the underlying rationale for this from a headquarter perspective is that promising projects are supported and overall added corporate value is expected (Forsgren et al., 2005).

Innovation Transfer in MNEs

After development, innovation transfer is a natural step in the MNE where the developer send the innovation to other receiving units, internally or externally in terms of MNE boundaries. Transferring innovations is a strategic challenge which is of key importance for the MNE since it is difficult, costly and time consuming (Bartlett and Ghoshal, 1989; Teece, 1977) and the ability to facilitate this process and perform it better compared to transfer on the market external market, i.e. outside the MNE boundaries, is one of the main explanations to the existence of MNEs (Kogut and Zander, 1993). By internalizing intangible assets the MNE can expand into new markets (Buckley and Casson, 1976). The transfer can be categorized in terms of a source-target transfer along a channel in a lateral or hierarchical relation (Mudambi, 2002; Gupta and Govindarajan, 2000). However, the transfer per se create challenges since innovations, and knowledge, have been found to be ‘sticky’ and previous research have had a focus on barriers to transfer but also on the impact of the knowledge characteristics for knowledge transfer (von Hippel, 1994; Szulanski, 1996; Gupta and Govindarajan, 2000; Zander and Kogut, 1995).

Instead of looking at a continuous flow of knowledge (c.f. Gupta and Govindarajan, 2000) the transfer process can instead be unpackaged into distinct transfer projects, especially when the empirical setting is innovations (Persson, 2006; Kostova and Roth 2002). This in turn has implications for the specificity of the area under investigation in relation to the innovations subject to transfer where the empirical setting facilitates the measurement of i.e. the characteristics of the innovations and headquarters role in this process. Furthermore, the opportunity to investigate the performance of the innovation transfer project in terms of efficiency and effectiveness are at hand, although this last issue is beyond the scope of this paper since this paper focus on headquarters degree of involvement in innovation transfer developed at one subsidiary transferred to another subsidiary belonging to the same MNE, not on the performance of this transfer project.

TRANSFER OF DIFFERENT INNOVATION TYPES POSSESSING DIFFERENT CHARACTERISTICS

In MNE subsidiaries a multitude of activities are taking place on a daily basis. One of the most important activities in order to sustain a competitive advantage has to do with innovation development and subsequently innovation transfer and exploitation. MNEs have the possibility, by having operations in a multitude of countries, to tap into different environments and interact with the 'local knowledge base' and consequently develop more and newer innovations (Cantwell, 1992; Cantwell and Santangelo, 1999).

Schumpeter (1934) perceived economic development as dynamically driven by creative destruction, either radically or incrementally, which reflects in how innovations are developed and perceived. i.e. as more or less disruptive. Furthermore, he made a distinction between five different types of innovations that could act as a base for competitive advantage: (1) the introduction of a new good; (2) the introduction of a new method of production; (3) the opening of a new market; (4) the 'conquest of a new source of supply of raw materials or half-manufactured goods'; and finally (5) the carrying out of a new type of industrial organization. In the literature, innovations have further been classified in different dimensions such as e.g. product, process, marketing, administrative and service innovations building on these five Schumpeterian innovation types. This is in line with the definition of innovations introduced earlier in this paper and the OECD (2005) manual also identifies different types of innovations in line with the classification above (p. 48-55). However, there does not seem to be a common definition as to what constitutes an innovation, but one theme is prominent in literature dealing with innovation; 'innovativeness is a measure of discontinuity in the status quo in marketing factors and/or technology factors' (Garcia and Calantone, 2002, p. 118). The focus in the literature has been on development and performance of innovations, not on how different innovation types are related to headquarters strategic support.

The impact of an innovation has to be put in relation to what is already known, i.e. what does the innovation change. In that sense, the concept of knowledge is closely intertwined with the concept of innovation. Consequently, one way of studying knowledge, is by investigating innovations since they consists of features related to how to do things better than the current state of the art (Kreiner and Mauritzen, 2003; Teece, 1986). These innovations can consist of both tacit and explicit elements. However, how to do things differently and better varies between MNEs and its subsidiaries and can best be captured by an in-depth investigation of specific innovations stemming from subsidiaries. A good way of deciding upon what constitutes an innovation empirically is to rely on the judgment made by the specific subsidiary which has been responsible for developing the innovation.

Following this discussion about innovations and their key importance to MNEs the question arises as to if some innovation types are considered to be more important compared to others, thus gaining the attention of headquarters in a transfer process. It is likely that headquarters will perceive all innovation types as equally important and turn their attention to the ones perceived as important since they have a greater likelihood of adding more to the competitive advantage or to the innovations that are perceived as complex since this may make the transfer more problematic. Expressed differently, headquarters does not discriminate between different types of innovations, but on other aspects such as if the innovation is perceived as important and complex. Consequently the following hypothesis is postulated:

> *Hypothesis 1: Headquarters involvement in the transfer process of innovations between the sending and receiving subsidiary is not dependent on the type of innovation.*

As previously discussed, an innovation with a perceived greater importance for the MNE can be expected to add more to the MNE competitive advantage compared to less important innovations. By importance, it is referred to how great the importance is for other units in the MNE besides the developing subsidiary. It is natural for headquarters to have a wish to facilitate the transfer of such innovations by involving themselves in the process with the expectation of greater over all firm value if such an innovation is transferred, implemented and used throughout the MNE. This leads to the following hypothesis being suggested:

