What Explains Better the Success of Cross-border Technology Transfers in MNCs: Traditional Coordination Instruments or Modern Management Concepts?

Abstract

This paper reports on an empirical study analyzing the relative influence of (a) traditional coordination instruments (structural, technocratic, person-oriented) and (b) modern management concepts (epistemic community, absorptive capacity) on the success of forward technology transfers within MNCs. The study finds evidence that all three types of traditional coordination instruments relate to the success of such transfers. Comparing the different types of coordination instruments, the paper shows that the structural and technocratic coordination instruments relate most positively with the achievement of technology transfer goals. Whilst the absorptive-capacity concept has some positive relationship to the success of forward technology transfers, the epistemic-community concept did not relate to it. We think that these results have important implications on the foci of future (international) management research.

What Explains Better the Success of Vertical Cross-border Technology Transfers in MNCs: Traditional Coordination Instruments or Modern Management Concepts?

1. The Changing Focus of International Management Research and the Need to Test its Usefulness

Over the decades, international management scholars have conducted numerous (empirical) studies to identify factors ensuring and improving the cooperation among MNCs' subunits. Often, the publication of John Dunning's (1958) seminal book "American Investment in British Manufacturing Industry" is perceived as the starting point of this stream of research. Since then, the focus of research has changed in several dimensions. One important transition is reported in Martinez and Jarillo's (1989) review article, which found that "up to 1975, researchers concentrated their attention on structural and formal administrative tools … and starting in 1976, researchers seem to have begun to enlarge their focus including mechanisms of coordination, more informal and subtle" (p. 493). A further change is that early research was focused on the relationship between MNCs' headquarters and foreign subsidiaries (e.g., Picard 1977; Goehle 1980; Garnier 1982; Negandhi/Welge 1984; Gates/Egelhoff 1986), whilst later studies (e.g., Hedlund 1986; Bartlett/Ghoshal 1989; Ghoshal/Korine/Szulanski 1994; Malnight 1996) picked the relationships among foreign subsidiaries as their central theme.

In the current paper we want to embrace a further mutation having occurred in this field of research. Whilst most studies published prior to the mid of the 1990s were concentrated on coordination instruments which can be deliberately designed and implemented by managers (e.g., the structural integration of the subsidiaries into MNCs' formal organizational structure, the centralization and standardization of decisions, formal reporting and planning systems, cross-border transfers and visits

of managers), since the mid of the 1990s, more and more research studies have begun to focus on abstract management concepts. These later studies view less direct instrumental phenomena like the corporate culture, (sub)units' absorptive capacities (Cohen/Levinthal 1990), or epistemic communities among MNCs managers (Håkanson 2005a) to be crucial for the subunit integration within MNCs. One might explain this reorientation of research with the strong influence writings of authors like Hedlund (1986) or Bartlett and Ghoshal (1989) had on international management research, since these publications argued that knowledge (and technology) transfers *among subunits* to be crucial for MNCs. Whatever reasons might have driven the change, it is clear that, over the years, the latter view became dominant. The consequence of this change is that the literature on MNC coordination is nowadays dominated by these abstract management concepts. Such concepts distract themselves from the explicit design efforts of managers. For the managers, it is difficult to influence these concepts directly, since their development typically rests on entangled, long-lasting evolutionary processes going on within the firm.

The current paper focuses on this shift from traditional design-oriented coordination instruments to the more abstract management concepts. The paper's overarching goal is to find out which of these two groups of variables have a stronger influence on the success of the interactions among MNCs' subunits. To answer this question, the paper reports on an empirical study including both types of variables as well as data describing the success of the interaction of MNCs' subunits.

Such an explicit testing is necessary, since, in recent literature, the abstract management concepts have gained predominance although the efficacy of the more traditional, design-oriented coordination instruments was not called into question. For instance, only a few years before the rise of the abstract management concepts occured, Martinez and Jarillo (1989) argued that the designable formal and informal coordination mechanisms are fitting well to transnational or complex global strategies (p. 506). This means that, over time, the interest in the design-oriented coordination instruments has

waned without having evidence for their limited effectiveness. Or in other words: We cannot exclude a view saying that academia's move from the traditional design-oriented coordination instruments to the abstract management concepts is mainly caused by fashion-oriented forces working within the scientific system.

For our empirical analysis, we use a quite unique sample containing data on both types of variables (the design-oriented coordination instruments *and* the abstract management concepts), both of which were measured multi-dimensionally. To test the relative performance effects of these two groups of variables, we use a setting of vertical technology transfers between MNCs' home country units and foreign subsidiaries. This setting is appropriate since, as mentioned above, knowledge and technology transfers between the MNC subunits are commonly seen as being crucial for MNCs' success. Moreover, this setting is interesting since some scholars' ad-hoc intuition might assume that, if the goal is to improve an MNC's organization, the abstract management concepts are more useful than the traditional, design-oriented coordination instruments.

In the following, we will conceptualize the usefulness of the traditional, design-oriented coordination instruments and the abstract management concepts on the basis of information-processing theory. Under an information-processing perspective, the MNC is viewed as an information-processing system (Thompson 1967; Galbraith 1973; Tushman/Nadler 1978). Information processing in organizations is generally defined as including the gathering of data, the transforming of data into information, and the communication and storage of information in the organization. When this perspective is applied to this paper's topic, each of the various design-oriented coordination instruments and each abstract management concept is seen as facilitating certain types of information processing between the subunits – in this case the home country units and the foreign subsidiaries – while at the same time restricting other types of information processing (Egelhoff 1982, 1988).

Based on this view, the organization of the current paper is as follows: In the next section we will discuss the two main goals of international technology transfers considered in the current empirical study and we will outline the information-processing capacities of the design-oriented coordination instruments and the abstract management concepts considered in this study. We will do this in order to get insights and expectations with respect to the performance consequences of these two categories of variables. After this conceptual part, we will describe the study's sample and the measurement of variables. Then, we will report on the results of the data analysis, before we will discuss these findings. In the final section we will outline what the study's results mean for international management research and practice.

2. Conceptual Model and Hypothesis Development

2.1 Main Goals of Technology Transfers within MNCs

Means to manage technology transfers have to be designed and evaluated in front of the goals, which shall be reached by such transfers. In literature, there is little consensus about criteria to describe the goals of technology transfers. After all, scholars agree that research should consider multiple dimensions of transfer goals to obtain a more comprehensive understanding (Van Wijk/Jansen/Lyles 2008). Cummings and Teng (2003) distinguish between 22 items to operationalize the goals of technology transfers. Since there is a lot of overlap among these items and since this spectrum is too exhaustive for a study like the present, we guided our conceptualization by the assumption that technology transfers yield towards two broad categories of goals – (1) to improve the recipient units' current solutions and (2) to initiate further innovation and learning processes within this unit. Whilst the first goal category refers to a development of existing problem solving approaches, the second describes changes within the recipient unit which tend to be "a trip to the unknown". In the context of

the management of MNCs, this distinction is especially appropriate, since it is consistent with international management theory perceiving an ongoing improvement of efficiency and the inspiration of cross-border learning processes as main goals of MNCs (Bartlett/Ghoshal 1989).

