

Flows in the MNC Network – Assumptions in Literature and Empirical Evidence

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Competitive Paper

Stefan Schmid/Andreas Schurig/Michael Kutschker

Corresponding author: Stefan Schmid

Catholic University of Eichstaett/Germany
Department of Business Administration and International Management
Auf der Schanz 49
D – 85049 Ingolstadt
Germany
Tel. ++49/841/9371909
Fax. ++49/841/9371940
e-mail: stefan.schmid@ku-eichstaett.de

Abstract:

Within the literature on International Management, many authors conceive the MNC as a network organization with headquarters and subsidiaries being linked by complex flows. The first aim of the present article is to analyse several MNC models, like Bartlett/Ghoshal's Transnational Model and Hedlund's Heterarchy, with respect to network flows. By arguing that it is a useful endeavour to distinguish between several flow dimensions, similarities and differences between the MNC network models are identified. A second aim of the article is to confront some of the assumptions inherent in the MNC network models with empirical data. Drawing on a study about more than 2000 foreign subsidiaries located in Europe, some network flow dimensions, like the existence, intensity and criticality of flows, will be investigated in detail. By considering flows to and from focal subsidiaries, it can be shown that network embeddedness of subsidiaries is a very complex issue. Depending on the variables used for operationalizing embeddedness, the authors of this contribution come up with quite different results. Despite this problem, however, one major result is the following: Only a few subsidiaries are highly embedded.

Key Words: MNC Frameworks, MNC Networks, Flow Intensity, Flow Criticality, Network Embeddedness, Subsidiary Research

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Introduction

For some years, it has been popular to view the MNC as an *intra*-organizational and *inter*-organizational network. The *intra*-organizational perspective stresses that headquarters are not the single centre of MNCs, instead subsidiaries are linked to headquarters and to other subsidiaries by various ways, making the MNC a multi-centre organization (Hedlund 1986, Bartlett/Ghoshal 1989, White/Poynter 1990, Doz/Prahalad 1991). The *inter*-organizational perspective considers that there are multiple relationships between the focal MNC and external stakeholders, like suppliers, customers, competitors, joint venture partners, research institutions or governments (Håkansson/Snehota 1989, Ford, editor, 1990, Snehota 1993). Some authors concentrate primarily on internal networks, others analyse external networks, and again others focus their research simultaneously on internal and external networks (Westney 1990, Andersson/Forsgren 1995, 1996). Taken together, the intra-organizational and the inter-organizational network perspective have a great impact on our understanding of MNCs: Both perspectives demonstrate that it is important to go beyond the unitary view of organization, which is dominating in classical, neoclassical or transaction cost approaches. They take into account the social embeddedness of organizational units (Granovetter 1985).

One of the crucial characteristics of network approaches is the assumption that there are flows between different organizational units. Linkages or relationships are necessary to hold the network together. Clearly, without any interaction between the different units, we would not have a network organization. While the contents of flows as well as the characteristics of the linkages and relationships may vary a lot, all network organizations have in common that organizational units are neither “stand-alone-activities” nor are they tied together in a strictly hierarchical way. Within network organizations, interaction is not a one-way process, being

organized only top-down. Interaction is rather seen as a lateral process, making an end to the dichotomous distinction between top-down and bottom-up processes.

The overall aim of the present article is to contribute to our knowledge on the MNC as a network organization. More specifically, we are interested in the flows that occur within the MNC network. While we are convinced that flows are a basic characteristic of MNC networks, we are not sure, however, whether flows and some of their attributes, like their intensity or their criticality, are as widespread as some MNC network models in literature suggest. In the light of these reflections, the present article has three distinct but interrelated objectives:

- *First*, we will review some of the most prominent MNC network models discussed in literature. We will, however, not end up with a general review of these models; rather we want to carry out an analysis with respect to the role that flows have within the models. We will compare Bartlett/Ghoshal's Transnational Solution, Hedlund's Heterarchy, Prahalad/Doz's Diversified Multinational Corporation (DMNC) and White/Poynter's Horizontal Organization.
- *Second*, we will present empirical findings on flows within the MNC. Based on a comprehensive empirical study on more than 2000 MNC subsidiaries in seven different countries, we will provide insights into flows within the MNC network. In accordance with recent literature, we will take on a subsidiary perspective (see the contributions in Birkinshaw/Hood, editors, 1998 or Holm/Pedersen, editors, 2000). Thus, we will consider flows as seen from focal subsidiaries within MNCs.
- *Third*, the final objective of this contribution is to ask whether some of the assumptions which are prevalent in the MNC network models are reflected by our own empirical findings. We will try to show that the network perspective is a rather complicated perspective. While MNCs might have network characteristics for some attributes, they might not be considered as networks if we take into account other attributes.

Although being convinced that the frameworks suggested by Bartlett/Ghoshal, Hedlund, Prahalad/Doz, and White/Poynter are very promising models for progressive MNCs, we have some doubts whether empirical reality confirms them at present time (Chng and Pangarkar 2000:108). One should note that we will not test the MNC network models as such. This is an endeavour already attempted by other authors, particularly as far as Bartlett/Ghoshal's work is concerned (Leong and Tan 1993, Harzing 2000). The aim of the present article is more modest. We will just concentrate on the assumptions about flows which are inherent in the MNC network models, and we will ask whether these assumptions hold true when being confronted with empirical evidence. Before going on with research on the management of networks, it might be useful for scholars in International Management to reflect more upon the mere existence of networks and the mere existence of flows within networks.

Flows within MNC Network Models

During the last 10 to 15 years several authors have presented so-called "ideal types" of the MNC. These "ideal types" were introduced in literature as conceptual models and were said to be future-oriented types of the MNC. The most widespread MNC models are Bartlett/Ghoshal's "Transnational Solution", Hedlund's "Heterarchy", Prahalad/Doz's "Diversified MNC" and White/Poynter's "Horizontal Organization" (Malnight 1996). The four models can be interpreted as network models: Bartlett/Ghoshal see the Transnational Solution as an "Integrated Network", Hedlund's Heterarchy is conceived as a "Multi-Centre-Organization", Doz/Prahalad call their Diversified MNC a "Network", and White/Poynter use the term "Horizontal Network". We will now analyse the four network models of the MNC with respect to flows. While it was not the intention of Bartlett/Ghoshal, Hedlund, Prahalad/Doz and White/Poynter to come up with detailed descriptions of MNC flows, their frameworks nevertheless deal substantially with flows. This is not surprising since flows are a basic feature of networks.

To compare the MNC network models, we had to carry out a comprehensive literature review. The literature which was content-analysed is summarized in Table 1.

Bartlett/Ghoshal's Transnational	Hedlund's Heterarchy	Prahalad/Doz's DMNC	White/Poynter's Horizontal Organization
Bartlett 1986 Bartlett/Ghoshal 1986 Bartlett/Ghoshal 1987a Bartlett/Ghoshal 1987b Bartlett/Ghoshal 1988a Bartlett/Ghoshal 1988b Bartlett/Ghoshal 1989 Bartlett/Ghoshal 1990a Bartlett/Ghoshal 1990b Bartlett/Ghoshal 1990c	Hedlund 1986 Hedlund/Rolander 1990 Hedlund 1993 Hedlund/Kogut 1993 Hedlund 1996 (Hedlund 1994 Hedlund/Ridderstråle 1997 Hedlund 1999)	Prahalad 1976 Doz 1980 Doz/Bartlett/Prahalad 1981 Doz/Prahalad 1981 Prahalad/Doz 1981 Doz 1986 Doz/Prahalad 1984 Prahalad/Doz 1987 Doz/Prahalad 1991 Prahalad/Oosterveld 1999	White/Poynter 1989a White/Poynter 1989b Poynter/White 1990 White/Poynter 1990

Table 1: Contributions Analysed (in chronological order)

As can be seen from Table 1, there is a massive amount of books and articles published by the MNC network authors. The results of our analysis will first be described and then be summarized in a concise way in Table 2 (see Appendix). Before discussing the results of the literature review, some remarks may be helpful for understanding our analysis:

