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MNC KNOWLEDGE TRANSFER, SUBSIDIARY ABSORPTIVE CAPACITY AND HRM

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ABSTRACT

Based on a sample of 169 subsidiaries of multinational corporations (MNCs) operating in the USA, Russia, and Finland, this paper investigates the relationship between MNC subsidiary HRM practices, absorptive capacity and knowledge transfer. First, we examine the relationship between the application of specific HRM practices and the level of the absorptive capacity. Second, we suggest that absorptive capacity should be conceptualized as being comprised of both employees' ability and motivation. Further, results indicate that both ability and motivation (absorptive capacity) are needed to facilitate the transfer of knowledge from other parts of the MNC.

INTRODUCTION

Research in the area of knowledge management indicates that the ability to create and transfer knowledge internally is one of the main competitive advantages of multinational corporations (MNCs). The MNC is considered to be a "differentiated network", where knowledge is created in various parts of the MNC and transferred to several interrelated units (Hedlund, 1986; Bartlett and Ghoshal, 1989). Conceptualizing the MNC as a differentiated network has inspired a recent stream of research on the creation, assimilation and diffusion of internal MNC knowledge emphasizing the role of subsidiaries in these processes (Holm and Pedersen 2000).

It has been proposed in the knowledge transfer literature that the absorptive capacity of the receiving unit is the most significant determinant of internal knowledge transfer in MNCs (Gupta and Govindarajan, 2000). Subsidiaries differ in their absorptive capacity, and this affects the level of internal knowledge transfer from other MNC units. The literature, however, offers multiple methods to conceptualize and operationalize absorptive capacity, often not capturing the various facets of absorptive capacity. Moreover, little attention has been paid to the question of whether organizations can enhance the creation and development of absorptive capacity. Clearly, with a few exemptions, the characteristics of knowledge transfer and absorptive capacity have not been treated as endogenous to organizational processes and arrangements (Foss and Pedersen, 2002). This is true in spite of the commonly accepted idea that organizational learning is closely linked to how an organization manages its human resources (e.g., Lado and Wilson, 1994). For instance, limited investments in training and development may result in low levels of employee knowledge and skills, thereby inhibiting learning. In their study of relative absorptive capacity and interorganizational learning, Lane and Lubatkin (1998) assert that both compensation practices and organizational structures are positively associated with absorptive capacity as well as interorganizational learning. However, our knowledge of how human resource management (HRM) influences the absorptive capacity of a subsidiary and internal MNC knowledge transfer is still very rudimentary.

The contribution of this paper is twofold. First, we contribute to the conceptualization of absorptive capacity by emphasizing employees' motivation as well as employees' ability as important aspects of absorptive capacity. Second, while many other studies have focused on the importance of absorptive capacity for

knowledge transfer (e.g., Lyles and Salk, 1996; Lane and Lubatkin, 1998; Lane, Salk and Lyles, 2001), we extend these studies by exploring the types of organizational mechanisms that increase absorptive capacity. Our approach differs from the previously mentioned studies as we do not just explore the impact of absorptive capacity on knowledge transfer. We go a step further by treating the development of absorptive capacity as an endogenous part of the model. The paper is structured as follows: in the next section, we review the literature on MNC knowledge transfer and absorptive capacity. Based on the literature review, we develop hypotheses on: (1) the relationship between different aspects of absorptive capacity - employees' ability and motivation - and the level of knowledge transfer and (2) HRM practices and employees' ability and motivation. Finally, we explain the methodology employed, followed by a discussion of the results and implications of the study.

KNOWLEDGE TRANSFER WITHIN MNCs

The interest in knowledge within MNCs, its sources and transfer, has been expanding (e.g., Gupta and Govindarajan, 2000). MNCs are no longer seen as repositories of their national imprint but rather as instruments whereby knowledge is transferred across subsidiaries, contributing to knowledge development (Holm and Pedersen, 2000). A common theme in this line of research is that MNCs can develop knowledge in one location but exploit it in other locations, implying internal transfer of knowledge by MNCs. Thus, the competitive advantage that MNCs enjoy is contingent upon their ability to facilitate and manage inter-subsidiary transfer of knowledge. Hedlund (1986) and Bartlett and Ghoshal (1989), for example, focused on how to organize and structure MNCs in order to facilitate the internal flow and transfer of knowledge in MNCs.

Szulanski (1996) emphasized that "the movement of knowledge within the organization is a distinct experience, not a gradual process of dissemination" (p. 28). In his view, knowledge transfer is a process of dyadic exchanges of knowledge between the source and recipient units consisting of four stages: initiation, implementation, ramp-up and integration. While the first two stages comprise all events that lead to the decision to transfer and the actual flow of knowledge from the source to the recipient, the latter two stages begin when the recipient starts utilizing the transferred knowledge. Clearly, pure transmission of knowledge from the source to the recipient has no useful value if the recipient does not use the new knowledge. The key element in knowledge transfer is not the underlying (original) knowledge, but

rather the extent to which the receiver acquires potentially useful knowledge and utilizes this knowledge in own operations. Knowledge transfer may lead to some change in the recipient's behavior or the development of some new idea that leads to new behavior (Davenport and Prusak, 1998). This is in line with the definition of organization learning often put forth in the literature, where organizational learning involves a change in organizational outcomes (see Fiol and Lyles, 1985 for an overview of this literature). Accordingly, we define knowledge transfer between organizational units as a process that covers several stages starting from identifying the knowledge over the actual process of transferring the knowledge to its final utilization by the receiving unit. In the context of MNC, the other units are the headquarters and other subsidiaries in the corporation, while the receiving unit is the focal subsidiary.