2.2 Information-processing Capacities of Traditional Coordination Instruments and More Recent Abstract Management Concepts

In this chapter we will specify the information-processing capacities of the traditional coordination instruments and the management concepts used in more recent international management research. We will conduct this information-processing analysis (1) with respect to the different coordination instruments and management concepts considered in the subsequent empirical study and (2) to the fact that this study refers to vertical technology transfers within MNCs. First, we will refer to the traditional coordination instruments.

Many coordination instruments have been studied in international management research (for an overview see Martinez/Jarillo 1989; Wolf 1994). This abundance has led to a need to group them together in a conceptually meaningful way. The sociologist Leavitt (1964) has suggested a typology which, because of its intellectual clarity, is even nowadays quite prominent in organization theory. It distinguishes between structural, technocratic, and person-oriented coordination instruments. According to this typology, these coordination instruments (even the structural ones) do not describe an institution's basic organizational structure; instead they are instruments additionally used to improve the information-processing capacity of the basic organizational structure. The following information-processing analysis refers to Leavitt's trilogy of coordination instruments. Further, this analysis yields to hypothesize which instruments fit best to improve vertical technology transfer processes from MNCs' home-country units to the foreign subsidiaries. We will begin with the person-

oriented coordination instruments, since they are frequently seen as appropriate means to handle the transfer of technology between organizational subunits.

The constituting characteristic of *person-oriented coordination instruments* (such as informal meetings of managers, their expatriation or visits to other MNC subunits, video conferences, or manager trainings) is that they use the interaction and communication among human beings as means to align organizational subunits (Håkanson/Zander 1986). They provide open forums for problem solving. More than other coordination instruments, the person-oriented allow an exchange of social information (Daft/Lengel 1986). They have an interactive nature, are able to transfer unstructured kinds of information, and offer the chance for direct feedback. They thus allow an ad-hoc coordination and are best suited to deal with non-routine situations where a solution is not yet available and where creative attempts are required (Ring/Van de Ven 1994). Yet, since the transfer of information is little framed here, the problem might occur that the social interaction will develop in an unpredictable way. Further, in the case of person-oriented coordination instruments, it is difficult to steer the social interaction from the outside. These problems of person-oriented coordination instruments seem to be more crucial in an international business setting, where managers of different cultural backgrounds interact. For instance, research has shown that individuals' information-processing behavior depends on their cultural roots (Cattey 1980). And finally, person-oriented coordination instruments tend to be expensive, since their application typically requires a leave of managers from their standard work-processes as well as longer travelling activities. Again, because of higher geographical distances, the latter problem is even more pronounced in MNCs.

If we refer this discussion to the two categories of international technology transfer goals considered here, it has to be expected that person-oriented coordination instruments are more helpful if the goal "innovation and learning" predominates. The interactive nature of this type of coordination instruments, as well as their possibility to exchange unstructured and social kinds of information,

allow rich discussion processes as they are typical if open-ended problem-solving processes have to be mastered. Thus, although person-oriented coordination instruments should be helpful with respect to both kinds of technology-transfer goals, we formulate the following hypothesis:

Hypothesis 1: *In MNCs' vertical technology transfers, the positive relationship between the intensity of the use of person-oriented coordination instruments and the achievement of the goal "innovation and learning" is stronger than the positive relationship between the intensity of the use of person-oriented coordination instruments and the achievement of the goal "improvement of existing solutions".*

In the case of *technocratic coordination instruments* (such as guidelines, standards, or rules), interpersonal interactions are replaced by a "managerial technology". By doing so, technocratic instruments help to reduce the need of direct information exchange among individuals, since here decision situations are disposed a prioi (Mascarenhas 1984). If, for instance, in a technology transfer, standards and rules are applied, the decision-makers can use them as anchor points to classify and evaluate upcoming situations. Thus, technocratic coordination instruments – which are relatively cheap (Tushman/Nadler 1978) – help to reduce the information-processing requirements. Yet, in comparison to the category mentioned before, technocratic instruments' richness of information processing is significantly lower (Daft/Lengel 1986) and they reduce the leeway in decision-making. In literature, there is consensus that technocratic coordination instruments work best if problems reiterate and when decision situations are not very various and uncertain (Khandwalla 1973).

If the primary goal of international technology transfers is to improve the foreign subsidiary's innovation and learning ability, there is more variety and uncertainty than in international technology transfers yielding towards an improvement of existing products, processes, or performance levels. This is because in the latter case, the transfer process can refer to the status quo existing within the foreign

subsidiary. Here, it is possible to work with rules and standards defined on the basis of the existing. On the other hand, in cases where innovation and learning prevails, new horizons have to be opened and therefore existing frames of references are less valid. Thus, we expect:

Hypothesis 2: *In MNCs' vertical technology transfers, the positive relationship between the intensity of the use of technocratic coordination instruments and the achievement of the goal "improvement of existing solutions" is stronger than the positive relationship between the intensity of the use of technocratic coordination instruments and the achievement of the goal "innovation and learning".*

Typical characteristics of *structural coordination instruments* (e.g. regularly held meetings or permanent teams) are a planned occurrence as well as an institutionalization to organs. Under such a coordination regime, the responsibilities and communication patterns among the participating managers are deliberately designed. Within structural coordination instruments, interactions typically focus on fixed topics (Hulbert/Brandt 1980) which makes them less spontaneous than person-oriented coordination instruments. If applied in the context of technology transfers, structural coordination instruments are labelled with names like "Technical Executives Board" (Håkanson/Zander 1986). Structural coordination instruments are typically used to discuss adaptations to changed contextual conditions or approaches to meet time schedules.

With respect to information processing, structural coordination instruments improve the information flow between organizational subunits. Yet, since the information transfers typically follow a formal agenda, this occurs within a framed setting. This creates the rigid character of such instruments and limits the richness of information processing. In earlier times, it was quite difficult to use structural coordination instruments in an international setting, since they required frequent travelling activities of the members of these institutionalized groups. Nowadays, in times of technological media enriching

the distance communication among individuals, this problem is less critical. Yet, structural coordination instruments' formal character might restrict their usefulness if innovative questions have to be discussed, since institutionalization is contradictory to the need to be flexible. We formulate:

Hypothesis 3: *In MNCs' vertical technology transfers, the positive relationship between the intensity of the use of structural coordination instruments and the achievement of the goal "improvement of existing solutions" is stronger than the positive relationship between the intensity of the use of technocratic coordination instruments and the achievement of the goal "innovation and learning".*

As mentioned above, more recent organization theory has dealt less with designable coordination instruments and accentuated abstract management concepts as main success factors of subunit interaction. This shift is also existing in the more focused research field of (international) technology transfer within and between firms (e. g., Szulanski 1996; Gupta/Govindarajan 2000).