- *First*, the most detailed, the most consistent, and therefore probably the most powerful framework is the framework suggested by Bartlett/Ghoshal. Within their publications, Bartlett/Ghoshal provide a very clear picture of their MNC model, the Transnational Model. Furthermore, Bartlett/Ghoshal declare flows to be of great importance for the Transnational Organization. This is the reason why Bartlett/Ghoshal's work gives a very comprehensive view about the central issue of this paper, i.e. MNC network flows. Clearly, compared to the other three frameworks, Bartlett/Ghoshal's work is an extremely rich source for our own inquiry .
- *Second*, the ideas by Hedlund on the Heterarchy remain more vague than those developed by Bartlett/Ghoshal on the Transnational Organization. While some of the ideas outlined by Hedlund may be judged as being more innovative than those articulated by Bartlett/Ghoshal, the way the ideas are presented by Hedlund makes understanding sometimes difficult. Moreover, the analysis of Hedlund's work has to be restricted to those publications which explicitly deal with the Heterarchy. Hedlund

also introduced the “N-Form Corporation” (Hedlund 1994), the “Self-Renewing MNC” (Hedlund/Ridderstråle 1997) and the “MNC as a Nearly Recomposable System” (Hedlund 1999). Obviously, these frameworks share some similarities with the Heterarchy. However, as Hedlund fails to clearly differentiate the Heterarchy and the frameworks he introduced during the subsequent years, it would be misleading to mix up the different ideas. For Hedlund, flows are a basic characteristic of the MNC; however, we interpret Hedlund’s Heterarchy in the way that flows are not as important as for Bartlett/Ghoshal’s Transnational Organization.

- *Third*, within Prahalad/Doz’s work, one article is of great importance for understanding the DMNC model. This is the article which appeared in 1991 and in which the authors systematically describe the characteristics of the DMNC (Doz/Prahalad 1991). We have, however, not restricted our analysis to this central article. In the case of Prahalad/Doz we felt that it was very important to consider earlier publications as well in order to grasp the intention of the authors. In 1976, the DMNC was mentioned for the first time (Prahalad 1976), and in many contributions by Prahalad and/or Doz which appeared during the following years some characteristics of the DMNC were elaborated. Taken together the contributions provide a good understanding of Prahalad/Doz’s assumptions about the modern MNC and of the flows within the MNC.
- *Fourth*, White/Poynter’s Horizontal Organization is mainly described in one contribution. The White/Poynter (1990) text is basically a compilation of the three brief articles which appeared shortly before in Business Quarterly (White/Poynter 1989a,b, Poynter/White 1990). As this contribution is of short length it will be a bit unfair to compare White/Poynter’s MNC model to the other three MNC models - White/Poynter just have not given us as much information as the other authors on their MNC framework. This is also true as far as flows are concerned: Due to the lack of detailed information we do not know whether flows are only marginally important for White/Poynter or whether White/Poynter have not commented on the role of flows within the Horizontal Organization. Despite this, we are convinced that

White/Poynter's framework is interesting enough to be included in the following comparison.

- *Fifth*, one should keep in mind that, when presenting their frameworks, the authors not only use the term “flow”. They also speak of “links/linkages” or “relations/relationships”. Moreover, they talk about “interdependencies” (not only when referring to a particular type of flows which will be explained later on). Within the frameworks, most of the notions are used interchangeably. Thus, it is important to note that the authors of the MNC network models fall behind the works of authors in other disciplines like sociology, psychology, organization theory or industrial marketing which make subtle differences between the categories of flows, links, relations and interdependencies.

We will now analyse the four frameworks with respect to several flow issues which we call the flow dimensions. When referring to flows, it is not only important to look at the content of flows (Randøy/Li 1998), it is equally important to consider additional dimensions like the domain of flows, the provider and receiver of flows, the genesis of flows, the base of flows, the nature of flows, the intensity, frequency and criticality of flows and the coordination and coordinator of flows. There might even be some additional dimensions; we believe, however, these dimensions to be the most important ones.

The Content of Flows

(i) Many authors have already discussed flows within MNCs. We find studies which deal with the flow of products (Kobrin 1991), financial resources (Booth 1982), human resources (Edström/Galbraith 1977), technology (Blanc/Sierra 1999), values and culture (Van Maanen/Laurent 1993) or knowledge (Gupta/Govindarajan 1991, 1994, 2000). We propose to differentiate between *material and immaterial resources*. *Material resources* include products, capital and people. *Immaterial resources* can be information, trust, values, power and knowledge.

(ii) What is the content of flows within the four MNC frameworks? *First*, in all four modern frameworks of the MNC, flows of *material resources* are seen as being important. Within the Transnational Organization, the Heterarchy and the DMNC, flows of products, capital and people have a crucial role. Although White/Poynter only mention the flow of products, it can be assumed that the two other categories of material flows are not excluded purposively. *Second*, within the MNC network models, flows of *immaterial resources* are said to exist, too. The flow of information is very important for all authors. Likewise, values are an implicit characteristic of all four frameworks. While the authors do not explicitly mention flows of values, they all take normative integration for granted. Normative integration would be difficult to achieve without the flow of values, norms, attitudes, or beliefs. Further, the flow of knowledge within MNCs plays a crucial role for all authors but Prahalad/Doz. This shows that most MNC frameworks have attributed a high importance to knowledge flows at a time when knowledge was not as popular in management literature as it is nowadays. Surprisingly, flows of trust and power, two other categories of immaterial resources, are either not mentioned by the authors of the frameworks or they have no importance as compared to other flows.

The Domain of Flows

(i) Flows within the MNCs can occur at different levels, this means they can touch different domains. We can differentiate between *inter-functional* flows, *inter-business* flows and *cross-border* flows. *Inter-functional* flows are flows between different organizational functions within the MNC or, as Porter (1986) argues, flows between different value activities within the MNC. *Inter-business* flows occur when different (strategic) business units are involved as either provider or receiver of flows. We speak of *cross-border* flows, when a given flow involves units from different countries or regions within the MNC.

(ii) The four MNC frameworks consider all flows at all levels, i.e. between all domains. While it is self-evident to take into account cross-border flows within MNCs, inter-functional and inter-business would be no prerequisite for an MNC. The authors of the four frameworks, however, argue that flows do not only occur between different geographic units of the same function or between different geographic units of the same (strategic) business unit. Flows can

cut across countries, functions, and businesses. This demonstrates that the authors of the MNC network models interpret the MNC as having flows between different levels or different domains.

The Provider and Receiver of Flows

(i) Flows can also be analysed with the objective to find out who is the provider of flows and who is the receiver of flows. By identifying providers and receivers of flows, the direction of the flows can be determined. For a long time, headquarters were considered to be the primary provider of flows, whereas subsidiaries were considered to be receivers. Flows from one subsidiary to another subsidiary were thought to be very rare, because most flows were supposed to involve headquarters. While we admit that some subsidiaries also had a provider role in the past, for instance as providers of cheap labour or natural resources, we nevertheless can conclude that the main subsidiary role was the receiver role. This is particularly true as far as flows of people, information, values, power and knowledge are concerned.

(ii) The four network models of the MNC all stress that units are at the same time providers and receivers of flows. Flows occur in all directions, from headquarters to subsidiaries, from subsidiaries to headquarters, and between different subsidiaries without using headquarters as a channelling institution. In addition, Bartlett/Ghoshal's Transnational Solution considers flows to and from external partners, like joint venture partners. Likewise, Hedlund, who conceives the Heterarchy as being open for coalitions, stresses the necessity to have external linkages. Prahalad/Doz who have made important contributions to the literature on alliances within the field of Strategic Management (Hamel/Doz/Prahalad 1989, Doz 1996, Doz/Hamel 1999), identify the need to incorporate partners, customers and suppliers as well as other partners in the flow network.

The Genesis of Flows

(i) Basically, flows within the MNC could be either planned or emergent. We call this the genesis of flows. What is true for strategies (Mintzberg/Waters 1985), can also be applied to flows. There are some flows which are intended. These deliberately planned flows may then

become realized. Other flows, however, are not planned, but nevertheless they come into existence. These flows can be interpreted as emergent flows. Thus, the flows which exist in any MNC might be the result of either planning or emergence.

(ii) When analysing the four models of the network MNC, we can identify different assumptions about the genesis of flows. Bartlett/Ghoshal see flows as primarily planned, they even state that none of the linkages are accidental. Prahalad/Doz consider flows to be either planned or emergent. Hedlund seems to be in favour of the emergence view, since he points out that it is impossible to pre-specify flows. White/Poynter do not reveal their assumptions about the genesis of flows.

