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The Impact of Entry Mode on Outward Knowledge Transfer in MNCs: International Greenfield Investments and Acquisitions

ABSTRACT

Despite of the acknowledged individual importance of both entry mode and knowledge transfer, the interaction between these two issues has rarely been studied. In this paper we set out to examine the impact of entry mode, i.e. greenfield investments and acquisitions, on outward knowledge transfer from a subsidiary unit to other parts of the MNC. Additionally, we explore the impact of time elapsed on outward knowledge transfer. We test our hypotheses on a sample of 159 western majority owned subsidiaries located in Finland and China. The results of our study suggest that outward knowledge transfer is greater in subsidiaries established through acquisition than through greenfield investment. We also find that outward knowledge transfer increases with time both in acquisitions and greenfield investments although the underlying reasons for the increase are likely to differ across entry modes.

Key words: *knowledge transfer, entry mode, MNC, greenfield investment, acquisition*

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INTRODUCTION

One of the major challenges MNCs face is exploiting locally created subsidiary knowledge at a global level by means of internal cross-border knowledge transfer. Transferring knowledge internally is today considered as one of the most important competitive advantages of MNCs (Ghoshal, 1987; Gupta and Govindarajan, 1991, 2000; Kogut and Zander, 1993). Another crucial issue for MNCs is determining the entry mode through which they establish a new subsidiary.

Despite of the acknowledged individual importance of both of entry mode and knowledge transfer the interaction between these two issues has rarely been studied. Past literature on knowledge transfer has explored a variety of factors affecting the transfer process including the influence of different knowledge characteristics on the knowledge transfer process (Nonaka, 1994; Simonin, 1999), motivational factors such as knowledge sharing hostility (Husted and Michailova, 2002) and the relationship between sending and receiving units (Szulanski, 1996); as well as the effect of cultural differences on the knowledge transfer process (Kedia and Bhagat, 1988). Literature on entry mode has mainly concentrated on factors determining the choice between different modes of entry (Brouthers and Brouthers, 2001; Barkema and Vermeulen, 1998; Hennart and Park, 1993).

However, considerably less attention has been directed at examining the actual impact of different entry modes on knowledge transfer within the MNC. Knowledge transfer may not be the decisive factor when making the entry mode decision concerning a certain subsidiary. However, the entry mode decision may have an impact on subsequent knowledge transfer from that subsidiary to other units of the MNC and this is an issue that deserves to be further examined.

There are also additional reasons for exploring the impact of entry mode on knowledge transfer in greater depth. Although some studies (Foss and Pedersen, 2002) have touched upon the relevance of entry mode on knowledge transfer, entry mode has mostly been of secondary importance in these studies and included only as a control variable. Furthermore, the results of previous empirical studies are somewhat contradictory. Studies on the post-acquisition integration process have drawn attention to problems relating to knowledge transfer from acquired units (Ranft and Lord, 2002), whereas other studies have highlighted the value of acquired units as potential knowledge providers for the rest of the MNC (Gupta and Govindarajan, 2000).

The purpose of this paper is to shed further light on this under explored issue. Hence, our primary objective is to study the impact of different entry modes on outward knowledge transfer from a subsidiary. We concentrate on knowledge transfer from a subsidiary established either as

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a greenfield investment or as an acquisition. Our decision to focus solely on these two modes of entry whilst excluding for instance joint ventures, is due to the reason that there has been less empirical research conducted on knowledge transfer under these entry modes (Bresman et al., 1999). Furthermore, we go deeper in exploring this issue by also considering the impact of time elapsed since the subsidiary became a part of the MNC.

Argote (1999) argues for additional studies to examine knowledge transfer in different international contexts. The main contribution of such studies would be to help explain differences in knowledge transfer patterns across organisations depending on context-specific factors, as well as to further understanding for the conditions under which knowledge transfer takes place. Our study contributes to the knowledge transfer discussion by doing precisely this. There are few studies exploring knowledge transfer in greenfields, and even fewer in the context of acquisitions (Bresman et al. 1999).

Our study contributes to the knowledge transfer discussion the following way. First, we explore knowledge transfer in the context of greenfields and acquisitions, a context that has not been thoroughly explored in relation to knowledge transfer. In addition, our empirical data from Finland and China provides an additional contribution by showing that the influence of entry mode on outward knowledge transfer can be greater than the influence of home country.

This shows that the importance of entry mode for outward knowledge transfer seems to be of more general nature and not entirely context bound. Furthermore, contrary to other studies we focused on entry mode as our main independent variable rather than only controlling for its effect on knowledge transfer.

The paper is organized as follows. We start by presenting the theoretical background for our study and by defining our key concepts. After that we develop our hypotheses concerning the impact of entry mode on outward knowledge transfer from a subsidiary. Then we present our research design and the results of the regression analyses. Finally, we conclude by discussing the results, implications, and limitations of our study and suggest areas for future research.

BACKGROUND

Defining key concepts

Before moving on to discuss knowledge transfer in greenfield investments and acquisitions we will first define the key concepts of our study. Following Grant (1996) we chose to define knowledge simply as "that which is known" while acknowledging that many types of knowledge are relevant to the firm and that knowledge can be found across various functions. In accordance with Argote and Ingram (2000) we define knowledge transfer as a process through which one unit is affected by the experience of another. This definition describes the fact that knowledge lives

and changes constantly and thus is not the same in all situations. In other words, knowledge transfer means applying existing knowledge in a different context than the one in which it has originated.