There can be no doubt that the concept of *absorptive capacity* (Cohen/Levinthal 1990) is among these newer potential predictors of technology transfers' success. This concept is considered in manifold types of research projects, referring to both intra- and interorganizational technology and knowledge transfers (Lyles/Salk 1996; Lane/Lubatkin 1998; Gupta/Govindarajan 2000; Tsai 2001; Minbaeva 2003). Absorptive capacity describes "the ability of a firm to recognize the value of new information, assimilate it, and apply it to commercial ends" (Cohen/Levinthal 1990, p. 128). Based on findings of human brain research, it is argued that a firm's ability to internalize and use knowledge is dependent upon the knowledge stock already existing within the firm. If the content of incoming knowledge corresponds with knowledge already existing in the recipient unit, then there are good chances that the transfer will succeed. For a firm, knowledge absorption is most effective, if it can be related to knowledge already existing in it (Cohen/Levinthal 1990). Moreover, it is helpful if employees know

where the firm-specific knowledge resides within the firm. „This sort of knowledge can be knowledge of who knows what, who can help with what problem, or who can exploit new knowledge (Cohen/Levinthal 1990, S. 133).

Given these characteristics, it is not surprising that the absorptive capacity concept is frequently referred to inter- and intraorganizational technology transfers. Indeed, there will be only few cases where transferred technology can be used in a free-standing manner within the recipient unit (Connell/Klein/Powell 2003). Following the absorptive-capacity concept, technology transfers will succeed, if the recipient of a transferred technology has reflected the technical and organizational-social interdependencies of this technology (Martin/Salomon 2003).

Seen through the lens of information-processing theory, it becomes clear that the absorptive capacity concept does not exactly specify the channels along which the technology-oriented information flows within the recipient unit. This is an important difference vis-à-vis the traditional coordination instruments mentioned above. For instance, if the structural coordination instrument "regularly held meetings" is used, then typically it is decided which MNC managers can participate in the arena where the technology transfer is discussed. If the technocratic instrument "formal reporting system" is applied, there is an a-priori definition of variables considered in the report. Or if an MNC works with the person-oriented instrument "manager transfers" for technology transfer reasons, then it is specified who in the organization will serve as intellectual bridge between the sending and recipient unit. Unlike this, in the case of absorptive capacity, the information channels are much less clearly specified. If a firm has a high level of absorptive capacity, then this is a general reservoir the firm can use if a concrete transfer process has to be mastered. It serves more as a fertile soil on which a successful technology transfer can grow. We think that, for technology transfers, this difference between the traditional coordination instruments and the absorptive capacity concept is more relevant than it is for more general knowledge transfers within firms, since the former typically consists of more specified

forms of adaptations. Because of this conceptual difference between traditional coordination instruments and the absorptive capacity concept, it has to be expected that the link between foreign subsidiaries' absorptive capacity and the achievement of the goals of technology transfers is less clear and strong. Yet, since the transfer goal "improvement of existing solutions" corresponds with absorptive capacity's view that the knowledge stock already existing within the firm is important for knowledge transfers, we expect:

Hypothesis 4: *In MNCs' vertical technology transfers, the relationship between foreign subsidiaries' absorptive capacity and the achievement of the goal "improvement of existing solutions" is stronger than the relationship between foreign subsidiaries' absorptive capacity and the achievement of the goal "innovation and learning".*

A second factor frequently used in more recent research to explain the success of technology transfers is the existence of an *epistemic community* between the sender and the recipient of the technology. The term "epistemic communities" designates "those knowledge-oriented work communities in which cultural standards and social arrangements interpenetrate around a primary commitment to epistemic criteria in knowledge production and application" (Holzner/Marks 1979, p. 108). It is important to notice that an epistemic community – which consists at least of two persons – is more than a mere membership of a person in a group, team, or network (Haas 1992). Instead, the constituting characteristic of an epistemic community is the existence of a cognitive coupling among the persons belonging to it.

It has been argued that codes, theories, and tools are important for the development of such a strong cognitive coupling between individuals (Håkanson 2005b). These dimensions are crucial for the strength of an epistemic community. If people use a joint *coding* scheme, they have a common vocabulary and this increases the likelihood that information is correctly transmitted between the

community members. Then, the latter interprets the information in a way consistent with the sender's intention. The component "*theories*" means that the community members are sufficiently homogeneous with respect to their values. If this is true, the community disposes of a common culture which the members can use as a joint cognitive map and interpretation scheme. This alleviates information-processing since symbols and other "informational shortcuts" can be applied in the communication processes. *Tools and practices* are artefacts serving as boundary objects to demarcate the epistemic community against other communities. This helps the community to focus its information processing and to shield disturbing influences (Håkanson 2005b). Because of the community members' use of codes, theories, and tools, a shared understanding can develop, which in turn influences the community's practices as well as the members' views on themselves (Brown/Duguid 1991).

It is obvious that the epistemic community concept offers a systemic view on technology transfer processes within MNCs (Tiessen 1999). If the sender and the recipient of a transferred technology belong to the same epistemic community then this will ease the transfer processes (Håkanson 2005a). In such a case, for them it is easier to evaluate the relevance and importance of the transferred technology correctly. This leads to higher levels of effectiveness. But the joint use of codes, theories, and tools also improves the efficiency of the transfers, since complicated explanations can be saved (Tushman/Scanlan 1981). And finally, there also might be a reverse relationship from technology transfers to epistemic communities: If a unit offers a valuable and useful technological component, this increases the likelihood that the unit will become a member of an existing epistemic community so that in the future it can get access to the other community members' technologies (Schrader 1991).