The Base of Flows

(i) But why do we have flows in MNC? The fundamental reason lies in the configuration of MNC activities. Clearly, in MNCs activities are dispersed (Porter 1986). While in some MNCs dispersion might not lead to flows, in other MNCs dispersion might be coupled with flows – whether material or immaterial flows. There might be various sources for the existence of these flows. In accordance with the resource-based view within Strategic Management, we can distinguish between tangible resources and intangible resources (Wernerfelt 1984). *Tangible assets* include machines, plants or technology, and some of the most important *intangible assets* are capabilities, competences, abilities and brands. In addition to tangible and intangible assets, *responsibilities* are a third category. Responsibilities might for instance be granted in the way that a given subsidiary becomes a Centre of Competence (Schmid 2000) or a Centre of Excellence (Holm/Pedersen, editors, 2000) within the MNC. Thus, a subsidiary assumes responsibility for a given area (for instance for functions, products, or processes).

(ii) With respect to the base of flows, the four frameworks differ a lot. On the one hand, we have the works of Bartlett/Ghoshal and Prahalad/Doz, which are quite strong in giving reasons for the flows: For Bartlett/Ghoshal the base of flows can be tangible assets like plants, intangible assets like expertise, skills, capabilities or creativity, and responsibilities.

Furthermore, Bartlett/Ghoshal attach particular importance to innovation (Bartlett/Ghoshal 1990b). The innovation generated by subsidiaries may be an important reason for the existence of flows. Prahalad/Doz, also have clear arguments for the sources of flows: They mention the importance of tangible and intangible assets as well as other reasons for network flows, like vertical integration interdependencies or market interdependencies. On the other hand, we have the works of Hedlund and White/Poynter where we cannot find detailed information about the base of flows. Hedlund only points out that the expertise of units may be the reason for flows. White/Poynter mention responsibilities and innovation, but they do not consider tangible assets or intangible assets of any other kind than innovation.

The Nature of Flows

(i) Within social science literature, a crucial question related to flows between units is: What types of dependence may be distinguished as a consequence of the existing flows? We suggest that we might differentiate *independence*, *dependence* and *interdependence*. The difference between the three options can be illustrated by assuming that we have two units, unit A and unit B. There is independence when A is not dependent on B, and B is not dependent on A. Dependence means that unit A depends on unit B, whereas B does not depend on A (or vice versa). Interdependence can be defined as mutual dependence: unit A is dependent on unit B, while unit B is dependent on unit A. The most interesting case is interdependence (Kelley/Thibaut 1978). Therefore interdependence in the network MNC should be analysed more closely. We will look at the *degree of interdependence* and the *type of interdependence*. As far as the degree of interdependence is concerned, Thompson has identified three alternatives: pooled, reciprocal and sequential interdependence (Thompson 1967). Thompson's work has had a great impact on International Management literature, his categories being used not only by the authors of the present MNC frameworks but also by various other scholars (Baliga/Jaeger 1984). In addition, with respect to the type of interdependence, we can differentiate symmetrical and asymmetrical interdependence. While symmetrical interdependence suggests that units A and B are equally dependent on each other, asymmetrical interdependence occurs when there is interdependence between units A and B, the dependence of A being either higher or lower than the dependence of B.

(ii) Bartlett/Ghoshal assume that, within the Transnational Solution, independence, dependence and interdependence exist at the same time. The most important alternative, however, is interdependence. Within Bartlett/Ghoshal's Transnational Organization, interdependencies are said to be pooled, sequential or reciprocal. Again, among the different categories of interdependencies, one alternative is declared to be the most prevalent: reciprocal interdependencies. Within their work, Bartlett/Ghoshal suggest that interdependence is symmetrical between subsidiaries, but primarily asymmetrical between subsidiaries and headquarters. It is important to note that, within the Transnational Solution, headquarters still have a dominating role as compared to most subsidiaries. For Hedlund's Heterarchy, interdependence is the basic nature of flows. According to Hedlund, interdependence within the Heterarchy is rather sequential and reciprocal, but not pooled. Likewise, Prahalad/Doz stress that interdependence is very important for the DMNC. In contrast to Hedlund, Prahalad/Doz believe that not only sequential and reciprocal interdependence but also pooled interdependence occurs. In addition, the MNC is not only characterized by interdependencies, but also by independence and dependence. While White/Poynter mention that interdependence is a basic characteristic of the Horizontal Organization, they do not elaborate more precisely on interdependence.

The Intensity, Frequency and Criticality of Flows

(i) Up to now we have not dealt with three very important aspects of flows within MNCs: the intensity, frequency and criticality of flows. These flow dimensions may vary a lot, for instance as a function of the flow contents, the domain of flows, the provider and receiver of flows, the genesis of flows, the base of flows or the nature of flows. Flow intensity might range from very low to very high. Furthermore, we could also categorize flows according to the frequency, since some flows may occur permanently, others may take place at several occasions at discrete points of time, again others may only exist at one point of time. Criticality of flows is indicated by the degree of consequences for the receiving unit if the providing unit would cease to exist.

(ii) According to Bartlett/Ghoshal, the Transnational Organization is characterized by different intensities of flows. For some flows, the intensity is low, for other flows it is high, again in other cases the intensity of flows is somewhere in-between. Overall, the authors assume the intensity of flows in Transnational Organizations to be much higher than in other types of MNCs (for instance in multinational, international and global MNCs). Prahalad/Doz state that the intensity of flows depends on the mission of the units whereas Hedlund and White/Poynter do not specify the intensity of flows. Hedlund concentrates more on the pattern of flows which he describes as being complex. The frequency and criticality of flows is not discussed in detail by the authors of the four frameworks. Only Bartlett/Ghoshal's work suggests that permanent flows of different kinds are assumed.

The Coordinator of Flows

(i) If flows are a basic characteristic of network MNCs, we should also ask who the coordinator of flows is. Flows might be coordinated either primarily by the provider of flows, or by the receiver of flows, or by both parties. In addition, there might be a third party involved in the coordination of flows. Finally, the parties involved might expect that self-coordination is a promising alternative.

(ii) Bartlett/Ghoshal stress that the major coordinator of flows is top-management. For Prahalad/Doz, coordination is purposively installed, but Prahalad/Doz do not comment on whether the coordinator is the provider or the receiver of flows or whether the coordinator is a third party. Only by taking into account the general intention of the authors within their work we can assume that Prahalad/Doz, like Bartlett/Ghoshal, still have a predominantly headquarter- and top-management orientation. Thus, it can be concluded that, according to the authors, the main coordinator should be top management within headquarters. While Hedlund and White/Poynter do not explicitly discuss who the coordinator of flows is, we will see in the next paragraph that they consider self-coordination.

The Coordination of Flows

(i) Finally, one of the most important questions is the question of how coordination of flows is achieved. While it is known that a multitude of coordination mechanisms exist, there is no common understanding in literature. Many authors have come up with attempts to categorize mechanisms of coordination (Egelhoff 1988, Marcati 1989, Martinez/Jarillo 1989, Roth/Nigh 1992). We decided to differentiate process-based coordination (for instance by formalization, standardization, programming), behaviour-based coordination (for instance by values, norms, beliefs, mission, culture, socialization), output-based coordination (for instance by budgeting or reporting, based either on accounting/balance sheet or shareholder value-related measures) and muddling through/self-organization.

(ii) Bartlett/Ghoshal consider process-based coordination and behaviour-based coordination as being very important for the Transnational Organization. They also believe that there is some muddling through and self-organization, but they do not mention output-based control. For Hedlund, the behaviour-based mode is essential for coordinating flows within the MNC. The Heterarchy is also held together by process-based and output-based coordination, but clearly these forms of coordination are less important than behaviour-based coordination. Likewise, for Doz/Prahalad behaviour-based coordination is the crucial form of coordination, but it is complemented by process-based and output-based coordination as well as by self-organization. For White/Poynter, behaviour-based mechanisms are key for coordination, but muddling through is important, too. Process-based coordination plays no role and output-based coordination is said to be not effective within the Horizontal Organization. Thus, in all frameworks the behaviour-based alternative seems to be the most important type of coordination, but all authors agree that behaviour-based coordination is not enough to coordinate flows within the MNC.

What can be concluded after having analysed the four MNC network models with respect to the flow dimensions? First, we have shown that for analytical purposes differentiating flow dimensions is a useful endeavour. Second, even though in the literature on International Management, the four MNC-network models are often considered as being nearly identical,

we could trace quite substantial differences as far as flows are concerned. Third, despite these differences the four frameworks share one major similarity: they interpret the MNC as a network. Within the network, there are flows to subsidiaries and flows from subsidiaries. The subsidiaries are not being interpreted as self-sufficient or autonomous, instead units are expected to be embedded within the MNC network. Table 2 (see Appendix) summarizes these findings.