Consistent with the resource-based and knowledge-based views of the firm (Barney, 1991; Grant, 1996) we conceptualise the MNC as a heterogeneous bundle of resources, of which knowledge is the most important one. In this paper subsidiary implies a majority owned (>50% ownership) MNC unit located outside the home country of the MNC. Our focus is on subsidiaries established either through acquisition or greenfield investment. We define a greenfield investment as setting up a new venture from scratch (Barkema and Vermeulen, 1998). In line with Capron (1999), we define an acquisition as the acquisition by one company of another entire company, or of a business of an ongoing company.

We will now move on to look at previous research within the entry mode and knowledge transfer streams of literature.

Knowledge transfer in greenfield investments and acquisitions

A transaction cost theory perspective has been widely applied in previous research on acquisitions and greenfield investments (Hennart and Park, 1993). In addition, institutional and cultural variables such as level of foreign experience (Hennart and Park, 1993; Wilson 1980), R&D intensity, size of foreign direct investment in comparison to the investing company (Brouthers and Brouthers, 2000; Hennart and Park, 1993), and cultural distance (Brouthers and Brouthers, 2000; Kogut and Singh, 1988) have also been included in previous studies. These studies have predominantly focused on reasons for choosing an acquisition type of entry mode over a greenfield investment and vice versa.

The implications of entry mode, i.e. greenfield investment or acquisition, on subsequent knowledge transfer between the new subsidiary and the rest of the MNC has not been widely explored in previous entry mode literature. The knowledge transfer literature on the other hand, touches on some of these issues but rarely in the context of acquisitions and greenfield investments. However, there are a few exceptions to this such as for instance the studies by Gupta and Govindarajan (2000) and Foss and Pedersen (2002). Although they both point to the importance of entry mode in connection to outward knowledge transfer neither takes entry mode as its primary object of focus.

Gupta and Govindarajan (2000) included entry mode in their operationalization of the concept 'value of knowledge stock', which they argued to have a positive impact on outward knowledge transfer. In their study entry mode was included as a part of a large model but was not really the focus of interest. Furthermore, the results of its impact on outward knowledge transfer differed depending on if the outflows were directed to peer subsidiaries or to the parent corpora-

tion. Acquired subsidiaries were found to transfer more knowledge to peer subsidiaries than their greenfield counterparts whereas this was not the case concerning outward knowledge transfer to the parent corporation. Foss and Pedersen (2002) also found that entry mode had an impact on subsequent outward knowledge transfer from a subsidiary in the way that acquired subsidiaries engaged in more outward knowledge transfer than greenfield subsidiaries.

Concerning factors that influence outward knowledge transfer from a subsidiary we limit ourselves to reviewing factors that can be expected to be of particular relevance in connection to the choice of entry mode. Thus, our focus lies on motivational and cultural factors rather than on knowledge related factors with the exception of an important knowledge characteristic; tacitness.

Tacitness is one of the most commonly discussed barriers to internal knowledge transfer (Zander and Kogut 1995). Nonaka (1994) describes tacit knowledge as something that cannot be easily communicated and shared, is highly personal, and deeply rooted in action and in an individual's involvement within a specific context. In other words, separating such knowledge from the unit in possession of it in order to transfer it to another one is not always easy, especially as some aspects of a routine can be difficult to pinpoint and may even be performed subconsciously.

Tacit knowledge that is embedded in organizational structures, policies and procedures may be easier to transfer by greenfield investments since acquisitions often come with established structures and policies that can be difficult to change (Harzing, 2002). Hence, tacitness of knowledge is more likely to be a problem for knowledge transfer in acquisitions than in greenfield investments. Nonetheless, it is often tacit knowledge that is most interesting for acquiring firms as it may be the key to "how things are done here", in other words it may be precisely what makes a certain unit valuable. One solution for this particular problem in acquisitions could be the use of an integration mode where the objective is to dissolve the boundary between the units.

We move on from knowledge characteristics to discuss the importance of relationships for the knowledge transfer process. For instance inter-personal relationships between staff members, inter-unit relationships and relationships between organizations and their external counterparts are crucial in the process of knowledge transfer. Szulanski (1996) maintains that an arduous relationship is one of the main causes for what he terms internal stickiness. It is conceivable that the likelihood of an arduous relationship between the subsidiary and other units of the MNC is greater in the case of acquisitions than in greenfields as acquisitions involve bringing together two previously separate organizations.

An arduous relationship can, in turn, result in knowledge sharing hostility and in unwillingness to collaborate. Bresman et al. (1999) argue that knowledge sharing only takes place when individuals possess a sense of shared identity or belonging with their colleagues. According to

Husted and Michailova (2002), individuals are inherently hostile to knowledge sharing. This may be accentuated by the fact that acquisitions are often stressful and unwelcome events for the people involved since they imply change and a great deal of uncertainty. Thus, people may feel reluctant to share their own knowledge, fearing redundancy if their specific know-how is too widely diffused. This is more likely to be the case during the early stages of the post-acquisition integration process, when uncertainty is high.

Cultural variations across nations and organizations can also be a major factor influencing the process of knowledge transfer (Child and Rodrigues, 1996; Kedia and Bhagat, 1988; Bhagat et al., 2002). In an international context national cultural differences are always present irrespective of the chosen entry mode. However, certain cultural factors may be heightened in an acquisition context. Olie (1994) draws attention to the fact that cross-cultural acquisitions are likely to bring together people with different values and beliefs about the work place. Thus, a common frame of reference that may serve as a coordination mechanism is missing. Datta and Puia (1995) suggest that when national cultural differences are large the transfer of knowledge between the acquiring and acquired companies may be more difficult.