> *Hypothesis 2: Headquarters will involve themselves more in the transfer process between the sending and receiving subsidiary the greater the importance of the innovation subject to transfer.*

Research has shown that the complexity innovations have an effect on innovation transfer, i.e. the more complex the innovations are this will then affect the transfer process (Zander and Kogut, 1995). Headquarters are then likely to become involved in the transfer process since complexity can be one signal for a potentially arduous transfer process that consumes a lot of resources. Involvement by headquarters in this process means that additional resources in the form of time, responsibility and commitment can potentially help overcome the barriers to innovation transfer present when dealing with complex innovations consisting of many components or possessing the ability to be integrated in many functions at the receiving subsidiary. Consequently, the following hypothesises is proposed:

> *Hypothesis 3: Headquarters will involve themselves in the transfer process between the sending and receiving subsidiary to a greater extent the more complex the innovation subject to transfer is.*

Innovations can be more or less codified in blue-prints etc. and the more codified and less tacit an innovation is perceived to be fewer problems can be anticipated during the transfer phase. Consequently, more codified and less tacit innovations subject to transfer will not receive headquarters support in the form of their involvement owing to the fact that fewer problems are expected and that the resources leveraged by headquarters in the form of their involvement can be put to better alternative use in other competing transfer projects where greater difficulties are likely to occur during the transfer stage. On the other hand, since headquarters may have a limited amount of knowledge related to subsidiary level activities it can be easier for them to acquire information about explicit and codified innovations, thus triggering their involvement. As a corollary, the degree of codification has different rationales working in opposite directions the scenario where headquarters become more involved due to a high degree of codification is just as likely as the opposite scenario with less involvement connected to the degree of codification of the innovation subject to transfer. Thus, the following two competing hypotheses are suggested:

> *Hypothesis 4a: Headquarters will involve themselves in the transfer process between the sending and receiving subsidiary to a greater extent the more codified the innovation subject to transfer is.*

> *Hypothesis 4b: Headquarters will involve themselves in the transfer process between the sending and receiving subsidiary to a lesser extent the more codified the innovation subject to transfer is.*

Transfer Management

In order to manage the transfer of innovations, subsidiaries in an MNE can make use of different transfer management modes to both facilitate, and avoid barriers, to the transfer process. This transfer management can be divided into different main areas that subsequently can be structured into different tools and facilitators. One way of managing the transfer is by taking structural aspects into consideration such as technological and organizational similarities in the subsidiaries involved in the transfer (Lane and Lubatkin, 1998; Cohen and Levinthal, 1990). Another way of handling the transfer of innovations is by using relational management modes, i.e. features related to individuals and different human resource management tools that, for instance, can have positive effects on the subsidiary's absorptive capacity (Minbaeva et. al., 2003) and many studies have shown the importance of interpersonal contacts for knowledge transfer (Hansen, 1999; Tsai, 2001)

A long-term perspective towards creating good pre-requisites for innovation transfer is by moving staff between subsidiaries, which in some aspects is similar to expatriation from headquarters to subsidiaries, but instead deals with expatriation between subsidiaries. This can of course entail both managers and other employees (Budhwara and Sparrow, 2002). Expatriates can be used by headquarters in the different foreign subsidiaries to increase the internal consistency of the MNE and promote the parent country culture (Edström and Gailbraith, 1977) and in that respect expatriates are key agents for knowledge transfer and learning (Tsang, 1999). Additionally, expatriates are used as a control measure adopted by headquarters. Expatriates can also be used between subsidiaries (Edström and Gailbraith, 1977) and by doing so these expatriates are used to develop the organization and consequently as a way to increase the understanding between MNE subsidiaries and facilitate knowledge transfer between them. By moving personnel between subsidiaries a better understanding of structural aspects of the units engaged in the transfer can be created. Hence, by moving personnel between subsidiaries the prime motive is not control but instead to increase the understanding of the subsidiaries and their culture and consequently facilitate innovation transfer.

By using temporary or more permanent relational solutions such as project groups and cross-national teams that are formed for a specific purpose, transfer can be facilitated between subsidiaries (Gupta and Govindarajan, 1994; 2000). Team structures allow employees to create social ties, thus facilitating knowledge integration in the organization (Grant, 1996). This is a dynamic approach towards transfer management, and the level of interaction between the subsidiaries can be assumed to be greater compared to when moving personnel between the subsidiaries involved in the innovation transfer is used as a transfer management mechanism.

Transfer management where no face-to-face interaction is needed can also be used in order to facilitate the transfer process. This communication is taking place at a distance and the depth of the relational transfer management mode is not that great. However, the intensity of this mode may be higher. Headquarters will have fewer reasons to interact if the transfer management is conducted with a personal interaction compared to when the communication is taking place at a distance. A depth in the interaction between the subsidiaries is likely to signal to headquarters that sufficient measures are taken in order to manage the innovation transfer process. Transfer management between subsidiaries on a personal level then replaces the hierarchical involvement of headquarters since the need to oversee this process is less apparent compared to when the subsidiaries do not have any personal interaction. This reasoning leads to the following hypothesis:

> *Hypothesis 5: Headquarters will involve themselves in the transfer process between the sending and receiving subsidiary to a lesser extent if a personal face-to-face interaction is taking place or where personnel from the subsidiaries are exchanged compared to if the communication is taking place at a distance.*

The Model

The five hypotheses are summarised in figure 1. In the next section the model is confronted with the empirical data.