Knowledge transfer is not a random process and organizations can institute various internal policies, structures and processes to facilitate learning (Inkpen, 1998). More recently, much of the empirical research on intra-company knowledge transfer has been focusing on different factors that hinder or stimulate knowledge transfer (see Chapter 5 in Argote, 1999 for a detailed review). Ghoshal and Bartlett (1988) concluded that communications between organizational units facilitates knowledge flows within MNC. Simonin (1999) suggested that knowledge ambiguity plays a critical role as mediator between explanatory variables (e.g., tacitness, prior experience, complexity, cultural distance and organizational distance) and transfer outcomes. These effects were moderated by the capacity of the firm to support learning. Gupta and Govindarajan (2000) observed that the knowledge inflows into a subsidiary are positively associated with the richness of transmission channels, motivation to acquire knowledge, and capacity to absorb incoming knowledge.

Szulanski (1996) studied the impediments to the transfer using a slightly different approach. He applied all sets of factors together in an eclectic model to measure their relative impact on knowledge transfer (internal stickiness). His findings suggest that along with causal ambiguity and relationships between source and recipient units, the recipients' lack of absorptive capacity is the most important impediment to knowledge transfer within the firm. The role of absorptive capacity of the receiving unit also stands out as the most significant determinant of knowledge transfer in a number of other studies (e.g., Lane and Lubatkin, 1998; Gupta and Govindarajan, 2000).

ABSORPTIVE CAPACITY

In their seminal work, Cohen and Levinthal (1990) defined *absorptive capacity* as the "ability to recognize the value of new external information, assimilate it, and apply it to commercial ends" (p. 128). Cohen and Levinthal (1990) assumed that a firm's absorptive capacity tends to develop cumulatively, is path dependent and builds on existing knowledge: "absorptive capacity is more likely to be developed and maintained as a byproduct of routine activity when the knowledge domain that the firm wishes to exploit is closely related to its current knowledge base" (p. 150). Building on the concept of absorptive capacity, Lyles and Salk (1996) included international joint ventures' (IJV) capacity to learn as an independent variable to analyze knowledge acquisition from a foreign parent. Their results indicate that the "capacity to learn, mainly the flexibility, and creativity" (p. 896), is a significant indicator of knowledge acquisition from the foreign partner. Taking Lyles and Salk's conclusion as a starting point, Lane, Salk and Lyles (2001) refined the absorptive capacity definition offered by Cohen and Levinthal. They propose that "the first two components, the ability to understand external knowledge and the ability to assimilate it, are interdependent yet distinct from the third component, the ability to apply the knowledge" (p.1156).

Lane and Lubatkin (1998) further reconceptualized the concept and proposed that absorptive capacity is a dyad-level construct - denoted relative absorptive capacity - rather than a firm level construct. Lane and Lubatkin (1998) and later Lane, Salk and Lyles (2001) found support for the concept of relative absorptive capacity. In fact, Lane and Lubatkin (1998) tested the traditional measure of absorptive capacity of R&D as share of sales (e.g., applied by Cohen and Levinthal, 1990) against their own measures of relative absorptive capacity (three bibliometric-based measures of knowledge and five knowledge-processing-similarity variables). They found that the traditional measure of R&D spending explained only 4 percent of the variance in interorganizational learning, while the knowledge similarity variables explained another 17 percent and the five knowledge processing similarity variables explained an additional 55 percent. A number of significant conclusions can be drawn from these studies. First, absorptive capacity should be understood in its context indicating that in some instances absorptive capacity should be treated as a dyad-level construct rather than as a firm-level construct. Second, traditional measures of absorptive

capacity (e.g., R&D spending) may be inappropriate as they only partly capture the dyadic construct. Thus, relative absorptive capacity is "more important to interorganizational learning than the commonly used measure of absolute absorptive capacity" (Lane and Lubatkin, 1998: 473) There is, however, a limitation to the generalizability of Lane and Lubatkin's conclusion. Both studies - Lane and Lubatkin (1998) and Lane, Salk and Lyles (2001) – were conducted within the context of IJVs where two independent companies were involved in the process of knowledge transfer. In this study, the knowledge transfer takes place between organizational units within the same firm, where the organizational structures, systems, practices, etc. are expected to be more similar than between independent companies. Thus, the relative absorptive capacity is of minor importance in the context of internal MNC knowledge transfer.

In a recent article, Zahra and George (2002) summarized representative empirical studies on absorptive capacity. According to Zahra and George (2002) absorptive capacity has four dimensions – acquisition, assimilation, transformation and exploitation where the first two dimensions form potential absorptive capacity, the latter two – realized absorptive capacity. They argue that more attention should be devoted to studying the realized absorptive capacity which emphasizes the firm's capacity to leverage the knowledge that has been previously absorbed (Zahra and George, 2002). As put forward by Zahra and George (2002) "firms can acquire and assimilate knowledge but might not have the capability to transform and exploit the knowledge for profit generation" (p. 191). Zahra and George (2002) criticized the existing studies for applying measures (like R&D intensity, number of scientists working in R&D departments, etc.) that "have been rudimentary and do not fully reflect the richness of the construct" (p. 199). Such an approach neglects the role of individuals in the organization, which is crucial for knowledge utilization and exploitation.