Cultural differences, the relationship between units as well as motivational issues such as knowledge sharing hostility are all examples of factors that are likely to have a stronger negative affect on the knowledge transfer process in acquisitions than in greenfield investments.

HYPOTHESES DEVELOPMENT

Based on the review of previous research within entry mode and knowledge transfer literature, we will now go on to develop our hypotheses. The review of past research on knowledge transfer under different entry modes illustrates that there are certain difficulties associated with the post-acquisition integration process, which may complicate knowledge transfer from an acquired subsidiary. However, an acquisition mode of entry does also pose certain advantages related to outward knowledge transfer from the subsidiary.

As opposed to greenfield investments, acquired subsidiaries come with an existing knowledge stock. According to Prahalad and Hamel (1990), gaining access to new knowledge is often an important driver of an acquisition decision. Especially in cases where the target firm has a unique knowledge stock that is difficult or time-consuming to imitate, while speed of entry to the market is also important, acquisitions tend to be favoured over greenfield investments (Belderbos, 2003). Hence, acquisitions can to some extent be seen as a substitute for own R&D (Hennart and Park, 1993).

As Gupta and Govindarajan (2000) argue, the knowledge stock of an acquired firm is likely to be less duplicative relative to that of a greenfield investment. This would in turn motivate

knowledge transfer since knowledge worth sharing needs to exist in order for knowledge transfer to take place. Gupta and Govindarajan (2000) studied knowledge flows in MNCs and found that acquired subsidiaries engage in greater knowledge outflows to peer subsidiaries than greenfield investments. This study examines the differences in outward knowledge transfer in the entire MNC, i.e. from the subsidiary to both the peer subsidiaries and headquarters.

We argue that the advantages of acquisitions as opposed to greenfield investments is stronger when considering outward knowledge transfer subsequent to the establishment of a subsidiary and thus, we propose the following hypothesis:

Hypothesis 1. Outward knowledge transfer from an acquired subsidiary to other parts of the MNC will be greater than from a subsidiary started as a greenfield investment.

Besides depending on the entry mode, outward knowledge transfer may also be contingent on the time that the subsidiary has been in the MNC. The effect of time elapsed since the subsidiary became a part of the MNC can be expected to differ depending on if the subsidiary was acquired or established as a greenfield investment. The literature reports problems related to the first years of the acquisition whereas there are no similar problems reported concerning greenfield investments.

This is due to the fact that the post-acquisition process may render outward knowledge transfer more difficult during the first years of the acquisition. Based on Haspeslagh and Jemison (1991), we define post-acquisition integration as a gradual, interactive process where two organizations learn to work together and cooperate in the transfer of strategic capabilities, including knowledge. As Ranft and Lord (2002) argue, factors that make knowledge transfer difficult within an existing firm are likely to be heightened in an acquisition context because acquisition involves bringing together two previously separate organizations. Accordingly, Bresman et al. (1999), found empirical evidence that knowledge transfer in acquisitions was positively related to time elapsed since acquisition.

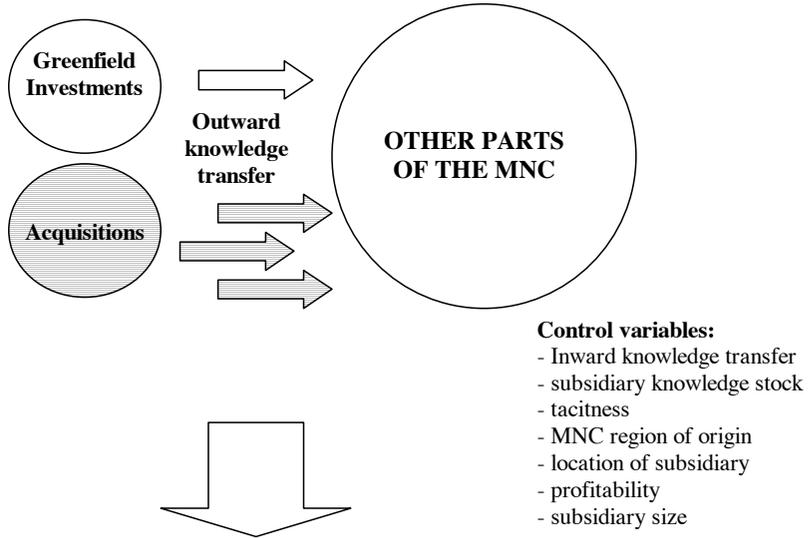
In the literature, the acquisition integration process is usually reported to last up to five years after the acquisition takes place (Krug and Hegarty, 1997). In this time it is likely that the acquired company has been integrated to the extent considered desirable by the MNC and the previously separate organizations have learned to work together and cooperate in the transfer of knowledge. Therefore we assume that outward knowledge transfer from the acquired company will increase after five years have elapsed since the acquisition, and we propose the following hypothesis:

516

Hypothesis 2. Outward knowledge transfer from an acquired subsidiary will increase after 5 years whereas there will be no such effect in greenfield investments.

In figure 1 below we illustrates the framework of our study.

Hypothesis 1.



Hypothesis 2.

