

THE STRATEGIC IMPACT OF EXTERNAL NETWORKS: SUBSIDIARY PERFORMANCE AND COMPETENCE DEVELOPMENT IN THE MULTINATIONAL CORPORATION

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This paper explores the importance of relational embeddedness in external networks as a strategic resource for performance and competence development in multinational corporations (MNCs). Two different types of relational embeddedness at the subsidiary level—business embeddedness and technical embeddedness—are proposed to have an influence on the subsidiary's market performance as well as its importance for competence development in the MNC. Using data on 97 Swedish MNC subsidiaries, five hypotheses are tested in a LISREL model analysis. The results suggest that technical embeddedness has a positive impact on both the subsidiary expected performance and its role in the development of products and production processes in the MNC. Indirectly, through external technical embeddedness, external business embeddedness also influences the sister units' product and process development and subsidiary market performance. Copyright © 2002 John Wiley & Sons, Ltd.

EXTERNAL NETWORKS AND THE MULTINATIONAL CORPORATION

A special feature of multinational firms (MNCs) is the notion that their subunits (subsidiaries) are embedded in different local networks (Ghoshal and Bartlett, 1990; Ghoshal and Nohria, 1997; Forsgren, Johanson, and Sharma, 2000). Each subsidiary maintains unique and idiosyncratic patterns of network linkages and consequently is differentially exposed to new knowledge, ideas and opportunities (McEvily and Zaheer, 1999). In fact, this differential exposure has been put forward as one of the basic competitive advantages of the multinational firm, because it increases the breadth and variety of its network resources (Malnight, 1996). It is also in line with recent trends in foreign direct investment theory, in which foreign investments

are viewed as series of attempts to selectively tap knowledge linked to specific local business contexts (Cantwell, 1990; Almeida, 1996; Dunning, 1996).

The network resources of a focused subsidiary can influence the competitive ability of an MNC in two main ways. First, there is reason to assume that the subsidiary's access to these network resources will have an impact on the subsidiary's competitive capability in its own market. Second, through the transfer of these capabilities from the focused subsidiary to other MNC units, the competence of the MNC as a whole will be upgraded.

Several studies have focused on the issue of how a subsidiary's business environment affects its role within the MNC. However, most of them treat the environment in a rather general way, not considering its complexity, dynamism or resource richness, for example, and focus more on internal conditions and relationships (see, for example, Hedlund, 1986; Ghoshal, 1986; Ghoshal and Nohria, 1989, 1997; Bartlett and Ghoshal, 1989; Jarillo and Martinez, 1990; Gupta and Govindarajan, 1991,

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1994; Rosenzweig and Singh, 1991; Birkinshaw and Morrison, 1995; Birkinshaw, 1997). Few studies have more explicitly examined the importance that a subsidiary's external network of specific business relationships has on its market performance and its strategic role within the MNC. This paper will explore this void.

Our approach is in line with the idea that firms are embedded in social networks with other actors (see, for example, Granovetter, 1985; Håkansson and Snehota, 1998; Zukin and DiMaggio, 1990; Burt, 1992; Holm, Johanson, and Thilenius, 1995; Uzzi, 1996; Dyer and Singh, 1998; Gulati, Nohria, and Zaheer, 2000; Rowley, Behrens, and Krackhardt, 2000). A common theme in this respect is that a firm's network can be seen as a resource in itself. Through the social network, the firm gets access to resources and capabilities outside the organization, such as capital, goods, services, innovations, etc. The network is created through a path-dependent process and is, therefore, idiosyncratic and difficult to imitate. Consequently, the resources which are accessible through the network are also relatively inimitable and nonsubstitutable (Gulati, 1999; Gulati *et al.*, 2000).

Our approach is also consistent with the emerging paradigm of the diversified MNC (Doz and Prahalad, 1993) and the conception of the MNC as a differentiated network discussed by Ghoshal and Nohria (1997). The latter authors maintain that the differentiated network model should be extended by recognizing that the environment of the MNC is itself a network of suppliers, customers etc. They emphasize that such research should be directed to understanding how different attributes of the MNC can be explained by selected attributes of the external network (Ghoshal and Nohria, 1997: 196).

This is precisely our intention with the present paper. We focus on two attributes of the MNC, both located at the subsidiary level: the subsidiary's market performance and the subsidiary's role in the competence development within the MNC as a whole. The selected attribute of the external network is the subsidiary's degree of embeddedness within its network. More specifically, we investigate how the degree of embeddedness within the external network affects the market performance of the subsidiary in its own market and its importance for competence development in other parts of the MNC.