The previous line of reasoning leads to the assumption that a joint membership of the sender and the recipient of a technology in an epistemic community facilitates the transfer of this technology. But, on the other hand, it has to be considered that in a multinational context the development of an epistemic

community is more difficult than in a domestic setting. Especially the cultural, geographic, and institutional distances between the home and the host countries, as well as the institutional fragmentation of the MNC into legally autonomous subunits, make it more difficult to develop cross-border epistemic communities (Wolf/Egelhoff 2010). Indeed, it has been shown that a relatively high *cultural distance* between home and host countries leads to differences in what employees of different locations expect from their work and firm (Kabanoff 1997) and this can hinder the development of social cohesion within an epistemic community. Since MNCs employ people from different countries, different levels of commitment coexist within their work forces, reducing chances for the development of strong epistemic communities within the firm. With respect to *geographic distance*, it has to be argued that strong epistemic communities necessitate extensive travel and transfer of managers between MNCs' subunits. Since MNCs' subunits are on average geographically more dispersed than those of non-international firms, such epistemic-community-building activities tend to be more expensive and complicated in MNCs (Taylor/Levy/Boyacigiller/Beechler 2008). The *institutional fragmentation* of the MNC into legally autonomous subunits leads to the fact that their subsidiaries located in different institutional settings face dual pressures: They do not only face an imperative for consistency within the firm, but are also pulled to achieve isomorphism with the host-country environment (Kostova/Roth 2002). Research by European sociologists (e.g., Morgan/Kristensen/Whitley 2001; Geppert/Matten/Walgenbach 2006) studying the decisions and actions of MNCs showed that subsidiary managers tend to adapt their business decisions and actions to the dominant social expectations of the business system in which the subsidiary is embedded. Given the simultaneous existence of these three kinds of heterogeneity (cultural, geographic, and institutional) within MNCs, it has to be expected that they face greater difficulty than non-international firms in creating and maintaining strong epistemic communities. To build such epistemic communities overarching MNC subunits located in different countries seems to be more difficult than developing a sufficiently strong level of absorptive capacity in the unit receiving technology from abroad, since for the latter distance arguments are less important. Thus, we expect:

Hypothesis 5: *The relationship between the strength of an epistemic community and the achievement of the two technology transfer goals is weaker than the relationship between the recipient unit's absorptive capacity and the two technology transfer goals.*

3. Method

3.1 Sample

The current empirical research focuses on technology transfers from MNCs' headquarters to their foreign subsidiaries (= forward technology transfers). Although reverse technology transfers from MNCs' foreign subsidiaries to the headquarters (e.g., Frost/Zhou 2005) as well as among foreign subsidiaries (e.g., Persson 2006) have gained importance during the last decades, in most MNCs the home country R&D units are still important and probably still the most important internal spenders of technology. Thus, as in earlier times, forward technology transfers continue to be extremely important for MNCs. Since large firms are pioneers with respect to systematically transferring technology between firm subunits located in different countries, this study focuses on large firms. The population of our research is Germany's top 500 firms as they were published in the newspaper "Die Welt" in the year 2005. We used the internet platform "XING" to identify employees working in these firms. We contacted these persons via email, since they could serve as contact persons within these firms. Indeed, these persons acted as informants to get access to the names and the contact data of managers involved in the respective firm's technology transfer projects from the headquarters to the subsidiaries. The latter persons were the target group to which the study's questionnaire was emailed to. The questionnaire was designed in scholarly research seminars which were conducted after ten narrative interviews with MNC managers responsible for intra-company technology transfers.

Data collection was conducted between September 2006 and June 2007. Altogether, the questionnaire has been sent to 872 managers. 436 managers did not answer and 112 responded that they do not want to participate. The remaining 324 said that they would participate in the study, but de facto 69 did not. 255 managers filled out the questionnaire. Yet, 59 questionnaires had to be taken out of the sample since they included too many missing values. So, 196 questionnaires were available. This is a response rate of 22.48 per cent.

It has to be considered that our questionnaire allowed the respondents to answer the questions with respect to forward and/or reverse technology transfers. Thus, our overall data base contains information on forward as well as on reverse technology transfers. Since 121 respondents filled out the questionnaire with respect to forward technology transfers, 31 exclusively with respect to reverse technology transfers, and 44 with respect to both kinds of technology transfers, data on 165 (=121 plus 44) forward technology transfers is available. The data on these 165 forward technology transfers is the empirical basis of the current research. Since in three of the 165 cases the MNC was extremely small (200 or less employees) and since in one case the recipient foreign subsidiary was very small (only 5 employees), these cases were excluded from the data base. Therefore, the data base of the current study consists of data on 161 forward technology transfers.

Since technology transfer projects are unique in many dimensions (e.g., characteristics of the transferred technology or relationship between the sending and the receiving unit), the current study's unit of analysis is the *individual* technology transfer *project*. Yet, although the current study is conducted at the project level, there can be no doubt that the development and success of such transfers are dependent upon characteristics of the organizational units involved in this transfer. Thus, in the current research we also collected data on factors describing the sender and the recipient of the technology as well as the MNC in general.

3.2 Measurement and Data

As mentioned above, the current study considers (1) the strength of the epistemic community between headquarters managers and foreign subsidiary managers, (2) the respective foreign subsidiary's absorptive capacity, and the intensity of the use of (3) structural, (4) technocratic, and (5) person-oriented coordination instruments as potential predictors of the success of technology transfers. In the following, we will describe the measurement of these variables.

Epistemic community: Since, when the empirical part of the project was conducted, a valid and reliable operationalization of this construct did not exist in the literature, based on related research (Cummings/Teng 2003; Håkanson 2007), we developed a new scale with five items mentioned in the Appendix. Unfortunately, Cronbach's alpha of this scale is low ($\alpha = 0.570$).

Absorptive capacity: The operationalization of this construct included both the potential absorptive capacity and the realized absorptive capacity (Zahra/George 2002) of the foreign subsidiary receiving the technology. Whilst the former describes a unit's capability to identify and acquire externally generated knowledge, the latter reflects its "capacity to leverage the knowledge that has been absorbed" (Zahra/George 2002, p. 190). The development of items to measure these two aspects was guided by Jansen, Van den Bosch and Volberda's (2005) work. Altogether, thirteen items were used in order to measure the two kinds of absorptive capacity. Cronbach's alpha for the scale "potential absorptive capacity" is 0.665, those for the scale "realized absorptive capacity" is 0.683.

Structural, technocratic, and person-oriented coordination instruments: With respect to the coordination instruments, the problem arises that, in literature, so many and different kinds of

coordination instruments are suggested. Given this heterogeneity, we conducted a detailed literature review in order to identify and group coordination instruments belonging to the three main categories of coordination instruments. Based on this review, we considered *"regularly held meetings"* and *"permanent teams"* as structural coordination instruments. *"Rules and procedures"* and *"formal reporting systems"* were considered as technocratic coordination instruments. And *"informal meetings of headquarters and subsidiary members"*, *"expatriation of headquarters or subsidiary members to the other unit"*, *"visits of headquarters or subsidiary members to the other unit"*, *"video conferences of headquarters and subsidiary members"*, and *"trainings of headquarters or subsidiary members"* were considered as person-oriented coordination instruments. Using a five-point answering format, respondents were asked to specify in which intensity they were using each of these nine coordination instruments during the technology transfer project they reported on.

More detailed information on the measurement of these five conceptualized predictors (epistemic community, absorptive capacity, structural coordination instruments, technocratic coordination instruments, and person-oriented instruments) of the success of technology transfers is presented in the Appendix.