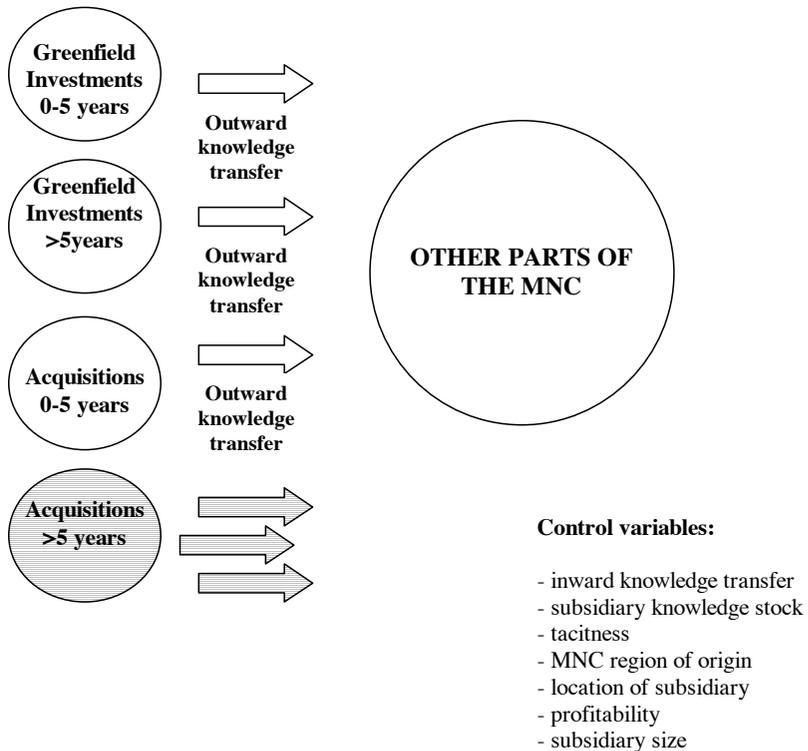


FIGURE 1. Framework of the study.

RESEARCH METHODS

Sample and data collection

The data collection for this study was carried out during 2000–2002. Our target group consisted of Western MNCs located in Finland and China. These two countries were selected because they represent two very different locations for subsidiaries. Finland represents a small, developed Western country while China represents a large, emerging Asian country. We wanted to test our hypothesis in a sample of two countries that are very different from each other to see whether our hypotheses hold across these two countries. If subsidiary home country has no great influence to the results, it offers more evidence for the applicability of our hypothesis in general across different countries than if we were using a one-country sample or a sample of two very similar countries.

Originally we targeted the 150 largest foreign-owned subsidiaries in Finland whilst the corresponding number was 300 in China. The resulting sample was 164 subsidiaries, of which 89 were located in Finland and 75 in China. Accordingly, the response rate for Finland was 59 per cent and the equivalent percentage for China was 25. The difference in the response rates between these two sub-sets of data was due to better access to companies in Finland than in China.

After controlling for missing values, our final data consisted of 159 majority owned subsidiaries out of which 89 were Finnish and 70 Chinese. Hence, the Finnish sample was somewhat bigger than the Chinese one. Concerning the entry mode, the total sample consisted of 87 greenfield investments and 72 acquisitions. In the Finnish sub sample the respective figures were 31 greenfields and 58 acquisitions compared to 56 greenfields and 14 acquisitions in the Chinese sub sample. Thus, the Finnish sub sample contained more acquisitions and less greenfields than the Chinese one.

Regarding the country of origin of the parent company, our total sample contained Western MNCs from the Nordic countries (57 MNCs), Western Europe (38 MNCs) and the US (64 MNCs). The following nations of origin were represented in the Finnish sample: Sweden (21 parent companies), Denmark (7), Norway (4), United Kingdom (4), Germany (5), the Netherlands (4), Russia (1), Belgium (1), France (2), Liechtenstein (1), Switzerland (9) and USA (30). The corresponding numbers for the Chinese sample were: Finland (12), Sweden (8), Denmark (1), Norway (3), the United Kingdom (3), German (12), the Netherlands (3), France (11), Italy (3), Austria (1), Switzerland (8) and USA (5).

In our data collection, we used a structured interview technique. In the first stage of the data collection process a letter was sent to subsidiary presidents, in which the project was described and the confidentiality of the responses was emphasized. Then, the respondents were contacted by telephone to agree on times for the interviews. The length of each structured face-to face in-

interview was 45–120 minutes, during which the respondent and the researchers went through the questionnaire together. Although English was used as the questionnaire language, Finnish, Swedish, or Mandarin were also used to explain certain terms or expressions that the respondents had difficulty understanding. Taking the time to conduct the survey in this kind of way is compensated by the increased reliability of the resulting data as opposed to data collected by for instance mail survey (Andersson, Forsgren and Holm, 2001).

Following previous studies (Foss and Pedersen, 2002), we targeted the president of each subsidiary for our interviews. This choice is motivated by the fact that we consider subsidiary presidents to be directly involved in the subsidiary's operations and therefore in a more favorable position than other actors to provide an overall picture of the subsidiary. Thus, our data consists of single responses from the presidents of each subsidiary. We use a perceptive measure that provides us with the various subsidiary presidents' subjective views. We think that subsidiary presidents as key decision makers can be considered to have the best overall view of the subsidiary while the view of lower level functional managers could be more restricted. Our choice to use a single respondent was mainly due to practical reasons, as it would have been extremely difficult to gain access to multiple respondents within each subsidiary. Furthermore, whilst the use of multiple respondents can pose certain advantages in the shape of increased reliability, it is not unproblematic due to possible interrater reliability problems.