The aim of this paper is to add to the existing literature on absorptive capacity in two important directions: (1) *the concept:* in terms of the conceptualization and measurement of absorptive capacity, we follow the path of recent contributions (e.g., Zahra and George, 2002) and aim our efforts at studying the firm's capacity to utilize and exploit previously acquired knowledge. We identify employees' ability and motivation as the key aspects of the firm's absorptive capacity that in turn facilitates internal knowledge transfer; and (2) *the development:* we consider different

organizational practices which may contribute to the development of absorptive capacity, thereby allowing us to examine the possible managerial influence on absorptive capacity that is not often examined in the literature. In particular, we identify specific HRM practices that managers might implement to develop the absorptive capacity of their organizations.

The concept

A firm's absorptive capacity is an organization-level construct that resides with its employees. The absorptive capacity has two elements: prior knowledge and intensity of effort (Cohen and Levinthal, 1990; Kim, 1998). "Prior knowledge base refers to existing individual units of knowledge available within the organization" (Kim, 1998: 271). Thus, employees' ability, their educational background and acquired job related skills may represent the "prior related knowledge" which the organization needs to assimilate and use (Cohen and Levinthal, 1990). However, in addition to the prior related knowledge there should be a certain level of "organizational aspiration" which is characterized by the organization's innovation efforts (Cohen and Levinthal, 1990). As proposed by Kim (1998) "the intensity of effort refers to the amount of energy expended by organizational members to solve problems" (p.271).

Employees' intensity of effort is well studied in the cognitive process theories such as the expectancy-valence theory of work motivation (see Vroom, 1964). Motivated employees want to contribute to organizational effectiveness. Even though the organization may consist of individuals with high abilities to learn, "its ability to utilize the absorbed knowledge will be low if employees' motivation is low or absent" (Baldwin, Magjuka, and Loher, 1991: 52). The ability/can do factor usually denotes "a potential for performing some task which may or may not be utilized" (Vroom, 1964:198) while the motivation/will do factor reflects drive. The prior knowledge base (or employees' ability) and intensity of efforts made by the organization (or employees' motivation) is related to the concept of potential and realized absorptive capacity, since potential absorptive capacity is expected to have a high content of employees' ability while realized absorptive capacity is expected to have a high content of employees' motivation.

The behavioral science literature suggests that both employees' ability *and* motivation are of importance for organizational behavior. To achieve a high performance at any level, both the ability and motivation to perform effectively are

needed (Baldwin, 1959). Empirical evidence supports an interactive, not additive, effect of ability and motivation on performance (e.g., French, 1957; Fleishman, 1958; Heider, 1958; O'Reilly and Chatman, 1994). Applying the concept of an interaction effect of ability and motivation on the issue of knowledge transfer, we expect that a higher rating in knowledge utilization will be achieved, if knowledge receivers have both the ability and motivation to absorb new external knowledge. Thus, we propose the following hypothesis:

Hypothesis 1. The interaction between employees' ability and motivation will increase the level of knowledge transfer to the subsidiary.

The development

Existing literature has paid little attention to how absorptive capacity is created and developed in the firm, rather taking for granted that this process does occur. To understand the sources of a firm's absorptive capacity, Cohen and Levinthal focused on "the structure of communication between the external environment and the organization, as well as among the subunits of the organization, and also on the character and distribution of expertise within the organization" (p. 132). These factors emphasize environmental scanning and changes in R&D investments but pay very little attention to other internal organizational arrangements and their role in absorptive capacity creation and development. For example, little is known about how managerial practices may increase absorptive capacity and help diffuse knowledge inside the firm. The few studies that have included organizational characteristics (e. g., Lane and Lubatkin, 1998; Gupta and Govindarajan, 2000) call for further research on "the learning capacities of organizational units," "organizational mechanisms to facilitate knowledge transfer," etc. Based on our definition of absorptive capacity as being related to both employees' ability and motivation, we intend to treat the development of absorptive capacity endogenously by identifying the organizational mechanisms (HRM practices) which shape the organization's absorptive capacity.

HRM PRACTICES

In his influential study of the impact of "*high performance work practices*" on organizational turnover, productivity and corporate financial performance, Huselid (1995) factor-analyzed a number of HRM practices into two categories: those mainly

influencing employees' abilities and those impacting employees' motivation. Huselid (1995) emphasized the interactive effect of HRM practices that influence ability and motivation. Similar results have been obtained by researchers who have clustered HRM practices into "bundles" examining practices which influence employees' ability and those that impact employees' motivation (e.g., Arthur, 1994; Ichniowski, Shaw, and Prennushi, 1997; Delaney and Huselid, 1996).

As emphasized by Huselid (1995), HRM practices influence employees' skills and competencies through the acquisition and development of a firm's human capital. The competitive advantage of the firm is dependent on the existence of human resources with relevant competence profiles. An analysis of the competencies needed for different positions – together with an analysis of the firm's current pool of employee competencies - helps the organization hire people with the desired skills and knowledge. In addition, performance appraisal (or performance management) systems provide employees with feedback on their performance and competencies and provide direction for enhancing their competencies to meet the needs of the firm. An integrated part of most performance appraisal systems is also the establishment of objectives and targets for the self-development and training of employees. There is also extensive evidence that investment in employees' training enhances the human capital of the firm, generally leading to a positive relationship between employee training and organizational performance (e. g., Delaney and Huselid, 1996; Koch and McGrath, 1996). Thus, we propose:

Hypothesis 2. Competence/performance appraisal and training are positively related to employee abilities.