Success of technology transfers: As mentioned above, two aspects were considered: To which degree the transfer goal "improvement of existing solutions" was achieved, and to which degree the transfer goal "innovation and learning" was achieved. Each of these two aspects was operationalized with two items (see Appendix).

Control variables: Altogether eight control variables (size of the MNC, size of the recipient foreign subsidiary, the origin of this foreign subsidiary, its strategic role, the difficulty of the transferred technology, and the geographic and cultural distances between the home country and the subsidiary's country) were used to check the robustness of the empirical relationships between the conceptualized

variables and the success variables. We selected such control variables which, in previous literature (e.g., Frost 1998; Minbaeva 2007), were considered as factors being relevant for (international) technology transfers and thus potentially might influence the relationships between the conceptualized variables and the success of forward technology transfers in MNCs. Here, we want to mention the variable "difficulty of transferred technology", since this is an integrative variable including the articulability, codifiability, observability, and complexity of the transferred technology. Each of these four dimensions, rooting in the work of Kogut and Zander (1993), Simonin (1999), and Håkanson and Nobel (2000), was measured with several items. The Cronbach's alphas of these scales (see the Appendix for their content) are quite high. The resulting variable "difficulty of transferred technology" is the sum of the average values of these four aspects (the first three dimensions were reverse calculated; i.e. a difficult technology is *not* articulable, *not* codifiable, *not* observable, and complex). A relatively high overall value (e.g., -0.10) indicates a difficult technology, a relatively low value (e.g. -3.05) indicates a simple technology.

Table 1 shows the minimal values, maximal values, means, standard deviations, and correlations among these altogether 16 variables.

(Insert Table 1 about here)

While some correlations are significant, the levels are sufficiently low that each predictor variable can be viewed as representing a different (contextual) aspect of the technology transfer project. The correlation between the two dependent variables "transfer goal: 'improvement of existing solutions'" and "transfer goal: 'innovation and learning'" is so low (r=0.415) that these two seem to mirror different aspects of the success of technology transfers.

3.3 Analyses

When all of the measured variables used in the study are entered in a factor analysis, no dominant factor emerges. Thus, there is no evidence of any common methods variance. Ordinary least squares regressions were used to test the hypothesis. First, each dependent variable was regressed on the control variables (Model 1). Then, in a serial process, the conceptualized variables were added (Models 2 to 5 and 8). The Models 6 and 7 present the regression analyses solely considering the conceptualized variables.

4. Results

The *first hypothesis* expected that the positive relationship between the intensity of the use of person-oriented coordination instruments and the achievement of the goal "innovation and learning" is stronger than the positive relationship between the intensity of the use of these coordination instruments and the achievement of the goal "improvement of existing solutions". Table 2 presents the results referring to this statement. A comparison of the upper and middle parts of this table shows that hypothesis 1 is not confirmed. Yet, as implicitly expected in this hypothesis, the person-oriented coordination instruments have a strong positive and significant relationship to the transfer goal "innovation and learning" (beta=0.234; significant at the 4 per mill level), but these coordination instruments are also strongly linked with the other transfer goal. This means that, according these results, the person-oriented instruments are helpful with respect to both kinds of transfer goals.

Hypothesis 2 stated that the technocratic coordination instruments have a stronger influence on the transfer goal "improvement of existing solutions" than on the transfer goal "innovation and learning". As can be seen from Table 2, this difference exists indeed. Whilst there is a strong and significant

relationship between the technocratic coordination instruments and the transfer goal "improvement of existing solutions" (beta=0.270; significant at the 0 per mill level), there is no significant relationship to the transfer goal "innovation and learning".

According *hypothesis 3*, the use of the structural coordination instruments operates similar to the use of technocratic instruments: Comparable to the previous hypothesis, we expected that there is a positive and significant relationship to the transfer goal "improvement of existing goals". Whilst this is true at the 7 per cent-level (beta = 0.139), astonishingly an intensive use of the structural coordination instruments is also helpful with respect to the transfer goal "innovation and learning". This relationship is even stronger (beta = 0.185; significant at the 3 per cent-level). We will have to discuss this surprising finding in the discussion section, too.

With *hypothesis 4* we expected that a high level of foreign subsidiaries' absorptive capacity mainly helps to reach the transfer goal "improvement of existing solutions". Unfortunately, this hypothesis is not confirmed, although there is the expected positive sign between this absorptive capacity and the transfer goal "improvement of existing solutions". But this relationship is not very strong and only of a moderate level of significance (beta = 0.148; significant at the 8 per cent-level). Furthermore, the difference with respect to absorptive capacity's influence on the other transfer goal is small. But at least, it can be said that hypothesis 4 is more confirmed when the coordination instruments are not taken into account.

Hypothesis 5 is fully supported. As expected, the relationship between the strength of an epistemic community and the achievement of the two technology transfer goals is weaker than the relationship between the recipient unit's absorptive capacity and the two technology transfer goals.

It is important to notice that these empirical results are astonishingly robust. They remain intact independent from including or excluding the eight control variables.

Finally, if we compare the results referring to the modern abstract management concepts with those referring to the traditional coordination instruments, it becomes obvious that the latter have a much stronger relationship to the two transfer goals. This difference exists with respect to both components of the transfer goals (i.e., the transfer goal "improvement of existing solutions" and the transfer goal "innovation and learning"). But it also exists if we integrate these two goal dimensions into one (see the lower part of Table 2).

5. Discussion

In the following, we want to discuss some findings which we have not expected in advance. We want to focus on the following two:

1. We did not expect that an intensive use of the structural coordination instruments supports the achievement of the transfer goal "innovation and learning".
2. And we did not expect that the traditional coordination instruments have more power than the newer management concepts to explain the success of vertical technology transfers in MNCs.

Ad 1: If we want to understand the importance of structural coordination instruments (regularly held meetings; permanent teams) with respect to ensure innovation and learning in technology transfer processes, it is important to notice that structural coordination instruments establish relatively stable and reliable forums for managerial co-operation within the firm. They support the development of time-stable patterns of interpersonal interactions. If structural coordination instruments are used,

technology-specific information can flow along these well-established lines of communication. This can be guaranteed much less by a use of person-oriented coordination instruments. In the latter case, frequently there is a change in the composition of the interaction partners. One might argue that manager transfers can also help to create such reliable patterns, since the expatriate's position at his/her foreign workplace and thus the spectrum of his/her interaction-partners are clearly specified. But in the case of other person-oriented instruments (e.g., visits or video conferences) it is less clear who will interact with whom.