In the next section of this contribution, we will present some empirical data which shed light on flows within MNCs. Clearly, our data will not touch upon all flow dimensions described above. Our major objective, however, is to check whether the basic assumption, the existence of flows and the embeddedness of subsidiaries, can be confirmed.

Empirical Findings on Subsidiary Flows

The Empirical Study

For the empirical analysis, we draw upon a sample of 2110 foreign subsidiaries located in seven European countries (Sweden, Norway, Denmark, Finland, UK, Germany and Austria). The data used in this analysis was collected by mailing a standardized questionnaire to the heads of the subsidiaries. The sample comprises all kinds of subsidiaries in all fields of business. The size of the subsidiaries varies considerably from 1 to 44,000 employees with an average of 504 employees and a median of 102 employees. The average turnover of the subsidiaries is 151 million USD and ranges from 0.2 to 16,140 million USD, the median being 30 million USD. The majority of the subsidiaries' headquarters are located in Europe (73.1%), North America (21.6%), and Asia (4.6%). The questionnaire was made up of four sections: the first section was about basic subsidiary characteristics, the second section about the roles of subsidiaries, the third section about the internal and external factors influencing the role of subsidiaries, and the fourth section about the consequences of subsidiaries for internal and external partners. For the current paper, we only use a limited set of questions from the questionnaire: questions from the second section concerning subsidiary roles (for

more details on the questionnaire and on the data-gathering process see Holm/Pedersen 2000).¹

Specific Goals of the Empirical Study

As mentioned above, flows are considered a basic characteristic of networks. The degree of embeddedness of subsidiaries into the corporate network is of special interest. Embeddedness is related to the degree of exchange between corporate units and the focal subsidiary illustrated by different flows between the units. Therefore, embedded network entities simultaneously act as receiver as well as provider of flows within the MNC. In the following empirical analysis, five main goals are pursued to find out more about flows from and flows to focal subsidiaries: (i) The basic goal of the analysis is to investigate the mere *existence* of flows between the focal subsidiary and other corporate units. (ii) Another goal is to provide some insights into the *intensity* of flows. (iii) In addition, the *criticality* of flows is of interest. (iv) When analysing intensity and criticality, we will also answer the question whether subsidiaries have more of a *provider* or more of a *receiver* role, as far as flows are concerned. (v) Finally, we will discuss the question whether the *differentiation of flows and flow dimensions* is a necessary and useful endeavour.

In order to pursue these goals we have concentrated our analysis on variables indicating flows and the flow dimensions mentioned above.

- As a first step, we will take a closer look at the amount of input/purchases the focal subsidiary is receiving from other corporate units as well as at the amount of output/sales the focal unit is transferring to other corporate entities. These measures are proxies for the *intensity* of flows; they further differentiate between the *receiving and providing* party (goals (ii) and (iv) combined).
- As a second step, we will trace the *criticality* of flows. On the one hand, we will analyse the degree of consequences for other corporate units if they no longer had access to the competences of the focal subsidiary. On the other hand, we will look at the degree of consequences for the focal unit if it no longer had access to the

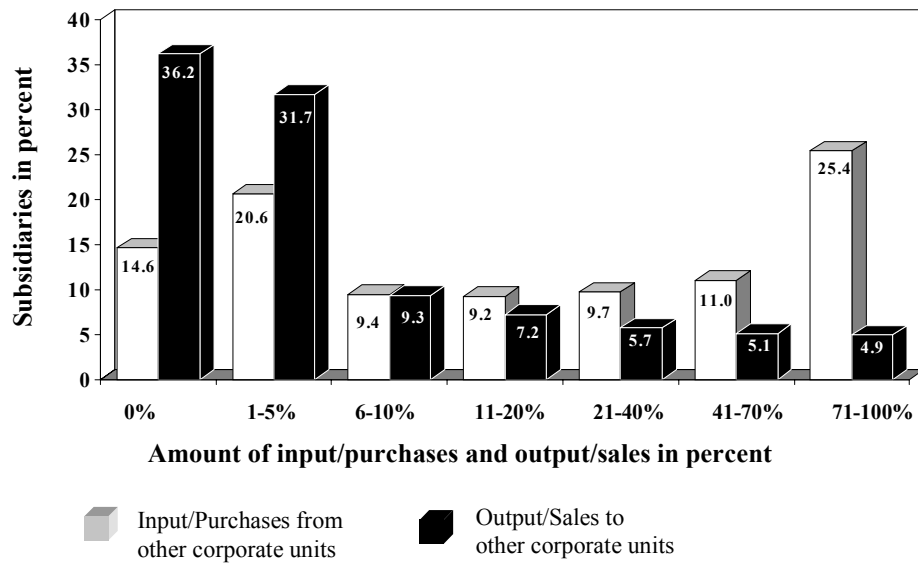
competences of other corporate entities. Again, this enables us to look at both the *receiver* and the *provider* role of subsidiaries (goals (iii) and (iv) combined).

- As a third step, we will compare our findings on the intensity of flows with our findings on the criticality of flows in order to find out more about the *complexity of flows and flow dimensions* within MNC networks (goal (v)).

It is important to note that goal (i) will be reached “en passant”. By looking at the intensity and the criticality of flows, we will be able to answer the question whether flows *exist* at all.

Input and Output Flows within the MNC Network

In the questionnaire, the subsidiaries were asked to indicate the amount of input/purchases received from other corporate units as well as the amount of output/sales transferred to other corporate units. Although “input/purchases” and “output/sales” are relatively broad concepts of flows, containing for instance finished goods, semi-finished goods and components as well as services, some interesting findings on the *intensity* (as well as on the existence and direction) of flows can be reported. The basic results of our data analysis are shown in the upper part of Figure 1:



		Amount of input/purchases received from other corporate units						Total
		0%	1-5%	6-10%	11-20%	21-40%	41-70%	
Amount of output/sales transferred to other corporate units	0%	9.7%	4.5%	1.5%	1.0%	2.2%	2.9%	36.2%
	1-5%	1.8%	9.8%	3.8%	2.3%	2.5%	3.5%	31.7%
	6-10%	0.8%	1.8%	1.6%	1.7%	1.0%	1.4%	9.3%
	11-20%	0.6%	1.2%	1.0%	1.7%	1.3%	0.7%	7.2%
	21-40%	0.5%	1.4%	0.5%	0.9%	1.3%	0.9%	5.7%
	41-70%	0.5%	0.9%	0.6%	1.0%	0.8%	1.0%	5.1%
	71-100%	0.7%	1.1%	0.5%	0.7%	0.7%	0.5%	4.9%
Total		14.6%	20.6%	9.4%	9.2%	9.7%	11.0%	100.0%

Figure 1: Subsidiaries' Input and Output Flows

- Inputs:** About 45% of all subsidiaries receive not more than 10% of their input/purchases from other corporate units. Only about 25% of the subsidiaries obtain over 70% of their input/purchases from other corporate entities.

- **Outputs:** Approximately 77% of all subsidiaries transfer not more than 10% of their output/sales to other corporate counterparts. Only in 5% of all subsidiaries, more than 70% of output/sales go to other corporate units.
- **Inputs/Outputs:** Broadly speaking, flows from other corporate units towards subsidiaries seem to be more significant than flows from subsidiaries to other corporate entities.