INSERT FIGURE 1 HERE

DATA AND METHODS

In order to capture a more in-depth understanding of how knowledge can affect an organization, especially when headquarters involve themselves in the transfer process, a well-established definition needs to be adopted in terms of what kind of knowledge is studied. This study focuses on technological knowledge by investigating innovations developed by MNE units.

The data used in this study was collected between 2002 and 2005 from 62 subsidiaries belonging to 23 MNEs. This study make use of data from 72 specific innovations developed in these subsidiaries that have been transferred intra-MNE to 169 receivers. This means that when investigating innovation characteristics and headquarters involvement it is possible to study this phenomenon in 169 specific transfer projects where the innovation characteristics are identifiable. 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 subsidiaries have a large geographical dispersion across 14 countries in Europe, Asia and the U.S. The number of employees in the subsidiaries ranged from 9 to 6000, with a mean of 589. This indicates a well distributed sample both in terms of size and geographical location.

The selection criterion for the innovations studied was based on the novelty and value of the specific innovation to the organization. This estimation 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. By sampling on innovations that have the potential of being transferred this means that the data set also contains some innovations that have not been subject to transfer.[1] These innovations are excluded in the present analysis. One potential bias with the sample is that it only contains successful innovations. However, given the question at hand – when do headquarters involve themselves in the transfer process – this bias is almost intrinsic since the transfer of unsuccessful innovations is highly unlikely and would not add anything substantial to the MNE competitive advantage. The data was collected through face-to-face interviews on site at the subsidiaries where the person deemed to be the most appropriate for answering the questionnaire was interviewed for approximately two hours. The respondents had been involved in the development of the innovation and were usually R&D managers, project managers or subsidiary CEOs etc. 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 a detailed understanding of the innovations investigated, a deeper understanding of the specific innovations could be gained as well as the possibility to discuss the questions with the respondents. This approach also gives the opportunity to target the appropriate respondent and detect inconsistencies in the answers during the interview, hence increasing reliability.

Measures

In this study single measure indicators are avoided whenever possible and the advice of Boyd et. al. (2005) is followed by using multiple indicators in both the dependent and independent variables. This method minimizes the measurement error, is parsimonious and offers a multifaceted representation of the underlying construct (Hair et. al. 2006). Furthermore, 7-point likert type scales, as recommended by Cox (1980), were used to obtain the data on the transfer of innovations in MNEs.

Dependent variable. In order to capture *headquarters involvment in the transfer process* of innovations three items were used. This variable builds on and extends the attention based view of headquarters (Ocasio, 1997; Bouquet and Birkinshaw, 2008; Bouquet et al., 2008). 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>, <The MNE HQ have themselves been heavily involved in conducting the actual transfer process with the counterpart> and finally <The MNE HQ have taken complete responsibility for the transfer of this innovation to this counterpart>*. The individual items were the summed and averaged to form the construct. Internal reliability of the construct had a coefficient α=0.697, which can be deemed as satisfactory.

Independent variables. In order to capture the type of innovation submitted to transfer the respondents were asked to indicate if the innovation was:*<Core technology>, <Product>, <Production process>, <Marketing> and/or <Administrative>*. These items were coded dichotomously with a 1 for yes and 0 representing no and included in the subsequent analysis. These five types are conceptually linked to Schumpeter's (1934) five innovation types.

Importance of the innovation. Two items were used in order to capture the importance of the innovation. The respondents were asked to indicate on a scale from 1 (very low) to 7 (very high) the:*<Importance of the innovation for the division/business area as a whole> and <Importance of the innovation to the MNE as a whole>*. The indicators were added up and divided by two to form the scale. The internal reliability of the scale well exceeded the recommendations by Nunnally (1978),

[1] The total number of innovations in the dataset is 85, where 13 of these innovations are still untransferred.

coefficient α=0.877. This concept is linked to the definition of innovations as consisting on something new and improved.

Complexity of the innovation. This construct captures the complexity of the innovation by using three items. The respondents were asked to evaluate the following statements on a scale from 1 (strongly disagree) to 4 (neither/nor) up to 7 (strongly agree):*<The innovation comprises a high number of interacting sub-systems and components>, <The innovation can satisfy a large number of functions> and <The innovation comprises a high variety of functional knowledge bases>.* The three indicators were summed and averaged to form the construct. Internal reliability of the construct did not meet the requirements set by Nunnally (1978) with a coefficient α=0.632. However, it is common to find low alphas when dealing with few items and in such cases it can be appropriate to check for the mean inter-item correlation (MIC). The optimal range for the MIC is 0.2 to 0.4 (Briggs and Cheek, 1986). The MIC for this construct was 0.364, thus meeting stipulated criterion. Also, this construct falls out as distinct from the others in the principal component analysis, see table 1. Complexity is closely connected to how easily an innovation can be understood (i.e. Zander and Kogut, 1995) and this operationalization builds on Zander and Koguts (1995) framework.