Dependent Variables

Outward knowledge transfer. Following the approach of Gupta and Govindarajan (2000), Holm and Pedersen (2000) and Schulz (2001), we assessed the outward knowledge transfer from the subsidiary by asking respondents to rate the extent to which the subsidiary's distinctive competence had been used by other units of the MNC during the last three years. We measured this as the mean of five different organizational functions: general management, manufacturing, marketing/sales, service, and R&D. The respondents were asked to answer separately for each of the functions on a seven-point Likert scale where 1 = very much lower, and 7 = very much higher. Although there is no clear theoretical argument as to why the different functions should constitute one construct, we have nonetheless decided to examine them as one variable as they do co-vary empirically. In our sample this is indicated by the fact that all functions load on the same factor and have a relatively high Cronbach's alpha of .81.

Independent Variables

Mode of Entry. Acquired subsidiaries, as opposed to greenfield subsidiaries, can from the start be expected to possess a knowledge stock that is less duplicative to that of the rest of the MNC (Gupta and Govindarajan, 2000; Hennart and Park, 1993). We argue that the non-duplicative nature of

subsidiary knowledge may pose an advantage for outward knowledge transfer. Following this line of reasoning, we used entry mode as our independent variable. The respondents were asked to state whether the subsidiary had been established through acquisition or greenfield investment. We coded their answers into a dummy variable where acquisitions received the value of 1 and greenfield investments the value of 0.

Time elapsed since the subsidiary became a part of the MNC. Time elapsed was measured by asking the respondents how many years the subsidiary had been in the MNC. The answers were divided into four different groups, 0–5 years elapsed since acquisition, >5 years elapsed since acquisition, 0–5 years elapsed since greenfield investment and >5 years elapsed since greenfield investment. We created dummy variables for the first three groups that were then compared to the fourth group. We labeled the dummy variables as follows: 0–5 years elapsed since acquisition; >5 years elapsed since acquisition; 0–5 years elapsed since greenfield investment. The limit of 5 years has been used in previous acquisition studies (Krug and Hegarty, 1997) to represent the length of the acquisition integration process. Although this is a rather crude division, it gives indication of whether newer acquisitions differ from older ones. Greenfield investments were divided to two groups as well in order to control that there was no similar time effect in them.

Control Variables

Inward knowledge transfer. In order to control for subsidiary's access to internal knowledge sources within the MNC, we measured the inward transfer of corporate knowledge to a subsidiary. Similarly to Schulz (2001), internal knowledge transfer to a subsidiary was determined by asking respondents to rate the extent to which the subsidiary had used the distinctive competence of other units within the corporation during the last three years. We measured this as the mean of five different organizational functions; general management, manufacturing, marketing/sales, service, and R&D. The respondents were asked to answer separately for each of the functions on a seven-point Likert scale where 1 = very much lower, and 7 = very much higher. As with our dependent variable we decided to examine the different functions as one variable as they do covary empirically. All functions loaded on the same factor and had a Cronbach's alpha of .63

Knowledge stock of the subsidiary. A stock of knowledge that is superior to the knowledge of other units could increase outward knowledge transfer. For knowledge exchange to take place, knowledge worth sharing needs to exist (Schulz, 2001). Knowledge superior to that of other corporate units is the knowledge that could be especially valuable to share. Thus, a subsidiary with a unique knowledge stock is likely to be an attractive collaboration partner (Davenport and Prusak, 1998). We therefore controlled for the knowledge stock of the subsidiary, which was operationalized as the extent to which the subsidiary during the last three years had developed knowledge that was superior compared to that of other units in the business area. We measured

this as the mean of five different organizational functions; general management, manufacturing, marketing/sales, service, and R&D. The respondents were asked to answer separately for each of the functions on a seven-point Likert scale where 1 = very much lower, and 7 = very much higher. This construct had a Cronbach's alpha of .69.

Tacitness of knowledge. Tacitness is one of the most commonly discussed barriers to internal knowledge transfer (Zander and Kogut 1995). Thus, we considered it important to control for the tacitness of knowledge in our study. The respondents were asked how easy it is to explain subsidiary knowledge to others and how easy is this knowledge for others to understand based on a verbal presentation. The respondents answered each of the two questions on a Likert scale where 1 corresponded to "very easy" and 7 corresponded to "very difficult. The Cronbach's alpha for this construct was .86.

*Region of origin of the parent company.*¹ The region of origin of the MNC can influence the way the MNC operates. For example, in the study by Gupta and Govindarajan (2000) subsidiaries of Japanese MNCs tended to engage in less outward knowledge transfer to peer subsidiaries compared to subsidiaries of US and European MNCs. Thus, we controlled for whether the region of origin of the parent company had an impact on outward knowledge transfer since this could have equal influence or even a more significant influence than the entry mode.² In our sample, we divided the parent companies into the following three groups based on their region of origin: the Nordic countries, the rest of Europe, and the USA. Therefore, we built three dummy variables representing the region of origin of the parent company. We chose the Nordic countries as the base case to which the two other dummy variables representing the USA and the rest of Europe were compared.

Location of the subsidiary. Our empirical data is based on samples collected from two countries: foreign subsidiaries of Western MNCs in Finland and China. There could be a difference in outward knowledge transfer depending on whether the subsidiary is located in Finland or China. It is feasible that due to larger cultural differences, the Chinese subsidiaries possess knowledge that is different from the knowledge of the rest of the MNC and that it thus could be of value. On the other hand, it is possible that since Finland is a more developed country than China, the Finnish subsidiaries could possess technologically superior knowledge compared to the Chinese subsidiaries and thus be able to contribute more to the outward knowledge transfer. Thus, we

¹ We chose to control for the region of origin of the parent company instead of country of origin because we saw this sufficient for our controlling purposes. Another possibility would have been to control for each individual country of origin. However, since the number of countries included in the study was large (15 countries), including them individually would have increased the number of variables in the model to a degree that would have been unsupported considering our sample size.