This view for a need of structural coordination is consistent with organization theory's insight that formally established teams are helpful, when extensive and complex tasks have to be mastered (Galbraith 1973). Typically, innovation projects are of such an extensive and complex nature. In regularly held meetings and formally established teams, the team members are carefully selected to ensure that complementing personal qualifications and capabilities come together. Thus, it is not astonishing that research has shown that permanent teams play a crucial role in new product development processes (Hoegl/Parboteeah 2003). One might argue that in MNCs a deliberate and more permanent design of the composition of teams and meetings' attendants is even more important, because this might help that the representatives of geographically, culturally, and institutionally distant subsidiaries will be carefully introduced in the network of MNC managers.

Ad 2: We were also surprised that the traditional coordination instruments are in a closer empirical relationship with the success of vertical technology transfers than the more recent abstract management concepts. If we want to understand this finding we have to consider that it is possible for managers to design the traditional coordination instruments deliberately yielding to the needs of the respective technology transfer project. If, for instance, problems arise in a technology transfer project, managers can establish a task force to solve these problems, they can visit the respective unit, they can expatriate personnel etc. On the contrary, the development of an epistemic community within the firm

or the improvement of a subsidiary's absorptive capacity is much more time-consuming and of a much more general nature. Consequently, these concepts cannot be spontaneously applied if a transfer problem has stalled. As mentioned above, these management concepts provide more a conceptual background helping to support technology transfers indirectly. By saying this, we do not want to debase the importance of the abstract management concepts; we only want to express that it is quite difficult to specifically use them with respect to concrete transfer projects.

6. Summary and Conclusions

The current research has analyzed the relative influence of (a) traditional coordination instruments (structural, technocratic, person-oriented) and (b) modern management concepts (epistemic community, absorptive capacity) on the success of forward technology transfers within MNCs. The study found evidence that all three types of traditional coordination instruments relate to the success of such transfers. Comparing the different types of coordination instruments, the paper shows that the structural and technocratic coordination instruments relate most positively with the achievement of technology transfer goals. Whilst the absorptive-capacity concept has some positive relationship to the success of forward technology transfers, the epistemic-community concept is empirically not linked with it.

Given these findings, we think that, in the last decades, research went too far in shifting its focus of interest from the traditional coordination instruments to the modern management concepts. Thus, future research should again include more the manageable coordination instruments. Such a re-orientation would have several advantages: First, it would go back to variables being important drivers of success. Too often during the last years, these variables have been lost from researchers' radar screens without having strong reasons to do so. Second, such a research, since it focuses on

manageable variables ("design variables"), would be more instrumentally helpful for managers than research being mainly oriented towards the conceptual side of management. And third, one might argue that empirical research dealing with such design-oriented variables is less prone to a common methods bias. This is because the coordination instruments are conceptually less close than constructs like "epistemic community" and "absorptive capacity" to the outcome variables of managerial action. One might argue that in some cases where the abstract management concepts are studied, the conceptual proximity between the explaining and the explained variable is so high that a tautology of the statements is not very far away. In contrast, for respondents delivering empirical data on the coordination instruments, it is less possible to develop a "private theory" on plausible or socially expected relationships between these coordination instruments on the one hand and the outcome variables on the other.

Of course, like other papers, the current is not free of any limitations. The following might be dealt with in future research projects. First, one might argue that the paper's two unexpected results will have to be explored and tested in future research, since they were not conceptualized in advance. Furthermore, one might argue that the insignificance of the epistemic-community concept in the current paper is related with the problems we had to measure this construct reliably. Thus, future research should develop methods to measure this concept (although we think that our method of measuring epistemic community is at least valid).

Some might argue that there is a causal relationship between the coordination instruments on the one hand and the management concepts on the other. If, for instance, the headquarters develop specific rules and procedures to be applied in the technology transfer processes, if a foreign subsidiary reports over a longer time to the headquarters based on a specifically structured formal reporting system, or if managers are frequently transferred from and to this foreign subsidiary, this will intensify the information transfer between these two units and in turn this, over time, will strengthen the epistemic

community existing between headquarters' and the foreign subsidiary's managers. Indeed, many relationships between management tools and abstract management concepts can be developed (Jansen/Van den Bosch/Volberda 2005). Based on such thoughts it could be argued that structural equation modelling would be an appropriate means to statistically treat the current field since then the whole causal texture could be captured. But, on the other hand, at least in the data set underlying the current study, there are quite weak and inconsistent intercorrelations between coordination instruments on the one hand and the abstract management concepts on the other (see Table 1), so that it is not very likely that in the current sample such processes have worked.

And finally, future research could introduce some contingency variables moderating the relationships discussed here. Indeed, it is possible to conceptualize different situations, where different ways of management might be helpful in MNCs' forward technology transfers. In the present paper, we have abstained from doing so, since it was the goal of the paper to conduct a general comparison of the usefulness of these two kinds of potential drivers of technology transfers' success.

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Appendix: Measurement of Variables

1. The scale to measure the concept "Epistemic Community" contained the following five items ((R) = reverse coded): "Employees of our subsidiary have the necessary know how to understand and to use the transferred knowledge."; "Employees of our headquarters understand how employees of our subsidiary want to use the transferred knowledge."; "Differences in the knowledge bases between employees of our subsidiary and employees of our headquarters make discussions difficult. (R); "Understanding problems between employees of our subsidiary and employees of our headquarters exist because of language deficits. (R)"; "The language used in daily work operations of our subsidiary is different to the language used in our headquarters." (R). Cronbach's alpha of this scale is 0,570.

2. Altogether 13 items were used to operationalize the variable "Absorptive Capacity". To measure the recipient subsidiary's potential absorptive capacity, we used the items: "Employees of our subsidiary collect industry information through informal ways (e.g. business lunch with colleagues, talking to business partners)."; "Employees of our subsidiary regularly organize appointments with customers or other parties to acquire new knowledge."; "Employees of our subsidiary regularly consult experts to acquire new information."; "Employees of our subsidiary only slowly recognize changes in the host market." (R); "Employees of our subsidiary recognize very fast new opportunities to support customers."; "Employees of our subsidiary analyze and interpret changes of market demands very fast."; To measure the recipient subsidiary's realized absorptive capacity, we used the items: "Employees of our subsidiary recognize the benefit of new knowledge related to existing knowledge very fast."; "New acquired external knowledge is documented by employees of our

subsidiary and saved for future use."; "Employees of our subsidiary only slowly seize opportunities resulting from newly acquired external knowledge." (R); "Employees of our subsidiary often meet to discuss consequences of changing of market needs and new product development."; "Complaints of customers fall on deaf ears by employees of our subsidiary." (R); "Employees of our subsidiary do permanently think about exploiting knowledge in a better way."; "Employees of our subsidiary have a common language regarding the products and services of our subsidiary." Cronbach's alpha is 0,665 for the potential absorptive capacity and 0,683 for the realized absorptive capacity.

3. Based on a literature review, "regularly held meetings" and "permanent teams" were considered as "Structural Coordination Instruments". Using a five-point answering format, respondents were asked in which intensity they were using the respective coordination instruments during the considered technology transfer.