In order to capture the innovations *degree of codification* two items were used to form this construct. This is also a measure adopted from Zander and Kogut (1995). The respondents were asked to indicate, on a scale from (1) strongly disagree to (4) neither/nor up to (7) strongly agree, if:*<The innovation technology/process know-how is easily codifiable (in blueprints, instructions, formulas etc.> and <The innovation technology process know-how is more explicit (i.e. easily transferable) than tacit*>. The two items were summed and averaged to form the construct. Internal reliability is somewhat below the recommendations, coefficient α=0.661. Theoretical considerations imply a two item construct instead of a single item measure meaning that the construct capture a broader spectrum of degree of codification compared to using a single item. Additionally, this is a two item construct where it can be more acceptable to have low coefficent α. Reliability increases the more items a scale contain (Nunnally, 1978, p. 243). Alpha tests are generally considered conservative and given the same average inter item correlation and the inclusion of additional variables the alpha increases (Carmines and Zeller, 1979, p.45) These considerations together with the principal component analysis accounted for in table 1 where both the factor loadings and communalities extracted are high indicates that this construct can be used. MIC exceeded the optimal level, with a MIC of 0.495. However, this measure still does not exceed the 0.5 level when Briggs and Cheek (1986) cautioned that as the MIC exceeds "the items on a scale tend to be overly redundant and the construct measured too specific" (p. 115).

Transfer management is operationalized in three different ways related to the relational management of innovation transfer, and not the structural facets of transfer management related to subsidiary specific features, i.e. technological similarity. To start with, a number of indicators were taken under consideration and the constructs were created in an iterative process where both theoretical implications and coefficient alphas were considered (Churchill, 1979). The transfer management modes discussed in the following were distinct from each other in the factor analysis, with the exception of one minor cross-loading when displaying loadings greater then 0.32.Following Comrey and Lee (1992) factor loadings below 0.32 can be considered poor since the overlapping variance then is below 10% and factor loadings of 0.45 represents 20% of the overlapping variance and are considered as fair. The first transfer management mode that can be employed by the units are a more permanent *exchange of personnel*. This aspect does not capture the intensity of the transfer management. Secondly, transfer management can also be conducted through different organisational solutions that entail *temporary personal meetings*. Thirdly, another organisational transfer management mode is the communication taking place at a distance, i.e. where there is *no personal interaction*, i.e. no face-to-face meetings. All these modes are different tools for managing a transfer between subsidiaries.

Exchange of personnel during the transfer of the innovation was captured using a three item construct. The respondents were asked to indicate on a scale from 1 (not at all) to 7 (very much) with regard to the transfer of the innovation the level of use with the counterparts of: *<Exchange of employees>, <Exchange of managers> and <To what extent the transfer of the innovation was driven by moving personnel between our unit and the counterpart>*. The indicators were added up and divided by three to form the construct used in the regression. Internal reliability was satisfactory with a coefficient $\alpha=0.772$.

The construct *temporary personal meetings* during the transfer of the innovation is a three item construct where the respondents were asked to indicate on a scale from 1 (not at all) to 7 (very much) with regard to the transfer of the innovation the level of use with the counterparts of*:<Temporary training at partner sites>, <Cross-unit teams, project groups, etc.> and <Face-to-face meetings>*. These three items were summed and averaged to form the construct. Internal reliability was within acceptable limits, coefficient $\alpha=0.732$.

Non-personal interaction during the transfer of the innovation is captured using two items. The respondents were asked to indicate on a scale from 1 (not at all) to 7 (very much) with regard to the transfer of the innovation the level of use with the counterparts of:*<Telephone> and <E-mail exchange>*. These two items were added up and divided by two to form the construct. The internal reliability of the construct was within acceptable limits, coefficient $\alpha=0.708$.

Control variables. In order to control for unobserved heterogeneity three variables were introduced as control variables in the model. *Age* was included as a control since older subsidiaries may be more autonomous (Forsgren, 1990) Also, older subsidiaries tend to be more innovative and the ability to exploit innovative opportunities depends to some extent on past experiences of similar activities (Foss and Pedersen, 2002; Cohen and Levinthal, 1990). To control for age, the logarithm of the number of years the subsidiary had been operating in the market was included in the regression equation. Subsidiary *size* may have an impact on in terms of autonomy and resources. Larger subsidiaries have a greater amount of aggregated knowledge, access to more resources and also larger subsidiaires can exercise more influence related to MNE strategic decisions (Gupta and Govindarajan, 2000; Tsai, 2002). Consequently size, measured as the number of employees in the sending subsidiary, was included in the regression equation as its logarithm.Finally, *patent* was introduced as a control variable. Whether or not the innovation is patented can have an impact on how visible the innovation is in the organisation and also on the degree of codification. In order to apply for patenting, documentation has to be communicated to the proper authorities. Furthermore, patent have been used as a marker for high versus low technological innovations as well as an indicator of importance (Trajtenberg, 1990; Albert et al., 1991). Hence, patent is controlled for as a dichotomous variable coded 1 for patent and 0 for no patent.

Common method bias and multicollinearity. In studies using self-reported data there is always a risk of common method bias. In order to check for such bias, Harman's one-factor test was employed (Podsakoff and Organ, 1986). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was used to test weather or not a factor analysis was appropriate. The KMO-value exceeded the acceptable level (0.5) with a value of 0.588 (Hair et. al., 2006). Also, the Bartlett's test of sphericity returned at a 0.000 significance level, indicating that sufficient correlations exist between the indicators (Hair et. al., 2006). Consequently, every indicator in the relevant constructs was included in a principal component factor analysis, see table 1. If high common method variance is a problem, only one factor will emerge with an eigen value exceeding 1, or alternatively one factor will account for a majority of the variance. In the principal component analysis, six factors were extracted and one additional factor emerged with an eigen value very close to one (0.986) and was also extracted to be included in the final model. The next factor, not included, had an eigen value of 0.841, thus not being close to the recommended cut off point of 1. If factors with an eigen value below 1 should be included is open for discussion. In this case the factor closest to one was included since if the eigen value was set at 1 or if the items used for the factor in question was dropped many of the values for the extracted communalities dropped indicating that the model explains what is measured in a better way with the variable included. Looking at the factor loadings and the extracted communalities for the items in question these were high which also indicates that the variable can be included in the model.