² It is possible that the country of origin could also have an indirect effect on outward knowledge transfer through entry mode since MNCs may prefer acquisitions or greenfield investments based on their country of origin.

controlled for the location of the subsidiary to see whether outward knowledge transfer differed depending on whether the subsidiary was located in Finland or China. We constructed a dummy variable by giving the value 0 to the Finnish subsidiaries the value 1 to the Chinese subsidiaries.

Profitability. Profitability can be used as an indicator of a successful operation. We argue that it is feasible that there will be greater interest in obtaining outward knowledge from a successful subsidiary than from a less successful one. Profitability of the subsidiary during the last 12 months was measured using a seven-point Likert scale where 1 = poor, and 7 = excellent. We used self-reported performance measures because there is evidence supporting the general reliability of self-reported performance measures (Venkatraman and Ramanujam, 1986).

Size of the subsidiary. On one hand, larger firms may have more resources and thus be able to engage in more outward knowledge transfer than smaller firms. There is evidence that outflows of knowledge tend to be higher for larger subsidiaries (Gupta and Govindarajan, 2000). On the other hand there may exist diseconomies of scale when transferring resources (Barkema and Vermeulen, 1998). For example, Ranft and Lord (2002) found that communication in large acquisitions was more difficult. Communication problems may in turn complicate outward knowledge transfer. Due to this evidence of the possible impact of size on outward knowledge transfer, following Gupta and Govindarajan (2000) we controlled for the size of the subsidiary by measuring the number of employees in the subsidiary.

RESULTS

We chose a multiple regression analyses as our analysis method because it provides a means of objectively assessing the degree and character of the relationship between dependent and independent variables by forming the variate of independent variables (Hair, Anderson, Tatham, and Black, 1998). Thus, regression analysis enabled us to assess the magnitude and direction (positive or negative) of our hypothesized relationships.³

We used forced entry, also known as standard multiple regression. In standard multiple regression, all independent variables are entered into the regression equation at once. Each independent variable is evaluated in terms of what it adds to the prediction of the dependent variable that is different from the predictability provided by all the other independent variables (Tabachnick and Fidell, 1989). We chose this method because it is recommended for assessing relationships

³ To test the robustness of the results across different multivariate methods, we tested hypothesis 1 also with logistical regression. The results of standard multiple regression and logistical regression were essentially similar.

among variables and answering the basic question of multiple correlation when there is no particular reason for using hierarchical or stepwise regression methods (Tabachnick and Fidell, 1989).

We built two regression models to test each of our two hypotheses separately. Table 1 provides descriptive statistics and correlation matrix for the variables used in the first regression model. In table 2 the respective information is given concerning the second regression model.

There are some interesting correlations worth noting. The negative correlation between the location of the subsidiary and the entry mode reflected the fact that our Chinese sample included relatively more greenfield investments than acquisitions compared to our Finnish sample. This could possibly indicate a propensity of MNCs to establish greenfields in China and acquisitions in Finland.

Location of the subsidiary was also correlated with inward knowledge transfer suggesting that Chinese subsidiaries engaged in more inward knowledge transfer than Finnish ones. This could follow from the fact that Chinese subsidiaries were more often established as greenfield investments than the Finnish ones. Inward transfer of knowledge has been related particularly to greenfield investments (Gupta and Govindarajan, 2000). Indeed, in our analysis as well, entry through greenfield investment was somewhat correlated with increased transfer of inward knowledge. In addition, we found a strong correlation between inward knowledge transfer and subsidiary knowledge stock. This suggests a possible interaction effect between these two variables. Finally, profitability was correlated with subsidiary knowledge stock indicating that subsidiaries with large stocks of knowledge were more profitable than the ones with a smaller knowledge stock. Or alternatively, subsidiaries that were profitable were able to invest in the development of large stocks of knowledge.

We then examined both correlation matrices to identify possible collinearity between independent variables. Including dummy variables in the model can create a situation of high multicollinearity (Hair et al., 1998). However, there were no high correlations of .90 or above present in our models to suggest serious collinearity problem (Hair et al., 1998).

We further examined multicollinearity with the help of multicollinearity statistics. Based on the variance inflation factor (VIF), tolerance, and condition index no serious multicollinearity problems existed in either one of our regression models. The dummy variable "0–5 years since greenfield investment" had the lowest tolerance value (tolerance = .29) and correspondingly the highest variance inflation factor value (VIF = 3.40). Nevertheless, the tolerance was still well above the recommended threshold of 0.1 and the VIF value was well below the common threshold of 10.0 (Hair et al., 1998). The highest condition index was 19.34 for the last dimension in the second regression model, which fell under the most commonly used threshold value of 30 (Hair et al., 1998). We also checked the data for possible outliers. We detected no outliers over

TABLE 1. Descriptive statistics and Pearson correlations.