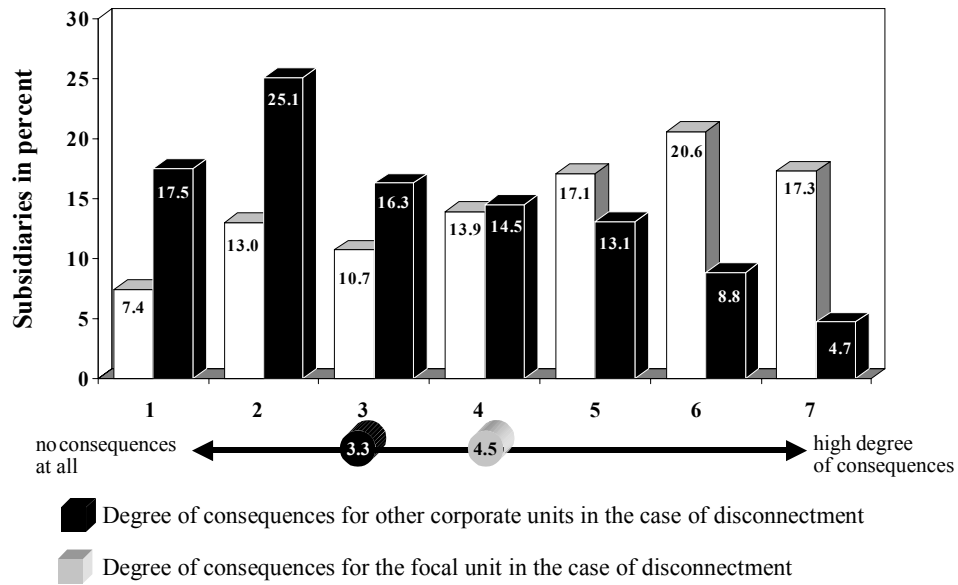
While, the upper part of Figure 1 summarizes only aggregate results, the lower part of Figure 1 combines inputs/purchases of all focal subsidiaries with their respective outputs/sales. Thus, by looking at the input-/output-matrix, it is possible to see whether subsidiaries are primarily receivers, primarily providers, receivers and providers at the same time, or neither receivers nor providers of flows.

- In about 10% of the cases, subsidiaries have no corporate inputs and no corporate outputs at all. As these subsidiaries have neither inflows nor outflows, they are neither receivers nor providers of corporate flows.
- If we do not only consider subsidiaries which have no flows, but also those subsidiaries which have low inflows and low outflows (inputs and outputs $\leq 10\%$), we arrive at a category of subsidiaries which can be called “stand-alone-subsidiaries”. A relatively high proportion of subsidiaries, about 35% of all units, seem to act as “stand-alone-subsidiaries”, as far as inputs and outputs are concerned.
- The other extreme are subsidiaries receiving a high amount of inputs from other corporate units and transferring a high amount of their outputs (inputs and outputs $\geq 41\%$) to other units. These subsidiaries are highly embedded within the corporate network. In our sample, only 2.5% of all subsidiaries can be considered as belonging to the category of “highly embedded subsidiaries”.
- Furthermore, in only 18.4% of all cases, subsidiaries have more corporate outputs than inputs. Thus, the provider role is dominating in relatively few cases. In 56.1% of all cases, corporate inputs are more significant than outputs, i.e. the receiver role is dominating in the majority of subsidiaries. For the remaining 25.7% of the subsidiaries, inputs and outputs have a similar level.

Degree of Consequences in the Case of Disconnectment from the MNC Network

In our study, respondents were further asked to estimate the degree of consequences for their unit if they no longer had access to the competences of other corporate entities. Moreover, they were requested to indicate the degree of consequences for other corporate units if they no longer had access to the competences of the focal subsidiary. In both cases the degree of consequences was measured on a seven-point scale ranging from “no consequences at all” to “a high degree of consequences”. While this analysis allows no conclusion about the contents of flows, it is related to the base of flows. Competences are a special base of flows; they can create some sort of flows or relatedness between the focal subsidiary and other corporate units. The aggregate results, which can be seen from the upper part of Figure 2, enable us to draw some conclusions on the *criticality* (as well as on the existence and direction) of flows:

- **Consequences for the focal subsidiary:** On the one hand, about 20% of all subsidiaries state that there are no or only very few consequences (1 and 2 on the seven-point scale) if they no longer had access to the competences of other corporate units. On the other hand, for nearly 38% the disconnectment from the corporate network would have severe consequences (6 and 7 on the seven-point scale).
- **Consequences for other corporate units:** If other corporate units no longer had access to the competences of the focal subsidiary, this would have no or only few consequences (1 and 2 on the seven-point scale) for more than 42%. Severe consequences (6 and 7 on the seven-point scale) are expected in only about 13% of the cases.
- **Consequences for the focal subsidiary and for other corporate units:** All in all, a tentative conclusion is that competences of other corporate units are more important for subsidiaries than competences of subsidiaries are for the MNC network. With an average of 4.5 of a seven-point scale, the consequences for subsidiaries if they no longer had access to the competences of other corporate units are more severe than for other corporate units if they no longer had access to the competences of the focal subsidiary, indicated by an average of 3.3. Thus, on average, subsidiaries seem to be more dependent on competences from other corporate units than vice-versa.



		Degree of consequences for the focal unit in the case of disconnection							Total
		1	2	3	4	5	6	7	
Degree of consequences for other units in the case of disconnection	1	5.0%	1.5%	1.8%	1.6%	1.5%	2.5%	3.7%	17.5%
	2	0.8%	5.2%	2.2%	4.1%	4.1%	5.2%	3.5%	25.1%
	3	0.3%	1.9%	2.8%	2.0%	3.1%	3.7%	2.6%	16.3%
	4	0.4%	1.6%	1.5%	3.5%	2.6%	3.1%	1.6%	14.5%
	5	0.4%	1.8%	1.2%	0.6%	4.4%	2.3%	2.3%	13.1%
	6	0.3%	0.7%	0.9%	1.4%	0.9%	3.3%	1.2%	8.8%
	7	0.2%	0.3%	0.3%	0.7%	0.5%	0.4%	2.4%	4.7%
Total		7.4%	13.0%	10.7%	13.9%	17.1%	20.6%	17.3%	100.0%

Figure 2: Degree of Consequences in the Case of the Subsidiary's Disconnectment

Again, we are not only interested in the aggregate analysis of subsidiaries' role in the corporate network, but also in the degree of embeddedness of each focal subsidiary into the corporate network. Therefore we combined the two variables (consequences for others and consequences for the focal unit) to a matrix indicating the degree of embeddedness of the

subsidiary into the corporate network. The lower part of Figure 2 reveals the following findings which disclose in more detail the receiver and provider roles of subsidiaries:

- For 5% of the subsidiaries there are no consequences at all in the case of disconnectment. As far as competences are concerned, these subsidiaries seem to have no links at all to the corporate network.
- Considering not only the cases where we have no consequences, but also the cases where we have low consequences (≤ 3 on the seven-point scale), we arrive at a percentage of 21.5% of the subsidiaries which can be considered as “stand-alone-subsidiaries”. These subsidiaries are only slightly embedded into their corporate network
- Only few subsidiaries, 7.3% of the cases, are “highly embedded subsidiaries”; in the case of subsidiary disconnectment, they show a high degree of consequences for both variables (≥ 6 on a seven-point scale).
- In 17.1% of all cases only, the subsidiary’s disconnectment would have more severe consequences for other units than vice-versa. In the majority of cases (56.2% of all cases), however, subsidiaries are more dependent on other corporate competences than vice-versa. For the remaining 26.6%, consequences are equally important in both directions.

Contrasting Dimensions of MNC Network Flows

We are further interested in how the two dimensions, the intensity and the criticality of flows, relate to one another. Thus, we try to give an answer to the question whether the differentiation of flows as elaborated in the first section of this article and as indicated in Table 2 (see Appendix) is a useful and necessary endeavour. For this analysis we will trace if the degree of consequences for the focal unit runs parallel to the amount of input the focal subsidiary receives from other corporate units and if the degree of consequences for others runs parallel to the amount of output the focal subsidiary transfers to other corporate counterparts.