"The effectiveness of even highly skilled employees will be limited if they are not motivated to perform" (Huselid, 1995: 637). In this context, several HRM practices may influence individual performance by providing incentives that elicit appropriate behaviors. Such incentive systems may include performance-based compensation and the use of internal promotion systems that focus on employee merit and help employees to overcome invisible barriers to their career growth (Huselid, 1995). Most studies have included performance-based compensation as a component of high performance HRM practices (e. g., Arthur, 1994; Huselid, 1995; MacDuffie, 1995; Delery and Doty, 1996).

While from an expectancy theory point of view it is the existence of a clear linkage between individual effort and reward that matters, from an equity theory (and organizational justice) perspective the main question is whether employees perceive that they receive the rewards that they are entitled to based on their contribution to the organization. Both perspectives would lead us to expect a positive relationship between performance-based compensation systems and employee effort. Promoting employees from within the firm is likely to provide a strong motivation for employees to work harder in order to be promoted (Pfeffer, 1994; Lepak and Snell, 1999). In addition, a philosophy of internal promotion indicates that a firm has decided to invest in its employees and is thus committed to them. Previous research has shown that employees are more motivated when they are informed about the firm. Sharing of information on, for example, strategy and company performance conveys to the employees that they are trusted. Further, it is important that employees are informed so that they can use the knowledge that resides in the firm to its fullest potential (Pfeffer, 1998). As a result, extensive intra-organizational communication is also likely to contribute to employees' motivation. Based on the arguments presented above, we propose:

Hypothesis 3. Performance-based compensation, merit-based promotion and internal communication are positively related to employees' motivation.

- INSERT FIGURE 1 HERE -

DATA AND METHOD

This paper examines foreign-owned subsidiaries located in three host countries: Finland, Russia and USA. These countries are different, e.g., in terms of history, culture and management style, making it a perfect sample for testing whether the proposed hypotheses on intra-organizational transfer of knowledge apply across the different contexts. The subsidiaries sampled have their MNC HQs located in five home countries: Sweden, Germany, Japan, USA, and Finland. We chose these countries because they were among the more active investors in Russia and Finland while still representing a reasonably diverse sample including countries from each of the triad regions of North America, Europe, and Asia.

Lists of subsidiaries of firms with headquarters in Japan, Germany, Sweden, and Finland operating in the USA were obtained from the foreign commercial sections of the respective embassies in the USA. 320 subsidiaries were randomly

selected from the lists and HRM managers or General Managers of the subsidiaries were contacted via telephone and asked if they would participate in the study. Of these, 28 did not meet the age or size sampling criteria. This resulted in a base sampling of 292 firms in the USA. These 292 firms were sent a questionnaire and non-respondents were contacted up to three times at two-week increments resulting in 79 responses or a 27 per cent response rate. In Finland, 188 firms were contacted which met the size and age sampling requirements and a similar procedure to that employed in the USA to obtain 62 responses or a 33 per cent response rate. In Russia, however, where there is little tradition of completing questionnaires and much worry about disclosing information, interviews were set up with the managers during which time managers were asked to complete the questionnaires. In a few cases, at the manager's request, the questionnaire was left with the manager and collected a few days later. In Russia 100 of the 357 contacted firms, which met the size and age sampling conditions, took part in the study (a 28 per cent response rate).

The resulting data set consists of 62 subsidiaries operating in Finland, 100 subsidiaries operating in Russia, and 79 subsidiaries operating in the USA for a total of 241 participating subsidiaries. However, due to missing data, only 168 observations were used in our data analysis (55 subsidiaries in Finland, 81 in Russia, and 32 in USA). On average, the subsidiaries were existence for 15 years with 173 employees of which 7 were expatriates. Further, on average, each MNC had subsidiaries in 40 different countries.

Seventy per cent of our respondents were general managers or deputy general managers and 30 per cent of our respondents were HR managers. No significant differences in responses were found between these sub-groups and thus following Guest (1997) the questionnaires were combined into one data set for analysis. Twenty-six per cent of the respondents were under 30 years old, 33 per cent were between 30-39, 32 per cent were between 40-49, and 9 per cent over 50 years old.

A careful process was used to develop the questionnaire for this study. The items/scales used in the study drew on established research (Gardner et al., 2001; Huselid, 1995; Wright et al., 1998; Zander, 1991). In addition, five experts were asked to review the questionnaire and provide feedback. The questionnaire was then administered to 10 managers (not part of the sampling frame) to obtain their feedback before development of the final questionnaire. The questionnaire was administered in English in the USA and Finland and respondents in Russia had the option of using an

English or Russian version. The Russian version was validated for accuracy using a translation back-translation procedure.

Following Podsakoff and Organ (1986), we used the Harman's one-factor test to examine the extent of common method bias in our data. A principal component factor analysis reveals there are 10 factors with an eigenvalue > 1 which together account for 69% of the total variance. The presence of several distinct factors combined with the relatively low amount of variance explained by the first factor and second factor (only 15% and 12%) indicates that the data does not suffer from common method variance (Podsakoff and Organ, 1986).