Finally, theoretical considerations pertaining to the fact that the variable explain phenomenon distinct from what the other variables capture motivates inclusion. None of the factors explains a majority of the variance, the range being between 5.475 % and 17.810 %. In total, the cumulative variance explained by the seven factors is 73.728 %. Also, all factors were distinct from each other. Only one cross-loading occurred for the item 'level of use of telephone' which loaded on temporary personal meetings with a value of 0.451 when using a cut-off point of 0.32 when interpreting the rotated factor solution. However this item loaded much higher on the factor non-personal meetings and also the other factor loadings for temporary personal meetings were much higher, see table 1. This minor cross-loading is not likely to cause any major concerns although the presence of common method bias can not be excluded. Taken together, the results from the principal component analysis indicate that common method bias is not likely to cause any major issues when analysing the data.

INSERT TABLE 1 HERE

In order to check for multicollinearity among the predictor variables, the variance inflation factor (VIF) was calculated, see table 2, which also reports on the cronbach alpha for every variable. A common upper cut-off limit for VIF values is 10 (Hair et. al., 2006; Marquardt, 1970) and some authors suggest a more conservative limit of 5 (Stedenmund, 1992). All VIF values were well below this with a mean of 1.565. Hence, multicollinearity will not be likely to constitute a problem when interpreting the results or on the predictive ability of the regression model results (Hair et al., 2006).

INSERT TABLE 2 HERE

RESULTS OF THE ANALYSIS

The mean values, standard deviations and correlations for all the measured variables are presented in table 3. In order to estimate the models Ordinary Least Squares (OLS) regressions were conducted in four steps in a hierarchical regression. The results of the OLS regressions are reported in table 4 estimating the effect of the independent variables on headquarters involvement in the transfer process.

Model 1 examines the control variables whereas model 2 examines the controls and the different types of innovations. In model 3 the characteristics of the innovations were included. Finally, in model 4 the transfer management modes were entered into the regression.

The first model is not significant with an F-value of 2.024 and only 2.6 % of the variance is explained by the control variables. However, one control variable is significant at the 10 % level in model 1. Whether or not the innovation is patented seems to have a negative impact on headquarter involvement in the transfer process. However, since the first model is not significant and considering the low explanatory value of model 1, this is of minor importance.

Model 2 examines the effects the different types of innovations have on the dependent variable. The significance level of the model increases with an F-value of 3.741 with the corollary being that the model now is significant at the 1 % level. Additionally, the change in the F-value is significant. The explanatory value of model 2 is moderate with 16.3 % of the variance being explained. No variables returned as significant at a satisfactory level in this model. However, three of the types of innovations returned as significant at the 10 % level.

The significance of model 3 - where the characteristics of the innovations were entered - is high, with an F-value of 4.628 ($p<0.001$) explaining 26.1 % of the variation in the dependent variable. Hence, model 3 is both significant and explains a satisfactory amount of the variance. The change in F-value from model 2 to model 3 is significant at the 1 % level. Age returns as significant and positive at the 5 % level which will be discussed in the following section. Also, importance of the innovation returns as significant at the 1 % level and complexity is significant at the 10 % level. The innovation types are no longer significant, not even at the 10 % level.

In model 4, all the variables are included in the regression equation. This model is significant, with an F-value of 4.701 ($p<0.001$). The change in F-value from model 3 to model 4 is significant at the 5 % level. The model explains 31.4 % of the variance in the dependent variable. Age is still significant at the 5 % level and two of the innovation types are now significant at the 10 % level. Importance of the innovation and the complexity of the innovation are highly significant. Also, two of the transfer management modes returned as significant at the 5 % level.

Hypothesis 1 posited that the type of innovation was not important in relation to headquarters involvement in the transfer process. In model 2, none of the innovation types returned as significant at a satisfactory level in relation to the dependent variable. In model 3, where the types of innovations are dealt with together with the characteristics of the innovations, none of the types returned with a satisfactory level of significance. Looking at model 4, the innovation types are still not significant at a 5 % level and only two types (production process and administrative) are significant at the 10 % level, which can not be deemed as adequate. Additionally, the innovation types did not explain much of the variance when comparing model 1, 2, 3 and 4. However, when the underlying features related to the innovations and the transfer management were introduced in model 3 and 4 the overall explanatory value of the models increased and many of these variables also returned as significant. Consequently, hypothesis 1 can be claimed to be supported. Consistent with hypothesis 2, the importance of the innovation was positively related to headquarters involvement in the transfer process between the sending and receiving subsidiary, ($p<0.001$) with a regression coefficient of 0.310 in model 3 and 0.286 in model 4. Hence, hypothesis 2 is strongly supported. Hypothesis 3 posited a positive relationship between the complexity of the innovation and the involvement of headquarters in the transfer process. The hypothesis is supported since complexity of the innovation is significant ($p<0.01$) and with a coefficient of 0.253 in model 4. In model 3 the significance was at the 10 % level. The relationship between the degree of codification of the innovation and headquarters involvement in the transfer process is dealt with in hypothesis 4a and b. No significant relationship related to this hypothesis can be found in model 3 or 4. Thus, neither hypothesis 4a nor 4b is supported. Hypothesis 5 was concerned with the transfer management modes and headquarters involvement. The results indicate that transfer management replace headquarters involvement, especially when the transfer is conditioned by projects groups ($p<0.05$). Tentative results also indicates a decreased level of headquarter involvement in the transfer when exchange of employees is employed as a transfer management mode. However, this result is not significant. When transfer management is taking place at a distance without face-to-face interaction between the subsidiary's headquarters involve themselves to a greater extent ($p<0.05$). Consequently, partial support is found for hypothesis 5.