		Degree of consequences for the focal unit in the case of disconnectment							Total
		1	2	3	4	5	6	7	
Degree of consequences for other units in the case of disconnectment	1	10.7%	2.8%	2.1%	1.8%	0.5%	0.8%	1.5%	21.2%
	2	1.5%	10.6%	3.4%	6.6%	3.9%	3.4%	1.2%	30.7%
	3	0.7%	2.6%	4.1%	2.3%	3.6%	1.9%	0.3%	15.6%
	4	1.0%	2.1%	2.1%	4.1%	2.3%	1.5%	0.7%	13.8%
	5	0.6%	1.9%	1.2%	0.6%	3.4%	0.1%	1.0%	9.8%
	6	0.6%	0.8%	0.1%	1.1%	0.7%	1.9%	0.6%	5.8%
	7	0.1%	0.3%	0.7%	0.7%	0.6%		0.8%	3.2%
Total		15.2%	21.1%	13.8%	17.2%	16.0%	10.7%	6.1%	100.0%

**criticality
of flows**

		Amount of input/purchases received from other corporate units							Total
		0%	1-5%	6-10%	11-20%	21-40%	41-70%	71-100%	
Amount of output/sales transferred to other corporate units	0%	9.7%	4.5%	1.5%	1.0%	2.2%	2.9%	14.5%	36.2%
	1-5%	1.8%	9.8%	3.8%	2.3%	2.5%	3.5%	8.0%	31.7%
	6-10%	0.8%	1.8%	1.6%	1.7%	1.0%	1.4%	1.0%	9.3%
	11-20%	0.6%	1.2%	1.0%	1.7%	1.3%	0.7%	0.8%	7.2%
	21-40%	0.5%	1.4%	0.5%	0.9%	1.3%	0.9%	0.2%	5.7%
	41-70%	0.5%	0.9%	0.6%	1.0%	0.8%	1.0%	0.4%	5.1%
	71-100%	0.7%	1.1%	0.5%	0.7%	0.7%	0.5%	0.6%	4.9%
Total		14.6%	20.6%	9.4%	9.2%	9.2%	11.0%	25.4%	100.0%

**intensity
of flows**

		Degree of consequences for the focal unit in the case of disconnectment							Total
		1	2	3	4	5	6	7	
Degree of consequences for other units in the case of disconnectment	1							5.7%	5.7%
	2					1.9%	5.7%	5.7%	13.2%
	3		1.9%		1.9%	1.9%		1.9%	7.5%
	4		1.9%		1.9%		5.7%	3.8%	13.2%
	5					9.4%	3.8%	1.9%	15.1%
	6					3.8%	9.4%	9.4%	22.6%
	7					1.9%		20.8%	22.6%
Total			3.8%		3.8%	18.9%	24.5%	49.1%	100.0%

**criticality
of flows**

Figure 3: Contrasting Intensity and Criticality of MNC Network Flows

The results of our analysis show that the two measures correlate to a high degree: 0.441 for the input dimension and 0.385 for the output dimension (Pearson correlation; significance at $p < 0.01$). But the degree of consequences for the focal subsidiary cannot fully be explained by the loss of input/purchases from other units, and the degree of consequences for other units is not fully explained by the loss of output/sales from the focal subsidiary. These results can be further developed by the cross tabulations shown in Figure 3. In the centre of Figure 3, we have again the input-/output-matrix depicted in Figure 1. We will now have a closer look at those subsidiaries which are “stand-alone-subsidiaries” and those subsidiaries which are “highly-embedded subsidiaries” as far as inputs and outputs are concerned. Therefore we will analyse the categories of “stand-alone-subsidiaries” and “highly-embedded-subsidiaries” with respect to the criticality dimension. The data analysis produces the following key findings:

- Out of the subsidiaries which can be labelled “stand-alone-subsidiaries” concerning the input and output flows ($n=731$), only 38.5% correspond with those subsidiaries which are “stand-alone-subsidiaries” according to the degree of consequences in the case of disconnectment.
- Out of those subsidiaries which are highly embedded into the corporate network concerning the input and output flows ($n=53$), only 39.6% are also highly embedded into the corporate network according to the degree of consequences in the case of disconnectment.

Thus, for quite a high percentage of subsidiaries, intensity and criticality of flows do not run parallel.

Linking MNC Network Models and Empirical Evidence

What can be concluded from our analysis? In the last section of this article, we will summarize our empirical findings, relate them to the MNC network models and critically reflect some limits of our paper.

(i) The Existence of Flows: Our empirical results confirm the basic assumption of MNC network models that there are flows between the focal subsidiary and other corporate units. However, there are some caveats to be taken into account: First, not all subsidiaries are linked to the MNC network; some subsidiaries are “stand-alone-units”, since they have neither inflows nor outflows. Second, when looking at flows, we have analysed input/purchases and output/sales. Thus, as far as the content of flows is concerned, we have concentrated on product flows and cannot provide evidence on flows of capital, people and immaterial resources like information, trust, values, power, and knowledge. Third, within our study, we have not differentiated between flows to and from headquarters on the one hand and flows to and from sister units on the other hand. Further research has to analyse more closely whether flows predominantly exist between the focal subsidiary and headquarters or also between the focal subsidiary and sister companies, as assumed by the MNC network models.

(ii) The Intensity of Flows: Our data show that subsidiaries differ a lot when it comes to the intensity of flows. This is in accordance with the MNC network models. Our findings are particularly related to Bartlett/Ghoshal’s and Prahalad/Doz’s frameworks, because these authors stated that intensity of flows varies significantly, depending on the role and the mission of subsidiaries. At the same time, the general assumption that we are moving towards Transnational Organizations (TNO), linking all units by highly intense flows, must be questioned. Admittedly, the object of our analysis was not the MNC, since we approached more than 2000 subsidiaries of different MNCs. Nevertheless, as the percentage of highly embedded subsidiaries is rather small, we can state that there is no strong evidence for TNO-like subsidiaries.

(iii) The Criticality of Flows: The present study reveals that foreign subsidiaries vary extremely as far as the criticality of flows is concerned. For some subsidiaries there would be severe consequences in the case of disconnectment, in other cases it seems that subsidiaries could be disconnected from the MNC network without severe consequences. Unfortunately, the authors of the MNC network models have not commented on the criticality of flows. We think, however, that the criticality of flows might be one of several very important dimensions

when analysing network embeddedness. Asking how important the competences of different units are, might even be more indicative of subsidiaries' and headquarters' role than just looking at the input-/output flows.

(iv) The Provider and Receiver Roles of Subsidiaries: Our study also shows that the focal subsidiary can function as a receiving as well as a providing unit of flows. While being in accordance with the MNC network models, this finding is not surprising. What is more interesting, is our analysis about the direction of flows which shows that, all in all, subsidiaries are (still) more dependent on other units than vice-versa. This is demonstrated by the data on flow intensity as well as by the data on flow criticality.

(v) Differentiating Flows and Flow Dimensions: Finally, we can conclude that the differentiation of flows and their dimension is highly important. The present analysis shows that the degree of intensity of the flows does not necessarily correspond with the degree of criticality of flows. The same might be true for other dimensions. This means: Any focal subsidiary might be highly embedded as far as one dimension is concerned, it might be less embedded as far as another dimension is regarded. The question of how to operationalise embeddedness, depends on the flow dimension we want to investigate. If we require a subsidiary to be highly embedded with respect to many dimensions, we have to take into account variables for these dimensions. In this case, probably almost no subsidiary can be identified qualifying for being an "overall highly embedded subsidiary".

Clearly, the MNC network models provide a rich starting point for differentiating network flows. While the present study only looked at some of these flow dimensions, future MNC research should try to simultaneously cover as many flow dimensions as possible. This will enable us to judge to what extent the MNC network models reviewed above are reality and can be found in practice as far as network flows are concerned. Although our own study is only of limited scope, it demonstrates that network embeddedness of subsidiaries is a highly complex issue which cannot be covered by a few variables. Instead of investigating hundreds of units and only looking at a very limited number of variables, it might be more helpful in the

future to look at a limited number of units, but at the same time investigating a broad range of dimensions. Case study research (Eisenhardt 1989, Yin 1994), taking MNCs and not subsidiaries as unit of analysis, will be very useful. Case study research will be particularly important for scholars who want to provide more insights into those flow dimensions which stress dynamic and interaction-oriented aspects: the genesis of flows, the nature of flows, and the coordination of flows.

Endnotes

¹ The data results from a joint research project which was carried out together with the following scholars: Jan Johanson, Deo Sharma, Ulf Holm (Sweden); Gabriel Benito (Norway); Mats Forsgren, Lee Davis, Torben Pedersen (Denmark); Ingmar Björkman, Patrick Furu (Finland); Karl Moore (UK); Lars Håkanson, Harald Stummer (Austria). The project was initiated and coordinated by the Swedish researchers.

Literature

Andersson, Ulf and Mats Forsgren. 1995. Using Networks to Determine Multinational Parental Control of Subsidiaries. In Stanley J. Paliwoda and John K. Ryans Jr., editors, *International Marketing Reader*. London, New York: Routledge: 72-87.

Andersson, Ulf and Mats Forsgren. 1996. Subsidiary Embeddedness and Control in the Multinational Corporation. *International Business Review*, 5(5): 487-508.

Baliga, B. R. and Alfred M. Jaeger. 1984. Multinational Corporations: Control Systems and Delegation Issues. *Journal of International Business Studies*, 15(2): 25-40.