MEASURES

All data used in the analysis were from the administered questionnaire and all variables were standardized prior to the development of indices.

Transfer of knowledge. We define the level of knowledge transfer based on the level of knowledge utilization by the recipients assuming both acquisition and use of new knowledge. Accordingly, the subsidiaries were asked to what extent they utilize knowledge from the parent company and from other MNC units. The questions used a five-point Likert-type scale, where 1 indicates no use of knowledge and 5 indicates substantial use of knowledge (Alpha=0.64).

Employees' ability. This construct captures employees**'** potential and ability. It is not a measure of an individual ability, but a measure of the overall ability of subsidiary's employees. This construct was measured by asking respondents to assess the quality of the subsidiary's employees relative to that of its competitors in: overall ability, job related skills and educational level. Respondents indicated this on seven-point Likert-type scales ranging from 1="Far below average" to 7="Far above average" (Alpha=0.77).

Employees' motivation. This construct consists of five items. In the same vein, this is a measure of the overall motivation of a subsidiary's employees and not the individual motivation. Two items asked respondents to assess the quality of the subsidiary's employees relative to those of its competitors on motivation and work effort using seven-point Likert-type scales (ranging from 1="far below average" to 7="far above average".) Three items were measured using a five-point scale (ranging from 1=strongly disagree to 5=strongly agree) where respondents were asked to

indicate: 1) whether the employees behave in ways that help company performance; 2) whether employees contribute in a positive way to company performance; and 3) whether the subsidiary, compared with the parent company, has a highly motivated group of employees (Alpha=0.75).

Training. The extent to which subsidiaries apply training is measured through two items capturing the number of days of formal training managerial and non-managerial employees, respectively, receive annually (Alpha=0.83).

Competence/performance appraisal. An index examining the extent to which competence/performance appraisal is used in the subsidiary is used. One item measures the proportion of the workforce that regularly receives a formal evaluation of their performance (in per cent), another measures the proportion of jobs where a formal job analysis has been conducted (in per cent), and the final item measures the proportion of new jobs for which a formal analysis of the desired personal skills/competencies/characteristics is carried out prior to making a selection decision (in per cent) (Alpha=0.66).

Merit-based promotion. The importance of internal promotion schemes is measured by an index comprised of three five point Likert-type scale items. The first item measures whether qualified employees have the opportunity to be promoted to positions of greater pay and/or responsibility within the subsidiary (1=no opportunities and 5=many opportunities), the second item measures whether the subsidiary places a great deal of importance on merit for promotion decisions (1=not at all and 5=to a large extent), and the third item measures the extent to which upper-level vacancies are filled from within (1=not at all and 5=to a large extent) (Alpha=0.63).

Performance based compensation. This three-item scale captures the extent to which compensation is performance-based. One item measures the proportion of employees who have the opportunity to earn individual, group or company-wide bonuses (per cent), and two items ask the respondents to indicate whether the company uses performance-based compensation (1=not at all and 5=to a large extent) and whether the compensation systems are closely connected to the financial results of the subsidiary (1=not at all and 5=to a large extent) (Alpha=0.61).

Internal communication. The extent to which exchange of information is promoted within the organization is measured through a scale comprised of three items (all on

five-point scales). The items capture communication flows between: 1) employees in different departments, 2) non-managerial employees and managerial employees, and 3) the HR department and the top management team (1=not at all and 5=to a large extent) (Alpha=0.72).

Control variables.

Subsidiary age. Subsidiary age was included as a control variable since older subsidiaries tend to be more autonomous and thus more innovative (e.g., Foss, and Pedersen, 2002). More innovative subsidiaries might be less dependent on knowledge from other parts of the MNC. On the other hand, more innovative subsidiaries may also be more interesting as knowledge exchange partners for other MNC units. Subsidiary age is measured as the number of years the subsidiary has operated in the host country.

Subsidiary size. Following the same logic as the subsidiary age variable, larger subsidiaries may acquire less knowledge from other MNC units than smaller subsidiaries because they are able to generate more knowledge themselves. Subsidiary size is measured as the logarithm of the total number of employees in the subsidiary.

Relative size of subsidiary compared to the rest of the corporation. This variable measures the strategic importance of the subsidiary. Following Birkinshaw and Hood (1998) and Holm and Pedersen (2000), it is expected that the larger the relative size of the subsidiary compared to the rest of the corporation, the stronger strategic position the subsidiary will gain in the MNC. A stronger strategic position allows better access to knowledge and other resources in other parts of the MNC. Relative size is measured as the number of employees in the subsidiary divided by the total number of employees in the MNC.

Share of expatriates. Expatriates are used in MNCs as vehicles for knowledge transfer from other MNC units to the focal subsidiary where the higher number of expatriates in a subsidiary, the more knowledge may be transferred (Downes and Thomas, 2000; Bonache and Brewster, 2001). Therefore, we controlled for the relative number (in per cent) of expatriates in the subsidiary.

Strategic mission. As pointed out by Lyles and Salk (1996), a clear understanding and sharing of the mission statement facilitates knowledge transfer since employees understand what knowledge is important. In order to control for this variable we asked the respondents to indicate to what extent the subsidiary has a clear strategic mission

that is well communicated and understood at every level throughout the organization. The respondents indicated this on a 5-point Likert-type scale (1=not at all to 5=very much.)