In the next section, the concept of embeddedness in an MNC setting is introduced. In the following

sections, hypotheses are formulated concerning the relationships between embeddedness and the subsidiary's expected market performance, and embeddedness and the importance of a subsidiary for competence development in the MNC as a whole. In the subsequent sections, the hypotheses are tested empirically by applying data from Swedish MNCs in a LISREL model. The final sections discuss the results from the empirical testing, managerial implications and possible areas for future research about the modern MNC.

EMBEDDEDNESS AS A STRATEGIC RESOURCE AT THE SUBSIDIARY LEVEL

The concept of embeddedness has been used by several scholars to emphasize the relationships with other business actors as a crucial ingredient of every organization's business life (see, for example, Polanyi, 1957; Granovetter, 1985, 1992; Zukin and DiMaggio, 1990; Grabher, 1993; Håkansson and Snehota, 1995; Uzzi, 1996, 1997; Gulati, 1998; Halinen and Törnroos, 1998; McEvily and Zaheer, 1999; Dyer and Chu, 2000; Gulati *et al.*, 2000; Rowley *et al.*, 2000). The concept of network embeddedness has also been used more specifically to analyze certain issues in relation to MNCs (Andersson and Forsgren, 1996, 2000; Forsgren *et al.*, 2000).

Although a closer look at these works reveals great variety in the conceptualization of network embeddedness, some common themes appear (for an overview, see Dacin, Ventresca, and Beal, 1999). First, network embeddedness can be looked upon as a strategic resource influencing the firm's future capability and expected performance. Therefore, performance may vary between firms because of differences in network embeddedness. Second, embeddedness in business networks is assumed to develop over time from a state characterized by arm's-length relationships to relationships based on adaptation and trust (Larson, 1992; Håkansson and Snehota, 1995; Ford, 1997; Uzzi, 1997). Consequently, embeddedness should be treated as a continuous variable rather than as a dichotomy that is either absent or present (Dacin *et al.*, 1999: 24).

Third, most writings recognize that embeddedness as a strategic resource has a relational as well as a structural dimension. Relational embeddedness stresses the role of direct cohesive ties

as a mechanism for gaining fine-grained information (Gulati, 1998: 296). Applied in an MNC context, relational embeddedness refers to the extent to which a subsidiary's individual, direct relationships with customers, suppliers, competitors etc. can serve as sources of learning. An underlying idea is that actors who are strongly tied to each other are more capable of exchanging information, and therefore can learn more from each other (Mowery, Oxley, and Silverman, 1996; Uzzi, 1996; Kumar and Nti, 1998; Lane and Lubatkin, 1998; Hansen, 1999). Consequently, an organization does not have an equal capacity to learn from all organizations. A subsidiary's possibility to identify new information in other organizations, and its ability to assimilate this information, is heavily dependent on the closeness of its existing dyadic relationships with different business partners (Lane and Lubatkin, 1998: 463).

Structural embeddedness shifts the analytical approach from the dyad to the system. In an MNC context structural embeddedness deals with the system of business relationships in which the subsidiary is embedded. It highlights the advantage a subsidiary can derive from its position in the network rather than advantage from information exchange in individual relationships (Granovetter, 1992; Gulati, 1998; Nahapiet and Ghoshal, 1998; Rowley *et al.*, 2000). An important distinction has been made between the advantage of a powerful brokerage position in a network of nonredundant ties and advantage connected to being a member of a coordinated network of redundant ties (Burt,

1992; Walker, Kogut, and Shan, 1997; Kogut, 2000).

In the present paper relational embeddedness is focused upon. We emphasize advantages through learning in individual relationships rather than through positions in a system of relationships. The purpose of the paper is to investigate what impact the closeness of the subsidiary's direct, external relationships at the dyadic level has on the subsidiary's market performance and role in the MNC's competence development.

Figure 1 illustrates the relationships between a subsidiary's external network and its market performance and the role the subsidiary plays in the competence development within the MNC. Through its relationships with individual actors, the subsidiary absorbs new knowledge from the environment, and this will have a positive impact on its own market performance. However, the subsidiary capacity to absorb knowledge can also have an impact on the strategic role in the competence development process through transfer of knowledge to other subsidiaries.