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9
1. Outward knowledge transfer	2.90	1.29	1.00								
2. Entry mode (Greenfield investment = 0, Acquisition = 1)	.45	.50	.24***	1.00							
3. Inward transfer of knowledge	3.69	1.21	.35***	-.14*	1.00						
4. Knowledge stock of the subsidiary	4.38	.93	.41***	.09	-.01	1.00					
5. Tacitness of knowledge	4.21	1.47	-.06	-.09	-.03	.11+	1.00				
6. Region of origin of the parent company (Western Europe)	.40	.49	-.02	-.05	-.00	-.06	.08	1.00			
7. Region of origin of the parent company (USA)	.24	.43	.06	-.01	.11+	.12+	-.11+	-.46***	1.00		
8. Location of the subsidiary (Finland = 0, China = 1)	.44	.50	-.14*	-.45***	-.32***	-.17*	.15*	.23**	-.26	1.00	
9. Profitability	5.06	1.58	.28***	-.12+	.10	-.18*	-.04	.05	.05*	.00	1.00
10. Size of the subsidiary	389	831	.09	.04	.01	.05	-.15*	.01	-.12	-.10	-.01

+ p < .10 * p < .05, ** p < 0.01, ***p < .001
All one-tailed tests.

TABLE 2. Descriptive statistics and Pearson correlations.

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11
1. Outward knowledge transfer	2.90	1.29	1.00										
2. 0-5 years since acquisition	.10	.81	.05	1.00									
3. > 5 years since acquisition	.23	.87	.15*	.70***	1.00								
4. 0-5 years since greenfield investment	.12	.82	-.07	.75***	.69***	1.00							
5. Inward transfer of knowledge	3.69	1.21	.35***	-.02	-.01	.03	1.00						
6. Knowledge stock of the subsidiary	4.38	.93	.41***	.03	.09	-.00	-.01	1.00					
7. Tacitness of knowledge	4.21	1.46	-.06	-.10	-.04	.01	-.03	.11+	1.00				
8. Region of origin of the parent company (Western Europe)	.40	.49	-.02	-.02	.11+	.04	-.00	-.06	.08	1.00			
9. Region of origin of the parent company (USA)	.24	.43	.06	.06	.02	.04	.11+	.12+	-.11+	-.46***	1.00		
10. Location of the subsidiary (Finland = 0, China = 1)	.44	.50	-.14*	-.03	-.11+	.23**	.32***	-.17*	.15*	.23**	-.26***	1.00	
11. Profitability	5.06	1.58	.28***	-.00	-.06	.02	.10	.18*	-.04	.05	.05	.00	1.00
12. Size of the subsidiary	389	831	.09	-.03	.49	-.06	.01	.05	-.15*	.01	-.12+	-.10	-.01

+ p < .10 * p < .05, ** p < 0.01, ***p < .001
All one-tailed tests.

the recommended threshold of 1.96, which is the critical t value at the .05 confidence level (Hair et al., 1998).

Table 3 presents the results of our first regression model that we built to test our first hypothesis. The model was significant as indicated by a significant F-value ($F = 11.94$, $p < .001$). The percentage of total variance explained was 42% ($R^2 = .42$).

TABLE 3. Regression model.

Independent Variable	Standardized Beta Coefficient	t-value
Entry mode (Greenfield investment = 0, Acquisition = 1)	.236***	3.29
Inward transfer of knowledge	.409***	6.02
Knowledge stock of the subsidiary	.345***	5.25
Tacitness of knowledge	-.039	-.603
Region of origin of the parent company (Western Europe)	.006	.081
Region of origin of the parent company (USA)	-.066	-.884
Location of the subsidiary (Finland = 0, China = 1)	-.119	-1.48
Profitability	.207**	3.20
Size of the subsidiary	.033	.518
R	.647	
R square	.419	
Adjusted R square	.384	
F	11.937***	

+ $p < .10$ * $p < .05$, ** $p < 0.01$, *** $p < .001$

All one-tailed tests.

Data in the table present standardized regression coefficients.

Concerning our first hypothesis, we proposed that outward transfer of knowledge from the subsidiary to other parts of the MNC would be greater from an acquired subsidiary than from a subsidiary started as a greenfield investment. We found strong support for this. The entry mode variable was positive and significant (standardized $\beta = .24^{**}$) indicating that outward knowledge transfer was significantly greater from acquired subsidiaries compared to subsidiaries established as greenfield investments.

Regarding the control variables, both inward transfer of knowledge (standardized $\beta = .41^{***}$) and knowledge stock of the subsidiary (standardized $\beta = .35^{***}$) had a highly significant positive relationship on outward transfer of knowledge. Profitability (standardized $\beta = .21^{**}$) was also somewhat positively related to outward transfer of knowledge. Contrary to our expectations, tacitness of knowledge, region of origin of the parent company, location of the subsidiary, and size of the subsidiary were insignificant.

The results of our second regression model can be seen in table 4. The model was significant ($F = 9.64$, $p < .001$) and explained 42% of the variance ($R^2 = .42$). In the second regression

model we tested our second hypothesis suggesting that knowledge transfer from an acquired subsidiary would increase after 5 years whereas there would be no such effect in greenfield investments. We further divided the entry mode variable that was used in the first model into a categorical variable including the following categories: 0–5 years since acquisition, >5 years since acquisition, 0–5 years since greenfield investment, and >5 years since greenfield investment. We chose the category of >5 years since greenfield investment as the base variable to which the other three categories were compared.

TABLE 4. Regression model.