Cultural relatedness. Lane and Lubatkin (1998) argue that absorptive capacity is a dyad-level construct dependent on the similarities/differences of both source and recipient firms in terms of knowledge bases, organizational structures and compensation practices, and dominant logic. We control for the cultural relatedness between the home country of the MNC and the host country of the subsidiary by applying the Kogut and Singh-index based on Hofstede's four dimensions of cultural difference (Kogut and Singh, 1988).

Home and host country. We expect that difference in local environments - economic, political, technological and socio-cultural – affect the process of knowledge transfer. Therefore we control for the home country of the MNC (Finland, Germany, Japan, Sweden and USA) as well as the host country of the subsidiary (Finland, Russia and USA).

Industry. Following Gupta and Govindarajan (2000), we control for industry characteristics since some industries are more global and apply a higher level of knowledge transfer among MNC units. We group the subsidiaries into six industries: Metal & Electronics, Food, Pulp & Paper, Chemicals, Financial service, Wholesale & Retail, and Hotel & Transportation.

RESULTS

The three hypotheses may be summarized in three basic equations:

1. Employees' ability = Competence/Performance appraisal + Training + Error
2. Employees' motivation = Merit-based Promotion + Performance-based compensation + Internal Communication + Error
3. Transfer of knowledge = Employees' ability + Employees' motivation + Employees' ability * Employees' motivation + Controls + Error

However, as the above equations represent decisions that are interdependent, the use of single equation models may yield biased results and obscure interesting theoretical possibilities. It is also possible that the joint optimization of all decisions

involved may lead to the suboptimization of one or more individual decisions. Statistically, the interdependence is indicated by the high correlation between the error terms of the three equations. The appropriate model to estimate these decisions is a three-stage least square model that circumvents the problem of interdependence by using instrument variables (the exogenous variables) to obtain predicted values of the endogenous variables (in our case, knowledge transfer, employees' ability, and employees' motivation). As the scales of the variables varied considerably, all variables were standardized (mean=0 and standard deviation=1) before analysis.

INSERT TABLES 1 AND 2 HERE

Descriptive data (mean values, standard deviation, minimum and maximum values) on all exogenous variables are provided in Table 1. For all variables the descriptive data is given before transformation (e.g. standardization). The correlation coefficients are shown in Table 2. As expected, there is a relatively high correlation between the three host country dummies (-0.34, 0.28 and -0.67) and between the cultural relatedness variable and the country dummies (both host and home country dummies). This can largely be explained by the way these measures are constructed. However, none of the other correlation coefficients indicated the possibility of multicollinearity (i.e. r>0.5), (Hair et al., 1995). Moreover, running the models with some of the correlated variables omitted had no effect on the explanatory power of the main variables. Therefore, we concluded that the results are very stable in terms of the different specifications of the model (See Table 3).

INSERT TABLE 3 HERE

Overall, the results indicate that the model including all three equations works well, explaining almost one third of the observed variation in the knowledge transfer (weighted R-square=0.32). This R^2 statistic has been corrected for the fact that the regression sum of squares and the error sum of squares do not sum to the total corrected sum of squares in methods using instrument variables where first-stage predicted values are substituted for endogenous regressors. Therefore, the overall R^2-value might be larger than the R^2–values for each of the three equations. The system weighted R^2-value is the best measure of the overall goodness of fit of the model. We turn now to the tests of our explanatory hypotheses.

Hypothesis 2 posited a positive relationship between competence/performance appraisal and training (HR practices) and subsidiary employees' ability. This

hypothesis is largely supported (See column 1 Table 3). Training has a significantly relationship with employees' ability ($p<0.01$). The effect of performance appraisal on employees' ability is marginally significant ($p<0.10$). This indicates that investments in HRM practices (e.g., training) directly aim at developing and upgrading the skills of the workforce have a stronger effect on employees' ability than the indirect (long-term) practice of competence and performance appraisal. Since the variables have been standardized, the two parameters 0.18 and 0.10, respectively, also indicate a substantial difference in the effects of these two variables on employees' ability.

Hypothesis 3 examined the relationship between merit-based promotion, performance-based compensation, and internal communication (HR practices) and employees' motivation. Only two variables had a significant positive relationship lending some support for the hypothesis (See column 2 Table 3). The two variables—performance-based compensation and internal communication—are highly significant ($p<0.001$) determinants of employees' motivation. An improvement in employees' motivation is more associated with the use of performance-based compensation and information sharing within the organization rather than with merit-based promotions.

Hypothesis 1 is concerned with two aspects of subsidiary absorptive capacity, ability and motivation, and their interaction effects as a facilitator of knowledge transfer in MNCs. While the main effects of both employees' ability and employees' motivation are positive but non-significant, the interaction effect between these two variables is highly significant ($p<0.001$; See column 3 Table 3). This indicates that neither employees' ability nor motivation by themselves is sufficient to facilitate knowledge transfer. The significant interaction of motivation and ability shows that in order to facilitate knowledge transfer both aspects of absorptive capacity - ability and motivation of employees' - are needed. It turns out that none of the control variables in the model are significant.