INSERT TABLE 3 & 4 HERE

Post-hoc analysis

In order to gain a more fine-grained analysis and understanding of the proposed conceptual framework, additional regression models were calculated. First, the same basic model, as reported above, was tested with dummy variables included for industry structure. Industry structure has been proposed as a factor that potentially can influence resource flows in MNEs (Mudambi and Aulakh, 2005). In our sample, industry structure does not seem to affect the model estimates in any significant way. Additional models testing for MNE size effects in terms of testing for the influence of the five largest MNEs in the sample and another model aggregating these five largest MNEs to one group did not affect the regression model results.

DISCUSSION

The results indicates that what matters when dealing with headquarters involvement in the innovation transfer process between a sending and a receiving subsidiary is not what type of innovation is subject to transfer, but instead how important the innovation is perceived to be and also how complex the innovation is. This result in itself is not that surprising. However, the implications this have for subsidiary communication with headquarters is important. Subsidiaries may or may not want headquarters to get involved in the innovation transfer process. Headquarter involvement implies a decreased degree of autonomy and an increased amount of control or monitoring. This is not something that is always deemed as positive from a subsidiary perspective. Additionally, some MNE headquarters may have the strategy to leverage responsibility to their subsidiaries and this finding can serve as an insight for headquarters of when to be aware of not getting involved even though the innovation is seen as complex and important. On the other hand, by getting the attention of headquarters by framing the innovation as important and complex, this might lead to additional resources allocated from headquarters to the subsidiaries involved in the innovation transfer. Hence, the issue of communicating what type of innovation and the character of the innovation are subject to transfer, can from a subsidiary perspective be a key to intra-MNE resource allocation (Mudambi, 1999). In this sense, innovations are also one source for intra-MNE power on the federative arena that subsidiaries can use when bargaining and competing with other players. This resource allocation and power perspective can help us understand why some subsidiaries and the innovations developed by the, gain a special position in the MNE. Theoretically this contributes to the understanding of subsidiary evolution by explaining how and why some subsidiaries are favoured for additional corporate resources, gain the attention of headquarters in form of their involvement, thus having a greater likelihood of getting mandates assigned or achieving the position of a CoE. Also, if the innovation gets the attention of headquarters this gives the innovation and the transfer project a hierarchical legitimacy and the innovation and the transfer project gains visibility in the organization as well as a perceived importance. Thus, by communicating with headquarters in ways that get their attention this can in the short run lead to a decreased amount of autonomy. However, in the longer perspective a subsidiary which has had the attention of headquarters can get a mandate or develop into a CoE, especially if additional resources are given from headquarters. This in turn can lead to the fact that the subsidiary controls critical resources and gain power in the network as well as an increased degree of autonomy. Headquarter involvement as used in this study is then both an extension and a specification of attention.

Whether or not the innovations are codified has no significance on headquarter involvement. This may have to do with the fact that headquarters value other features such as the importance and complexity more. Additionally, no satisfactory level of significance was found for the control variable patenting. If an innovation is patented this implies a certain degree of codification as well. This strengthens the argument that other underlying features of the innovation is more important when dealing with headquarter involvement. Age seem to make a difference for headquarters involvement in the innovation transfer process. This is not surprising since age to some extent can be an indication of embeddedness. The older the subsidiary the more it has interacted with headquarters and built relations to them as MNE network actors.

An interesting finding is the fact that different transfer management modes have an impact on headquarter involvement. How subsidiaries conduct their transfer management is decisive for headquarter involvement. When organizing the transfer management by personal interaction this seem to replace headquarters involvement whereas headquarter involvement is positively connected to communication at a distance. The more subsidiaries handle their relations by involving their personnel this decreases the hierarchical involvement from headquarters. This finding can be related to how subsidiaries can organize their dyadic relationships in order to increase autonomy and protect themselves from headquarter intervenention.

As a conclusion - this study shows that it is not important which type of innovations are developed at the subsidiary level in terms of getting headquarters involved in the transfer process. It is the underlying features of the innovation that matters and this fact has strategically important implications for the headquarter-subsidiary relationship in terms of autonomy and resources etc. Also, another conclusion is that how the focal subsidiaries decide to organize the transfer management affects headquarter involvement.