4. Based on a literature review, "rules and procedures" and "formal reporting systems" were considered as "Technocratic Coordination Instruments". Using a five-point answering format, respondents were asked in which intensity they were using the respective coordination instruments during the considered technology transfer.

5. Based on a literature review, "informal meetings of headquarters and subsidiary members", "expatriation of headquarters or subsidiary members to the other unit", "visits of headquarters or subsidiary members to the other unit", "video conferences of headquarters and subsidiary members", and "trainings of headquarters or subsidiary members" were considered as "Person-oriented Coordination Instruments". Using a five-point answering format, respondents were asked in which intensity they were using the respective coordination instruments during the considered technology transfer.

   The respondents' answers along these altogether nine coordination instruments (two structural, two technocratic, and five person-oriented) were factor analyzed (principal component analysis, varimax rotation). Applying the Kaiser criterion (eigenwert > 1), three factors appeared. Since factor 1 strongly corresponds with the technocratic coordination instruments, factor 2 strongly corresponds with the person-oriented coordination instruments, and factor 3 strongly corresponds with the structural coordination instruments, in the subsequent data analysis, these factors were used as indicator variables for the three classes of coordination instruments.

6. The variable "Size of MNC" was measured by its number of employees.

7. The variable "Size of Foreign Subsidiary" was measured by its number of employees.

8. In order to measure the origin of the recipient foreign subsidiary (the variable "Foreign Subsidiary: Acquisition or Greenfield"), respondents were asked if this subsidiary has been founded by the multinational corporation or acquired by the multinational corporation (0=acquisition; 1=greenfield).

9. The measurement of the two considered foreign subsidiary roles (global innovator and implementer) was based on Gupta and Govindarajan's (1991) work. According to them, the intensity of knowledge flows to and from the respective subsidiary defines this unit's role. Thus, with respect to seven functional areas (procurement, production, marketing and sales, R&D, logistics, finance, information technology), respondents were asked to answer to which degree the following statements are true: "Our subsidiary sends a significant amount of knowledge and skills of the following functional areas to the headquarters and other peer

subsidiaries of our MNC" and "Our subsidiary receives a significant amount of knowledge and skills of the following functional areas from the headquarters and other peer subsidiaries of our MNC". For each the two dimensions (knowledge outflow, knowledge inflow), a median split was calculated. A subsidiary was labelled "global innovator", if it had high knowledge outflows and low knowledge inflows. A subsidiary was labelled "implementer", if it had low knowledge outflows and high knowledge inflows. These two types of subsidiary roles were considered, since they are the opposite types in Gupta and Govindarajan's typology.

10. The variable "Difficulty of Transferred Technology" is a variable integrating the articulability, codifiability, observability, and complexity of the transferred technology. To measure the dimension "articulability", respondents had to evaluate to which degree the following statements are true: "Employees, who know the transferred technology very well, can easily explain/speak about this technology."; "Employees, who know the transferred technology very well, can easily conceptualize a training session about the transferred technology." Cronbach's alpha of this scale is 0,717. To measure the dimension "codifiability", respondents had to answer the following statements: "It is possible to document the transferred technology in a written form."; "It is possible to write a handbook that describes the handling of the transferred technology." Cronbach's alpha of this scale is 0,815. To measure the dimension "observability", respondents had to answer the following statements: "New employees/competitors can learn the transferred technology, by observing personnel who know the transferred technology very well."; "New employees/competitors can learn the transferred technology, if they participate in a guided tour through the functional department in which the transferred technology is used."; "New employees/competitors can learn the transferred technology, if they analyse the working materials (e.g. machines, computers); "New employees/competitors can learn the transferred technology, if they carefully analyse a process or a product that depends on the transferred technology."; "New employees/competitors can learn the transferred technology, if they test the use of the technology." Cronbach's alpha of this scale is 0,671. To measure the dimension "complexity", respondents had to answer the following statements: "The transferred technology is based on a larger number of different partial processes."; "Between the different partial processes exist several interdependencies."; "These interdependencies between the partial processes differ in contents." Cronbach's alpha of this scale is 0,875. The resulting variable "Difficulty of Transferred Technology" is the sum of average values of these four dimensions (the first three dimensions were reverse calculated; i.e. a difficult technology is not articulable, not codifiable, not observable, and complex). A relatively high value (e.g. -0,10) indicates a difficult technology, a relatively low value (e.g. -3,05) indicates a simple technology.

11. The variable "Geographic Distance" was measured as the kilometric distance between (1) the capital of the country, where the MNC is headquartered, and the capital of the country, where the foreign subsidiary is located.

12. The variable "Cultural Distance" was measured with the Kogut-Singh index (1988) based on Hofstede's (1980, 1991) data.

13. To measure the variable "Transfer Goal 'Improvement of Existing Solutions'", respondents were asked to which the following statements are true: "The transferred technology has caused a clear improvement of products and/or processes in the recipient subsidiary." and "The transferred technology has caused an increase of the subsidiary's performance."

14. To measure the variable "Transfer Goal 'Innovation and Learning'", respondents were asked to which the following statements are true: "The transferred technology has caused/will cause further innovation processes in the recipient subsidiary." and "During the technology transfer

learning effects occurred which could be used for future transfers."

15. The variable "Both Transfer Goals Together" is the sum of the values of two variables "Transfer Goal 'Improvement of Existing Solutions'" and "Transfer Goal 'Innovation and Learning'".