Independent Variable	Standardized Beta Coefficient	t-value
0–5 years since acquisition	.082	.772
>5 years since acquisition	.281**	2.76
0–5 years since greenfield investment	-.311**	-2.69
Inward transfer of knowledge	.387***	5.60
Knowledge stock of the subsidiary	.342***	5.16
Tacitness of knowledge	-.044	-.662
Region of origin of the parent company (Western Europe)	-.030	-.404
Region of origin of the parent company (USA)	-.079	-1.046
Location of the subsidiary (Finland = 0, China = 1)	-.112	-1.355
Profitability	.208**	3.190
Size of the subsidiary	.013	.200
R	.647	
R square	.419	
Adjusted R square	.376	
F	9.644***	

+ $p < .10$ * $p < .05$, ** $p < 0.01$, *** $p < .001$

All one-tailed tests.

Data in the table present standardized regression coefficients.

The results of the second regression analysis showed partial support for our hypothesis 2. Outward transfer of knowledge was indeed greater in acquisitions that were older than 5 years old compared to younger acquisitions.⁴ However, whereas we supposed that there would be no similar effect concerning greenfield investments, we found a similar effect. Outward transfer of knowledge was greater in greenfield investments that were older than 5 years compared to younger greenfield investments.

⁴ We ran an additional test to see whether we could establish a linear positive relationship between outward knowledge transfer in acquisitions and time elapsed, which would have represented a result very similar to Bresman et al. (1999). We did establish a positive relationship but it was non-significant.

The impacts of the control variables were similar to the first regression model. Inward transfer of knowledge (standardized $\beta = .39^{***}$), knowledge stock of the subsidiary (standardized $\beta = .34^{***}$), and profitability (standardized $\beta = .21^{**}$), were positively related to outward transfer of knowledge. Tacitness of knowledge, region of origin of the parent company, location of the subsidiary, and size of the subsidiary remained insignificant.

CONCLUSIONS

Our first objective was to examine the impact of entry mode, i.e. greenfield investments and acquisitions, on outward knowledge transfer from a subsidiary unit to other parts of the MNC. We showed that outward knowledge transfer to other parts of the MNC is significantly greater in subsidiaries established through acquisition than by means of greenfield investment. Our empirical data from Finland and China provided an additional contribution by showing that the influence of entry mode on outward knowledge transfer was greater than the influence of home country.

Thus, similarly to Gupta and Govindarajan (2000) our study implies that acquisitions may enable greater outward transfer to the rest of the MNC than greenfield investments. The theoretical conclusions of this finding are that the choice of entry mode has clear implications on outward knowledge transfer. Our study suggests that these implications can be more important than factors such as subsidiary home country or home region of the parent company. Therefore, the implications of entry mode on outward knowledge transfer could be included in the existing literature on the choice of entry mode that is currently to a large extent based on transaction cost theory. Our study suggests that the knowledge-based view could explain the choice and implications of entry mode choice as well.

Our second objective was to explore the impact of time elapsed since the subsidiary became a part of the MNC on outward knowledge transfer. We showed that outward knowledge transfer increased if the acquired subsidiary had been in the MNC for more than five years. This finding is in principle accordance with Bresman et al. (1999) who established a positive relationship between time elapsed and knowledge transfer. However, our study suggests that the relationship might actually not be strictly linear but that there is a clear difference between acquisitions younger than five years and older than five years. We acknowledge that this time limit although based on previous research is somewhat crude and more specific knowledge of the exact time limit would require curve fitting. Nevertheless, the theoretical conclusion that can be made is that outward knowledge transfer from acquisitions is a process that requires time. From this follows a methodological conclusion that if the performance of an acquisition is measured as the amount of outward knowledge transfer, this should be measured only after enough time has elapsed since the acquisition.

Contrary to our expectations, we found a similar time effect also in greenfield investments whereas we argued that this would not be the case since in greenfield there is no time consuming post-acquisition integration process. Our findings imply, however, that outward knowledge transfer takes time also in subsidiaries established as greenfield investments. This could be due to the fact that for knowledge exchange to take place, knowledge worth sharing needs to exist (Schulz, 2001). For a subsidiary established as a greenfield investment time may be required to create a knowledge stock that is of value to the other parts of the MNC and thus worth sharing. The first few years of greenfield investments may well be marked by inward knowledge transfer from the headquarters to the subsidiary. In conclusion, although outward knowledge transfer seems to increase in both entry modes, the reasons for this are likely to differ.

The implications of this study are tentative and offer several avenues for future research. Since the focus of this study was to demonstrate possible variation in knowledge transfer depending on entry mode and time, the different mechanisms and factors causing this variation remain unexplored in our study. Additional clarifying work is required as to why there is variation in knowledge transfer depending on entry mode and time elapsed. It would be of interest to concentrate on, for instance, knowledge transfer mechanisms and how they vary in subsidiaries established through different entry modes. Another interesting issue would be to further explore the impact of time elapsed. Our study suggests that the relationship between the impact of time and outward knowledge transfer could be non-linear. That raises the question as to which form the curve takes and whether it differs across entry modes.

Our study has certain limitations. Firstly, we have chosen to focus only on outward knowledge transfer to be able to better clarify certain aspects of the complex knowledge transfer process. Nevertheless, we realize that it is an inter-related, two-way process, which also comprises inward knowledge transfer. Secondly, we have considered outward knowledge transfer to the MNC as a whole entity, not separating between different corporate levels such as peer subsidiary units and headquarters. Thirdly, our study may contain some western bias as we have restricted ourselves to studying western MNCs. Finally, we also acknowledge the problem of drawing inferences about causality with cross-sectional data, which is inherent in these types of studies. ■

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