CONCLUSIONS

This paper set out to investigate what triggered headquarters involvement in subsidiary level activities in relation to subsidiary structure and processes. The results give rise both to new questions and insights related to the headquarter role in the contemporary MNE. Subsidiaries may want to get the attention and involvement of headquarters in order to get more resources or to gain a strategic role in the MNE. However, the involvement of headquarters may not always be beneficial for the focal subsidiaries and their local business networks. Headquarters involve themselves in the innovation transfer between two subsidiaries under the assumption that they can facilitate this process and add value. This may not always be the case, and the headquarter role in relation to transfer performance efficiency and effectiveness needs to be better understood and is a fruitful arena for future studies. Also, even if subsidiaries to some extent try to get the attention and involvement of headquarters, is there some cut-off point where they instead strive for more autonomy and do not seek headquarters involvement and resources. An important question to investigate is if there is a curvilinear relationship between different ways of gaining the attention of headquarters which would imply that subsidiaries at some point starts to strive for more autonomy. As a corollary other explanations to subsidiary autonomy, such as if they build financial slack in order to at some point be able to decrease the headquarter involvement needs to be researched. Furthermore, in a geographically dispersed MNE psychic distance between subsidiaries, but also between subsidiaries and headquarters, may affect the involvement of headquarters.

For subsidiary managers this study gives an understanding of how they need to communicate with headquarters in order to get them involved. Managers need to frame their communication so that headquarters perceive the innovation as complex and important. On the other hand, headquarter managers can evaluate the communication from the subsidiaries and untangle the reasons behind why subsidiaries communicate the way they do. Consequently, it is of importance for subsidiary managers to be aware of how they communicate with headquarters when considering their local strategy. Does the subsidiary seek autonomy or headquarters involvement and attention? Moreover, subsidiary managers needs to be aware of how they decides to organize their transfer management since this has implications for whether or not headquarters will involve themselves in subsidiary operations, thus this is also important for the question of subsidiary autonomy.

This study suffers from a number of limitations. Some of the measurements consist of subjective estimations made by the respondents. The use of perceptual measurements may 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. Finally, another limitation is that we only have data from the subsidiary perspective and not from headquarters, which may bias the results in favour of the subsidiary view.

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Figure 1

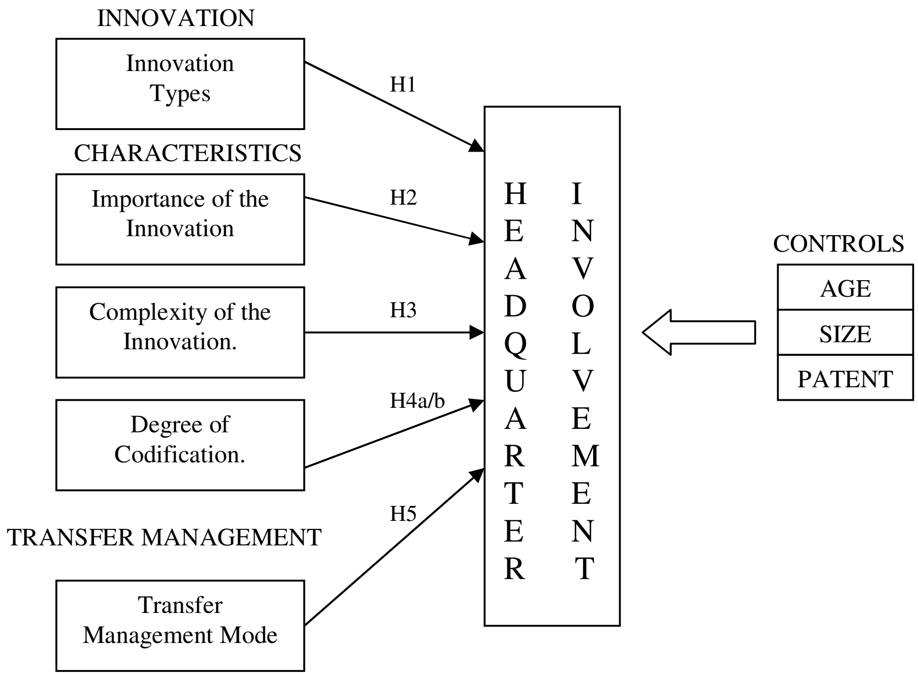
INNOVATION
Innovation Types
CHARACTERISTICS
Importance of the Innovation
Complexity of the Innovation.
Degree of Codification.
TRANSFER MANAGEMENT
Transfer Management Mode
H1
H2
H3
H4a/b
H5
HEADQUARTER INVOLVEMENT
CONTROLS
AGE
SIZE
PATENT

Table 1 Factor analysis with varimax rotation

Variable	Factor loadings		Communality
Factor 1: HQ involvment in transfer			
The MNE HQ has formally instructed you to share this innovation with the counterpart	0.806		0.766
The MNE HQ have themselves been heavily involved in conducting the actual transfer process with the counterpart	0.839		0.769
The MNE HQ have taken complete responsibility for the transfer of this innovation to this counterpart	0.736		0.639
Eigenvalue		2.896	
% Variance		16.091	
Factor 2: Importance of the innovation			
Importance of the innovation for the business area/division as a whole	0.919		0.881
Importance of the innovation for the MNE as a whole	0.869		0.881
Eigenvalue		1.588	
% Variance		8.823	
Factor 3: Complexity of the innovation			
The innovation comprises a high number of interacting sub-systems and components	0.633		0.601
The innovation can satisfy a large number of functions	0.659		0.629
The innovation comprises a high variety of knowledge bases	0.810		0.742
Eigenvalue		1.406	
Variance		7.810	
Factor 4: Degree of codification			
The innovation technology/process know-how is easily codifiable	0.819		0.686
The innovation technology/process know-how is more explicit than tacit	0.866		0.794
Eigenvalue		1.121	
% Variance		6.228	
Factor 5: Exchange of personnel			
Level of use of exchange of employees	0.799		0.671
Level of use of exchange of managers	0.827		0.726
Transfer driven by moving personnel between our unit and the counterpart	0.829		0.760
Eigenvalue		3.206	
% Variance		17.810	
Factor 6: Temporary personal meetings			
Level of use of temporary training at partner sites	0.729		0.671
Level of use of cross-unit teams, project groups etc.	0.750		0.666
Level of use of face-to-face meetings	0.831		0.730
Eigenvalue		2.068	
% Variance		11.490	
Factor 7: Non-personal interaction			
Level of use of telephone	0.721		0.779
Level of use of e-mail exchange	0.915		0.880
Eigenvalue		0.986	
% Variance		5.475	
Total variance explained		73.728	