CONCLUDING COMMENTS

This paper addresses the relationship between MNC subsidiary HRM practices, absorptive capacity and knowledge transfer. We found overall support for the argument that the absorptive capacity of the subsidiary facilitates transfer of knowledge from other parts of the MNC. The greater the absorptive capacity, the higher level of knowledge transfer. Moreover, and perhaps the most important finding

of this study, we find that both aspects of absorptive capacity (ability and motivation) need to be present in order to optimally facilitate the absorption of knowledge from other parts of the MNC. Employee ability or motivation alone does not lead to knowledge transfer. These results fall in line with recent contributions like Zahra and George (2002) who distinguish between potential absorptive capacity (with an expected high content of employees' ability) and realized absorptive capacity (with an expected high content of employees' motivation). While much prior research on absorptive capacity has only focused on the ability aspect of absorptive capacity, our results indicate that ability is necessary but not sufficient.

There exists a large and growing body of research on the relationship between HRM and organizational performance (see Becker and Gerhart, 1996; Guest, 1997; Becker and Huselid, 1998). In particular previous research has bundled different HRM practices into two main categories: those determining employees' ability and those determining employees' motivation. However, we diverge from previous work on HRM and firm performance by integrating the research on knowledge transfer within the MNC. The results of our study indicate that investments in employees' ability and motivation through the extensive use of HRM practices contribute to MNC knowledge transfer. Employees' ability and motivation constitutes the firm's absorptive capacity, which is seldom treated as an endogenous variable in the literature. While previous studies have paid little attention to how absorptive capacity is created and developed in the firm, the implication of our results is that managers can improve the absorptive capacity of their organizations by applying specific HRM practices oriented towards employees' ability (training and performance appraisal) and employees' motivation (performance-based compensation and internal communication).

Future research should collect data from multiple respondents to minimize the risk of common method bias. The validity of the current data on employees' ability and motivation was limited due to the use of only one respondent per subsidiary, a weakness in most international research. Future research should also examine the possibility of a lagged effect of investments in HRM on employees' competencies and motivation, and knowledge transfer. Finally, examining other factors of knowledge transfer such as the relationship between the parties involved, the sender's characteristics, and the characteristics of the knowledge transferred can extend the present model. While this study makes important contributions to our understanding

of the relationship between HRM, employees' ability and motivation, and knowledge transfer in the MNC, clearly, additional research is needed to further develop the field of knowledge management.

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Table 1. Descriptive Statistics for All Independent Variables before Any Transformation

	Means	Std. Deviation	Min.	Max.
1) Transfer of knowledge	3.51	0.83	1.5	5
2) Employess' ability	5.19	0.8	3	7
3) Employess' motivation	5.04	0.79	2.88	7
4) Training	1.42	1.09	1	5
5) Performance appraisal	3.32	1.44	1	5
6) Promotion	3.8	0.62	1.67	5
7) Performance based compensation	3.62	0.96	1.05	5
8) Communication	3.61	0.68	1	5
9) Subsidiary age	14.5	17.2	1	110
10) Subsidiary size	154	495	5	6000
11) Expatriates	9.8	18	0	100
12) Relative size of subsidiary	4.69	12.6	0.01	86.7
13) Strategic mission	3.56	1.08	1	5
14) Cultural relatedness	3.44	2.28	0.51	7.33
Home-country-dummies:				
15) Germany	0.25	0.43	0	1
16) Japan	0.32	0.47	0	1
17) Finland	0.18	0.39	0	1
18) Sweden	0.13	0.33	0	1
19) USA	0.13	0.33	0	1
Host-country dummies:				
20) Russia	0.48	0.5	0	1
21) Finland	0.33	0.47	0	1
22) USA	0.2	0.4	0	1
Industry dummies:				
23) Metal & Electronics	0.22	0.42	0	1
24) Food, pulp & paper	0.1	0.3	0	1
25) Chemicals	0.16	0.37	0	1
26) Financial service	0.08	0.28	0	1
27) Wholesale & retail	0.27	0.45	0	1
28) Hotel & transportation	0.16	0.37	0	1