Table 1: Intercorrelations of Variables

	Variable Name	Min	Max	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Control Variables																				
1	Size MNC	600,00	475000,00	65559,55	102395,82	1															
2	Size Foreign Subsidiary	10,00	50000,00	2145,05	5259,92	,303**	1														
3	Foreign Subsidiary: Acquisition (0) or Greenfield (1)	0,00	1,00	0,65	0,46	,041	-,085	1													
4	Foreign Subsidiary Role: Global Innovator	7,00	35,00	17,47	5,46	-,205**	,010	-,092	1												
5	Foreign Subsidiary Role: Implementor	12,00	35,00	23,32	4,57	-,108	,068	,085	,233**	1											
6	Difficulty of Transferred Technology	-3,05	-,10	-1,58	0,51	,052	-,036	-,062	-,206**	-,073	1										
7	Geographic Distance	160,00	16060,00	5353,98	3211,67	-,011	,046	,174*	-,095	,153	,033	1									
8	Cultural Distance	,03	4,71	1,74	1,20	-,040	-,099	,337**	-,225**	,048	-,009	,226**	1								
	Conceptualized Variables																				
9	Epistemic Community	6,00	24,00	14,67	3,28	,021	,027	,066	,286**	,051	-,345**	-,049	-,210**	1							
10	Absorptive Capacity	14,00	30,00	23,31	3,05	-,157*	-,055	,010	,302**	,100	-,089	,010	-,022	,353**	1						
11	Structural Coordination Instruments	-2,92	2,14	0,06	0,99	,107	,118	-,083	,147	,150	,088	-,064	-,089	,055	,068	1					
12	Technocratic Coordination Instruments	-2,71	2,03	0,06	0,97	,047	,009	,139	,112	,061	-,071	-,055	,134	,049	,240**	-,025	1				
13	Person-oriented Coordination Instruments	-3,15	2,27	0,06	0,98	,019	-,047	,137	-,156*	,039	,121	,082	,135	-,211**	,045	,015	,035	1			
	Dependent Variables																				
14	Both Transfer Goals Together	1,75	5,00	4,08	0,66	,043	,095	,110	-,084	,090	-,043	,039	,169*	,042	,225**	,180*	,265**	,306**	1		
15	Transfer Goal "Improvement of Existing Solutions"	1,00	5,00	4,10	0,83	,014	,072	,108	-,119	,147	,003	,040	,206**	,037	,212**	,133	,314**	,269**	,864**	1	
16	Transfer Goal "Innovation	1,50	5,00	4,07	0,73	,061	,089	,075	-,015	-,006	-,082	,025	,070	,033	,165*	,173*	,120	,244**	,817**	,415**	1

**: The correlation is significant at 0.01 (two-tailed).

*: The correlation is significant at 0.05 (two-tailed).

Table 2: Regression Models: Dependent Variable: Transfer Goal "Improvement of Existing Solutions"

Variable	ModelA1	ModelA2	ModelA3	ModelA4	ModelA5	ModelA6	ModelA7	ModelA8
Control Variables								
Size MNC	-,015	-,023	,008	,005	-,060			-,049
Size Foreign Subsidiary	,090	,092	,098	,098	,084			,091
Foreign Subsidiary: Acquisition or Greenfield	,039	,024	,033	,030	-,007			-,020
Foreign Subsidiary Role: Global Innovator	-,122	-,147 10%	-,198 3%	-,202 3%	-,163 5%			-,218 9PM
Foreign Subsidiary Role: Implementor	,163 5%	,165 5%	,158 5%	,159 5%	,117			,119
Difficulty of Transferred Technology	,000	,036	,006	,015	-,033			,000
Geographic Distance	-,047	-,048	-,055	-,055	-,014			-,023
Cultural Distance	,177 5%	,202 3%	,171 5%	,178 4%	,118			,140 9%
Conceptualized Variables								
Epistemic Community		,119		,031			,031	,095
Absorptive Capacity			,267 1PM	,257 3PM			,113	,148 8%
Structural Coordination Instruments					,152 5%	,136 7%	,126 9%	,139 7%
Technocratic Coordination Instruments					,305 0PM	,308 0PM	,279 0PM	,270 0PM
Person-oriented Coordination Instruments					,221 3PM	,256 1PM	,259 1PM	,223 3PM
F-Value	1.732 10%	1.755 9%	2.896 3PM	2.603 6PM	4.279 0PM	11.779 0PM	7.775 0PM	4.250 0PM
Adjusted R2	0.035	0.041	0.096	0.091	0.184	0.168	0.173	0.209

*p<0.1; **p<0,05; ***p<0,01; PM=per mill
n=161

Table 2 (continued): Regression Models: Dependent Variable: Transfer Goal "Innovation and Learning"

Variable	ModelB1	ModelB2	ModelB3	ModelB4	ModelB5	ModelB6	ModelB7	ModelB8
Control Variables								
Size MNC	,036	,035	,053	,058	,002			,018
Size Foreign Subsidiary	,088	,088	,093	,093	,082			,086
Foreign Subsidiary: Acquisition or Greenfield	,057	,054	,052	,059	,032			,034
Foreign Subsidiary Role: Global Innovator	,000	-,004	-,055	-,048	-,015			-,051
Foreign Subsidiary Role: Implementor	-,022	-,022	-,025	-,026	-,069			-,069
Difficulty of Transferred Technology	-,078	-,073	-,074	-,090	-,125			-,121
Geographic Distance	,004	,004	-,001	-,001	,020			,013
Cultural Distance	,060	,064	,056	,044	,031			,033
Conceptualized Variables								
Epistemic Community		,017		-,054			,031	-,004
Absorptive Capacity			,191 3%	,208 2%			,111	,145
Structural Coordination Instruments					,192 2%	,172 3%	,162 4%	,185 3%
Technocratic Coordination Instruments					,105	,116	,088	,073
Person-oriented Coordination Instruments					,246 2PM	,237 2PM	,240 2PM	,234 4PM
F-Value	0.490 ns	0.436 ns	1.031 ns	0.957 ns	2.009 4%	5.910 1PM	4.078 2PM	1.940 3%
Adjusted R2	-0,026	-0,033	0.002	-0,003	0.065	0.084	0.088	0.071

*p<0.1; **p<0,05; ***p<0,01; PM=per mill
n=161

Table 2 (continued): Regressions Models: Dependent Variable: Both Transfer Goals Together

Variable	ModelC1	ModelC2	ModelC3	ModelC4	ModelC5	ModelC6	ModelC7	ModelC8
Control Variables								
Size MNC	,010	,005	,034	,035	-,037			-,021
Size Foreign Subsidiary	,105	,107	,114	,114	,098			,106
Foreign Subsidiary: Acquisition or Greenfield	,056	,045	,050	,052	,013			,006
Foreign Subsidiary Role: Global Innovator	-,077	-,095	-,156 8%	-,155 9%	-,112			-,166 5%
Foreign Subsidiary Role: Implementor	,091	,092	,086	,086	,036			,037
Difficulty of Transferred Technology	-,044	-,018	-,037	-,040	-,090			-,067
Geographic Distance	-,028	-,029	-,035	-,035	,002			-,007
Cultural Distance	,145 10%	,163 7%	,140 10%	,137	,092			,107
Conceptualized Variables								
Epistemic Community		,085		-,011			,037	,058
Absorptive Capacity			,275 1PM	,278 1PM			,133 10%	,174 4%
Structural Coordination Instruments					,203 8PM	,182 2%	,170 2%	,190 2%
Technocratic Coordination Instruments					,251 1PM	,260 0PM	,225 3PM	,212 6PM
Person-oriented Coordination Instruments					,277 0PM	,294 0PM	,297 0PM	,271 0PM
F-Value	1.144 ns	1.117 ns	2.385 2%	2.134 3%	4.025 0PM	12.386 0PM	8.372 0PM	4.029 0PM
Adjusted R2	0.007	0.007	0.072	0.066	0.172	0.176	0.187	0.197

*p<0.1; **p<0,05; ***p<0,01; PM=per mill
n=161