Table 2 VIF values and cronbach alphas

VARIABLE	Cronbachs alpha	VIF
1. HEADQUARTER INVOLVEMENT	0.697	-
2. AGE	-	1.419
3. SIZE	-	1.277
4. PATENT	-	1.632
5. CORE TECHNOLOGY INNOVATION	-	1.827
6. PRODUCT INNOVATION	-	1.718
7. PRODUCTION PROCESS INNOVATION	-	2.102
8. MARKETING INNOVATION	-	1.410
9. ADMINISTRATIVE INNOVATION	-	1.455
10. IMPORTANCE OF INNOVATION	0.877	1.376
11. COMPLEXITY	0.632	1.604
12. CODIFICATION	0.661	1.639
13. EXCHANGE OF PERSONNEL	0.772	1.213
14. TEMPORARY PERSONAL MEETINGS	0.732	1.852
15. NON-PERSONAL INTERACTION	0.708	1.392

Table 3 Correlations and descriptive statistics

	MEAN	S.D.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. HEADQUARTER	1.924	1.446	1.000														
2. AGE	3.528	0.903	0.154	1.000													
3. EMPLOYEES	5.414	1.590	0.044	-0.106	1.000												
4. PATENT	0.578	0.495	-0.093	0.001	0.029	1.000											
5. CORE	0.301	0.460	0.332**	0.161	-0.162	-0.294**	1.000										
6. PRODUCT	0.830	0.376	-0.118	-0.238*	-0.087	0.355**	0.020	1.000									
7. PRODUCTION	0.368	0.484	0.297**	0.127	0.183	-0.370**	0.297**	-0.415**	1.000								
8. ADMINISTRATIVE	0.180	0.385	0.135	-0.250**	-0.038	0.004	0.233*	0.077	0.240*	1.000							
9. MARKETING	0.034	0.182	0.355**	0.008	-0.096	-0.289**	0.336**	-0.317**	0.253**	0.236*	1.000						
10. IMPORTANCE	4.547	1.641	0.477**	-0.034	0.214*	-0.095	0.311**	-0.080	0.293**	-0.001	0.130	1.000					
11. COMPLEXITY	4.072	1.630	0.181	-0.260**	0.208*	-0.006	0.173	0.000	0.265**	0.175	0.089	0.213*	1.000				
12. CODIFICATION	5.474	1.545	-0.299**	-0.190*	-0.050	0.048	-0.356**	0.014	-0.148	0.007	-0.210*	-0.325**	0.156	1.000			
13. EXCHANGE	1.994	1.402	-0.009	0.046	-0.040	-0.200*	0.297**	0.042	0.270**	-0.035	0.068	0.142	0.180	-0.141	1.000		
14. TEMPORARY	4.025	1.753	0.034	-0.099	0.017	0.016	0.152	-0.189*	0.370**	0.154	0.216*	0.069	0.513**	0.153	0.259*	1.000	
15. NON-PERSONAL	4.736	1.696	-0.007	-0.210*	0.148	-0.087	-0.120	-0.071	-0.086	0.036	-0.034	-0.050	0.232*	0.344*	0.085	0.308**	1.000

Spearman's correlation
* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Table 4 Results of the hierarchical regression for headquarter involvement in the transfer process

Variable	Model 1	Model 2	Model 3	Model 4
AGE	0.125	0.093	0.194*	0.206*
SIZE	0.107	0.107	0.009	-0.041
PATENT	-0.159†	0.005	-0.068	0.009
CORE TECHNOLOGY INNOVATION	-	0.198†	0.045	0.087
PRODUCT INNOVATION	-	0.064	0.076	0.081
PRODUCTION PROCESS INNOVATION	-	0.205†	0.089	0.218†
MARKETING INNOVATION	-	0.077	0.130	0.078
ADMINISTRATIVE INNOVATION	-	0.185†	0.157	0.184†
IMPORTANCE OF INNOVATION	-	-	0.310***	0.286***
COMPLEXITY	-	-	0.178†	0.253**
CODIFICATION	-	-	-0.044	-0.093
EXCHANGE OF PERSONNEL	-	-	-	-0.126
TEMPORARY PERSONAL MEETINGS	-	-	-	-0.231*
NON-PERSONAL INTERACTION	-	-	-	0.209*
Diagnostics				
R^2	0.052	0.222	0.333	0.399
Adj. R^2	0.026	0.163	0.261	0.314
ΔR^2	-	0.170	0.111	0.066
F-value	2.024	3.741***	4.628***	4.701***
Δ F-value	-	1.717***	0.887***	0.073*

[a] Values are standardized parameter estimates.

N=169

† p<0.1, * p<0.05, ** p<0.01, *** p<0.001