Bartlett, Christopher A. 1986. Building and Managing the Transnational: The New Organizational Challenge. In Michael E. Porter, editor, *Competition in Global Industries*. Boston/Mass.: Harvard Business School Press: 367-401.

Bartlett, Christopher A. and Sumantra Ghoshal. 1986. Tap Your Subsidiaries for Global Reach. *Harvard Business Review*, 64(6): 87-94.

Bartlett, Christopher A. and Sumantra Ghoshal. 1987a. Managing Across Borders: New Strategic Requirements. *Sloan Management Review*, 28(4): 7-17.

Bartlett, Christopher A. and Sumantra Ghoshal. 1987b. Managing Across Borders: New Organizational Responses. *Sloan Management Review*, 29(1): 43-53.

Bartlett, Christopher A. and Sumantra Ghoshal. 1988a. Creation, Adoption, and Diffusion of Innovations by Subsidiaries of Multinational Corporations. *Journal of International Business Studies*, 19(3): 365-388.

Bartlett, Christopher A. and Sumantra Ghoshal. 1988b. Organizing for Worldwide Effectiveness. *California Management Review*, 31(1): 54-74.

Bartlett, Christopher A. and Sumantra Ghoshal. 1989. *Managing Across Borders*. The Transnational Solution. Boston/Mass.: Harvard Business School Press.

Bartlett, Christopher A. and Sumantra Ghoshal. 1990a. Matrix Management: Not a Structure, a Frame of Mind. *Harvard Business Review*, 68(4): 138-145.

Bartlett, Christopher A. and Sumantra Ghoshal. 1990b. Managing Innovation in the Transnational Corporation. In Christopher A. Bartlett, Yves Doz and Gunnar Hedlund, editors, *Managing the Global Firm*. London, New York: Routledge: 215-255.

Bartlett, Christopher A. and Sumantra Ghoshal. 1990c. The Multinational Corporation as an Interorganizational Network. *Academy of Management Review*, 15(4): 603-625.

Birkinshaw, Julian and Neil Hood, editors. 1998. *Multinational Corporate Evolution and Subsidiary Development*. Houndmills, Basingstoke, New York: Macmillan/St. Martin's Press.

Blanc, Hélène and Christophe Sierra. 1999. The Internationalisation of R&D by Multinationals: A Trade-Off between External and Internal Proximity. *Cambridge Journal of Economics*, 23(2): 187-206.

Booth, Lawrence D. 1982. Capital Budgeting Frameworks for the Multinational Enterprise. *Journal of International Business Studies*, 13(3): 113-123.

Chng, Pheng-Lui and Nitin Pangarkar. 2000. Research on Global Strategy. *International Journal of Management Reviews*, 2(1): 91-110.

Doz, Yves L. 1980. Strategic Management in Multinational Corporations. *Sloan Management Review*, 21(2): 27-46.

- Doz, Yves L. 1986. *Strategic Management in Multinational Corporations*. Oxford et al.: Pergamon Press.
- Doz, Yves L. 1996. The Evolution of Cooperation in Strategic Alliances: Initial Conditions or Learning Processes? *Strategic Management Journal*, 17: 55-83.
- Doz, Yves L., Christopher A. Bartlett and Coimbatore K. Prahalad. 1981. Global Competitive Pressures and Host Country Demands. Managing Tensions in MNCs. *California Management Review*, 23(3): 63-74.
- Doz, Yves L. and Gary Hamel. 1999. *Alliance Advantage: The Art of Creating Value through Partnering*. New York et al.: Mc Graw-Hill.
- Doz, Yves L. and Coimbatore K. Prahalad. 1981. Headquarters Influence and Strategic Control in MNCs. *Sloan Management Review*, 23(1): 15-29.
- Doz, Yves L. and Coimbatore K. Prahalad. 1984. Patterns of Strategic Control within Multinational Corporations. *Journal of International Business Studies*, 15(2): 55-72.
- Doz, Yves L. and Coimbatore K. Prahalad. 1991. Managing DMNCs: A Search for a New Paradigm. *Strategic Management Journal*, 12: 145-164.
- Edström, Anders and Jay R. Galbraith. 1977. Transfer of Managers as a Coordination and Control Strategy in Multinational Organisations. *Administrative Science Quarterly*, 22 (6): 248-263.
- Egelhoff, William G. 1988. *Organizing the Multinational Enterprise – An Information-Processing Perspective*. Cambridge/Mass.: Ballinger.
- Eisenhardt, Kathleen M. 1989. Building Theories from Case Study Research. *Academy of Management Review*, 14 (4): 488-511.
- Ford, David, editor. 1990. *Understanding Business Markets: Interaction, Relationships and Networks*. The Industrial Marketing and Purchasing Group. London et al.: Academic Press/Harcourt Brace Jovanovich Publishers.
- Granovetter, Mark. 1985. Economic Action and Social Structure: The Problem of Embeddedness. *American Journal of Sociology*, 91(3): 481-510.

- Gupta, Anil K. and Vijay Govindarajan. 1991. Knowledge Flows and the Structure of Control within Multinational Corporations. *Academy of Management Review*, 16(4): 768-792.
- Gupta, Anil K. and Vijay Govindarajan. 1994. Organizing for Knowledge Flows within Multinational Corporations. *International Business Review*, 3(4): 443-457.
- Gupta, Anil K. and Vijay Govindarajan. 2000. Knowledge Flows within Multinational Corporations. *Strategic Management Journal*, 21: 473-496.
- Håkansson, Hakan and Ivan Snehota. 1989. No Business is an Island. The Network Concept of Business Strategy. *Scandinavian Journal of Management*, 5(3): 187-200.
- Hamel, Gary, Yves L. Doz and Coimbatore K. Prahalad. 1989. Collaborate with your Competitors and Win. *Harvard Business Review*, 67(1): 133-148.
- Harzing, Anne-Wil. 2000. An Empirical Test and Extension of the Bartlett and Ghoshal Typology of Multinational Companies. *Journal of International Business Studies*, 31(1): 101-120.
- Hedlund, Gunnar. 1986. The Hypermodern MNC – A Heterarchy? *Human Resource Management*, 25(1): 9-35.
- Hedlund, Gunnar. 1993. Assumptions of Hierarchy and Heterarchy, with Applications to the Management of the Multinational Corporation. In Sumantra Ghoshal and D. Eleanor Westney, editors, *Organization Theory and the Multinational Corporation*. New York: St. Martin's Press: 211-236.
- Hedlund, Gunnar. 1994. A Model of Knowledge Management and the N-Form Corporation. *Strategic Management Journal*, 15: 73-90.
- Hedlund, Gunnar. 1996. Organization and Management of Transnational Corporations in Practice and Research. In *Transnational Corporations and World Development* (published by Routledge on behalf of the UNCTAD Division on Transnational Corporations and Investment). London et al.: International Thomson Business Press: 123-141.
- Hedlund, Gunnar. 1999. The Intensity and Extensity of Knowledge and the Multinational Corporation as a Nearly Recomposable System (NRS). *Management International Review*, Special Issue 1999/1: 5-44.

Hedlund, Gunnar and Bruce Kogut. 1993. Managing the MNC: The End of the Missionary Era. In Gunnar Hedlund, editor, *Organization of Transnational Corporations* (United Nations Library on Transnational Corporations, Volume 6). London, New York: Routledge: 343-358.

Hedlund, Gunnar and Jonas Ridderstråle. 1997. Toward a Theory of the Self-Renewing MNC. In Brian Toyne and Douglas Nigh, editors, *International Business – An Emerging Vision*. University of South Carolina Press: 329-354.

Hedlund, Gunnar and Dag Rolander. 1990. Action in Heterarchies – New Approaches to Managing the MNC. In Christopher A. Bartlett, Yves Doz and Gunnar Hedlund, editors, *Managing the Global Firm*. London, New York: Routledge: 15-46.

Holm, Ulf and Torben Pedersen, editors. 2000. *The Emergence and Impact of MNC Centres of Excellence. A Subsidiary Perspective*. Houndmills, Basingstoke, New York: Macmillan/St. Martin's Press.

Holm, Ulf and Torben Pedersen. 2000. The Centres of Excellence Project – Methods and Some Empirical Findings. In Ulf Holm and Torben Pedersen, editors, *The Emergence and Impact of MNC Centres of Excellence. A Subsidiary Perspective*. Houndmills, Basingstoke, New York: Macmillan/St. Martin's Press: 23-41.