Table 2. Correlation Matrices Including all Independent Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1)	1.00																										
2)	0.12	1.00																									
3)	0.36***	0.48***	1.00																								
4)	0.37***	0.20**	0.22**	1.00																							
5)	0.32***	0.19*	0.31***	0.27**	1.00																						
6)	0.21**	0.27**	0.34***	0.17*	0.09	1.00																					
7)	0.28**	0.20**	0.35***	0.25**	0.32***	0.34***	1.00																				
8)	0.31***	0.19*	0.42***	0.29***	0.25**	0.41***	0.27**	1.00																			
9)	-0.07	0.03	-0.03	-0.24**	-0.07	0.01	0.04	-0.16*	1.00																		
10)	-0.15*	0.03	-0.07	-0.20**	-0.06	0.09	0.06	-0.13+	0.41***	1.00																	
11)	0.16*	-0.09	0.05	0.07	0.05	-0.14+	-0.09	-0.07	-0.01	-0.35***	1.00																
12)	-0.14+	-0.09	-0.08	0.05	0.04	-0.02	-0.17*	-0.04	-0.08	0.14*	-0.09	1.00															
13)	0.21**	0.33***	0.43***	0.21**	0.18*	0.32***	0.23**	0.39***	-0.02	0.01	-0.18*	-0.03	1.00														
14)	0.25**	0.02	0.11	0.32***	0.13	0.11	0.15*	0.14+	-0.36***	-0.32***	0.13+	-0.06	-0.03	1.00													
15)	-0.05	0.005	0.02	0.07	0.02	-0.01	0.01	0.09	0.01	0.01	-0.23**	0.01	0.11	-0.41***	1.00												
16)	0.21**	-0.34***	-0.05	-0.02	0.12	-0.16*	0.08	-0.08	-0.06	-0.25***	0.45***	-0.15*	-0.23**	0.32***	-0.39***	1.00											
17)	-0.19*	0.14+	-0.03	-0.10	-0.09	-0.01	-0.01	-0.07	0.09	0.17*	-0.18*	0.01	0.17*	-0.44***	-0.28**	-0.32***	1.00										
18)	0.01	0.15*	0.12	-0.05	-0.03	0.13+	-0.04	0.05	0.13	0.14+	-0.14+	0.01	0.02	0.09	-0.22**	-0.26**	-0.18*	1.00									
19)	-0.02	0.15+	-0.04	0.11	-0.06	0.11	-0.07	0.03	-0.16*	0.02	-0.13+	0.19*	-0.03	0.52***	-0.22**	-0.26**	-0.18*	-0.14+	1.00								
20)	0.33***	0.07	0.14+	0.42***	0.24**	0.08	0.25**	0.23**	-0.39***	-0.37***	0.06	-0.01	0.12	0.75***	-0.17*	0.17*	-0.18*	-0.08	0.28**	1.00							
21)	-0.21**	-0.06	-0.03	-0.36***	-0.31***	0.03	-0.09	-0.07	0.22**	0.23**	-0.27***	0.01	0.16*	-0.61***	0.30***	-0.28**	N.A.	-0.11	-0.15+	-0.67***	1.00						
22)	-0.10	0.21**	-0.03	0.08	-0.17+	0.14	-0.09	-0.07	-0.16+	-0.01	0.21*	0.30**	-0.02	0.67***	-0.19*	-0.36***	-0.16+	0.18+	N.A.	-0.28**	-0.34***	1.00					
23)	0.03	-0.07	0.09	0.09	0.03	-0.01	0.11	0.02	0.02	-0.07	0.05	-0.02	0.12	-0.04	0.06	0.07	-0.03	-0.11	-0.03	0.02	0.11	-0.09	1.00				
24)	-0.03	0.13	-0.02	0.12	0.03	0.02	-0.02	-0.01	0.12	0.15*	-0.10	0.12	0.01	-0.05	-0.06	-0.14	0.15+	0.11	-0.01	0.03	-0.02	0.01	-0.18*	1.00			
25)	-0.10	0.08	0.06	-0.03	-0.05	-0.06	-0.04	0.01	-0.10	0.20**	-0.11	0.06	-0.03	-0.08	-0.03	-0.05	0.08	0.18*	-0.17*	-0.16*	-0.03	-0.19	-0.24**	-0.15+	1.00		
26)	0.14+	0.17*	0.09	0.07	0.03	0.05	-0.02	0.06	-0.05	-0.09	0.19*	-0.09	-0.02	0.01	0.03	0.03	-0.03	0.02	-0.05	0.06	-0.12	-0.07	-0.16*	-0.10	-0.13+	1.00	
27)	-0.04	-0.20**	-0.05	-0.17*	0.11	-0.03	0.05	-0.07	0.09	-0.08	-0.04	-0.09	-0.07	0.05	-0.02	0.22**	-0.09	-0.11	-0.07	-0.03	-0.03	-0.06	-0.33***	-0.20**	-0.27**	-0.18*	1.00
28)	0.03	0.01	-0.15*	-0.03	-0.17*	0.07	-0.13+	0.02	-0.09	-0.07	0.04	0.03	-0.02	0.11	0.01	-0.19*	-0.04	-0.02	0.32***	0.10	0.04	0.43***	-0.24**	-0.15+	-0.19*	-0.13	-0.27**

Note: Variable names corresponding to the numbers used above can be found in Table 1

***, **, * and + = significant at 0.1, 1, 5 and 10 per cent, respectively

Table 3. The Three-Stage Least Squares Estimation of a Simultaneous Equation Model

	EMPLOYEES ABILITY	EMPLOYEE'S MOTIVATION	TRANSFER OF KNOWLEDGE
Intercept	-0.01	-0.01	-0.01
	(-0.07)	(-0.07)	(-0.09)
Training	0.18		
	(0.07)***		
Performance appraisal	0.1		
	(0.06)+		
Promotion		0.08	
		(-0.07)	
Performance based compensation		0.21	
		(0.07)***	
Communication		0.29	
		(0.07)***	
Ability			0.91
			(-0.73)
Motivation			0.31
			(-0.44)
Ability*motivation			0.33
			(0.12)***
Controls:			
Age of subsidiary			0.03(0.12)
subsidiary size			0.07(0.12)
Share of expratiates			-0.11(0.12)
Relative size of subsidiary			-0.02(0.11)
Strategic mission			-0.11(0.14)
Cultural relatedness			0.02(0.29)
Home country dummies (4)			yes§
Host country dummies (2)			yes§
Industry dummies (5)			yes§
F-value	5.34***	18.00***	1.84*
R-square	0.06	0.25	0.22
N	167	167	167

***, **, * and + = significant at 0.1, 1, 5 and 10 per cent, respectively

§) Indicate that dummies for home country (4) and host country (2) and industries (5) are included in the model, although, the (11) parameters is not shown in the table.

Figure 1. Conceptual model.