Kelley, Harold H. and John W. Thibaut. 1978. *Interpersonal Relations. A Theory of Interdependence*. New York, Chichester, Brisbane, Toronto: John Wiley & Sons.

Kobrin, Stephen. 1991. An Empirical Analysis of the Determinants of Global Integration. *Strategic Management Journal*, 12: 17-31.

Leong, Siew and Chin T. Tan. 1993. Managing Across Borders: An empirical Test of the Bartlett and Ghoshal (1989) Organizational Typology. *Journal of International Business Studies*, 24(3): 449-464.

Malnight, Thomas W. 1996. The Transition From Decentralized to Network-Based MNC Structures: An Evolutionary Perspective. *Journal of International Business Studies*, 26(1): 43-65.

Marcati, Alberto. 1989. Configuration and Coordination – The Role of U.S. Subsidiaries in the International Network of Italian Multinationals. *Management International Review*, 29(3): 35-50.

- Martinez, Jon I. and Carlos J. Jarillo. 1989. The Evolution of Research on Coordination Mechanisms in Multinational Corporations. *Journal of International Business Studies*, 20(3): 489-514.
- Mintzberg, Henry and James A. Waters. 1985. Of Strategies, Deliberate and Emergent. *Strategic Management Journal*, 6: 257-272.
- Porter, Michael. 1986. Competition in Global Industries. A Conceptual Framework. In Michael Porter, editor, *Competition in Global Industries*. Boston/Mass.: Harvard Business School Press: 15-60.
- Poynter, Thomas A. and Roderick E. White. 1990. Making the Horizontal Organization Work. *Business Quarterly*, 54(3): 73-77.
- Prahalad, Coimbatore K. 1976. Strategic Choices in Diversified MNCs. *Harvard Business Review*, 54(4): 67-78.
- Prahalad, Coimbatore K. and Yves L. Doz. 1981. An Approach to Strategic Control in MNCs. *Sloan Management Review*, 22(4): 5-13.
- Prahalad, Coimbatore K. and Yves L. Doz. 1987. *The Multinational Mission. Balancing Local Demands and Global Vision*. New York, London: The Free Press/Macmillan.
- Prahalad, Coimbatore K. and Jan P. Oosterveld. 1999. Transforming Internal Governance: The Challenge for Multinationals. *Sloan Management Review*, 40(3): 31-39.
- Randøy, Trond and Jiatao Li. 1998. Global Resource Flows and MNE Integration. In Julian Birkinshaw and Neil Hood, editor, *Multinational Corporate Evolution and Subsidiary Development*. Houndmills, Basingstoke, New York: Macmillan/St. Martin's Press: 76-101.
- Roth, Kendall and Douglas Nigh. 1992. The Effectiveness of Headquarters-Subsidiary Relationships: The Role of Coordination, Control, and Conflict. *Journal of Business Research*, 25: 277-301.
- Schmid, Stefan. 2000. Foreign Subsidiaries as Centres of Competence – Empirical Evidence from Japanese Multinationals. In Jorma Larimo and Sören Kock, editors, *Recent Studies in Interorganizational and International Business Research*. Vaasa: Proceedings of the University of Vaasa, Vol. 58: 182-204.

Snehota, Ivan. 1993. Market as Network and the Nature of the Market Process. In S. Tamer Cavusgil and Deo D. Sharma, editors, *Advances in International Marketing: Industrial Networks*. Vol. 5, Greenwich/Ct.: JAI Press: 31-41.

Thompson, James D. 1967. *Organizations in Action. Social Science Bases of Administrative Theory*. New York et al.: Mc Graw-Hill.

Van Maanen, John and André Laurent. 1993. The Flow of Culture: Some Notes on Globalization and the Multinational Corporation. In Sumantra Ghoshal and Eleanor D. Westney, editors, *Organization Theory and the Multinational Corporation*. Houndmills, London: St. Martin's Press: 275-312.

Wernerfelt, Birger. 1984. A Resource-based View of the Firm. *Strategic Management Journal*, 5: 171-180.

Westney, Eleanor D. 1990. Internal and External Linkages in the MNC: The Case of R&D Subsidiaries in Japan. In Christopher A. Bartlett, Yves Doz and Gunnar Hedlund, editors, *Managing the Global Firm*. London, New York: Routledge, 171-181.

White, Roderick E. and Thomas A. Poynter. 1989a. Organizing for Worldwide Advantage. *Business Quarterly*, 54(1): 84-89.

White, Roderick E. and Thomas A. Poynter. 1989b. Achieving Worldwide Advantage with the Horizontal Organization. *Business Quarterly*, 54(2): 55-60.

White, Roderick E. and Thomas A. Poynter. 1990. Organizing for world-wide Advantage. In Christopher A. Bartlett, Yves Doz and Gunnar Hedlund, editors, *Managing the Global Firm*. London, New York: Routledge: 95-113.

Yin, Robert K. 1994. *Case Study Research: Design and Methods*. 2nd ed. Newbury Park: Sage.

Appendix: Table 2 - Flows within MNC Network Models

	MNC Network Models			
	Bartlett/Ghoshal's TNO	Hedlund's Heterarchy	Prahalad/Doz's DMNC	White/Poynter's Horizontal Organization
Perspective on flows				
	Integrated Network	Multi-centre Organization	Network	Horizontal network
Relevance of flows				
	very high	medium/high	medium	low/medium
Content of flows				
1) Material Resources				
Products	very important	very important	very important	very important
Capital	very important	very important	very important	-
People	very important	very important	very important	-
2) Immaterial Resources				
Information	very important	very important	very important	very important
Trust	no crucial role	-	-	no crucial role
Values	implicit (normative integration)	implicit (normative integration)	implicit (normative integration)	implicit (normative integration)
Power	no crucial role	-	no crucial role	important
Knowledge	very important	very important	no crucial role	very important
Domain of flows				
1) interfunctional	✓	✓	✓	✓
2) interbusiness	✓	✓	✓	-
3) cross-border	✓	✓	✓	✓

	MNC Network Models (continued)			
	Bartlett/Ghoshal's TNO	Hedlund's Heterarchy	Prahalad/Doz's DMNC	White/Poynter's Horizontal Organization
Provider (outflow)/Receiver (inflow)				
1) HQ	✓	✓	✓	✓
2) focal subsidiary	✓	✓	✓	✓
3) other subsidiary	✓	✓	✓	✓
4) external partner (e.g. J-V)	✓	✓	✓	-
Genesis of flows				
1) Planned	planned dominant, but emergent considered	no pre-specification of flows	planned and emergent	n.a.
2) emergent				
Base of flows				
1) tangible assets	✓	-	✓	n.a.
2) intangible assets	✓	✓	✓	n.a.
3) responsibilities	✓	-	-	✓
4) other			vertical integration market relationships	innovation
Nature of flows				
1) independence	important	n.a.	low importance	n.a.
2) dependence	important	n.a.	low importance	n.a.
3) interdependence	very important	very important	very important	very important
a) degree of interdependence				
Pooled	important	-	important	n.a.
reciprocal	very important	important	important	n.a.
sequential	important	important	important	n.a.
b) type of interdependence				
symmetrical	between sub.	n.a.	n.a.	n.a.
asymmetrical	between HQ and sub.	n.a.	n.a.	n.a.

	MNC Network Models (continued)			
	Bartlett/Ghoshal's TNO	Hedlund's Heterarchy	Prahalad/Doz's DMNC	White/Poynter's Horizontal Organization
Intensity of flows low – medium – high	low, medium and high intensity considered, high plays a dominant role	n.a.	depends on the mission of the unit	n.a.
Importance of flows low – medium – high	n.a.	n.a.	n.a.	n.a.
Criticality of flows low – medium – high	n.a.	n.a.	n.a.	n.a.
Frequency of flows 1) at one point in time 2) at several occasions 3) permanently	- - ✓	n.a. n.a. n.a.	n.a. n.a. n.a.	n.a. n.a. n.a.
Coordinator of flows 1) provider of flows 2) receiver of flows 3) third party 4) no coordinator	top-management (can be provider, receiver or third party)	n.a.	coordinator purposively installed	n.a.
Coordination of flows 1) process-based coordination 2) behaviour-based coordination 3) output-based coordination 4) muddling through and self organization	very important very important n.a. important	important very important important n.a.	important very important important important	no crucial role very important explicitly not effective important