In research on the causal relationship between relational embeddedness and performance there are indications that over a certain threshold level the degree of embeddedness can be counterproductive due to 'overembeddedness' (Uzzi, 1996, 1997; Håkansson and Snehota, 1998). However, the risk of overembeddedness in this research is mostly associated with the second-order network coupling while the first-order coupling shows a positive and linear relationship with performance (Uzzi, 1996:

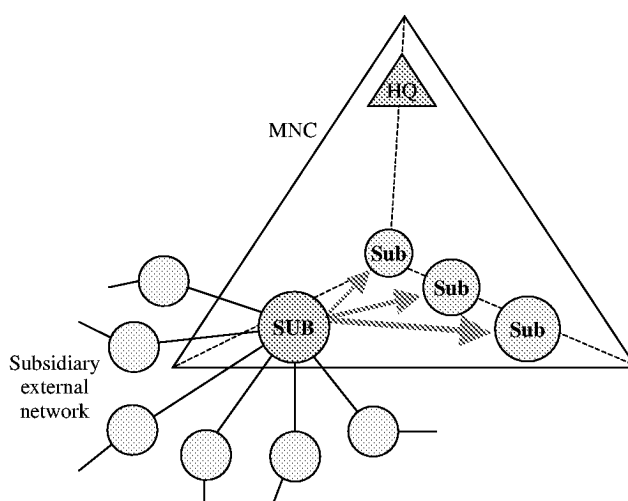


Figure 1. The subsidiary's external network embeddedness and importance for MNC development



691). As we in this paper are focusing on the subsidiary's direct business relationships, that is the first-order network coupling, we will treat the relationship between relational embeddedness and performance as a linear rather than as a curvilinear relationship.

BUSINESS AND TECHNICAL EMBEDDEDNESS IN SUBSIDIARY RELATIONSHIPS

Firms can be interconnected with each other through a wide range of social and economic relationships (Gulati, 1998). In the following, we will concentrate on the subsidiary's relationships with customers and suppliers to enable us to restrict our analysis to a manageable level. It has been argued in a large number of studies that for strategic purposes buyer–seller relationships should be at the centre of the investigation (Webster, 1979; Cunningham and Homse, 1986; Johanson and Mattsson, 1988). Buyer–seller relationships have also been central in studies of contractual relations (Williamson, 1979) and in studies of technical development within industrial systems (von Hippel, 1988; Håkansson, 1989). However, we should bear in mind that relationships with competitors, trade associations, and authorities, for example, may also influence a subsidiary's performance and its role in the MNC's competence development.

The existence of a subsidiary's relationships with customers and suppliers implies that the subsidiary is linked to external actors through sales and the purchase of goods and services. At one extreme, these relationships can be of a purely arm's-length character. The transactions between the subsidiary and its customers/suppliers are then based on economic considerations, with a readiness to change partners if changes in price, etc., occur. At the other extreme, transactions are based on very long-lasting relationships between the subsidiary and its customers/suppliers. In such transactions the partners have adapted their behavior extensively to each other, in terms of business routines, planning systems, information, etc., and the relationships are largely based on trust and mutual commitment. The interface between the subsidiary and its partners is also broad in terms of the number of functional areas and people involved. In such a situation, the readiness to change partner

is low owing to the investment already made in the relationship (Dyer and Singh, 1998).

In most cases, the characteristics of the transactions—and, consequently, of the relationships—lie somewhere between these two extremes. However, the more the relationships deviate from arm's-length relationships, the higher the degree of embeddedness (Uzzi, 1997). A high degree of embeddedness indicates that the actors have known each other for a long time, have transacted over a long period, have adapted their business conduct to each other and are used to exchanging information about market conditions. We have chosen to call this form of relational embeddedness with customers and suppliers *business embeddedness*.

Another form of embeddedness is *technical embeddedness*, which is defined as the interdependencies between firms in terms of their product and production development processes. It reflects the fact that development activities in one firm can be more or less adapted to development activities in another firm. A high degree of technical embeddedness means that the two organizations are highly interdependent in terms of their technological activities. For instance, the development of new products in the subsidiary might be based on intensive information exchange with another organization, and the development activities will therefore be adapted to conform with similar processes in that organization.

The two types of relational embeddedness are independent variables. A subsidiary can have a close relationship with another business actor based on sales or purchases, without any important interactions concerning product development or production process development taking place, and vice versa.

However, it has been shown that customers and suppliers play an important role for the manufacturers' development of products and processes (von Hippel, 1988). This is in line with the notion that intense contacts related to exchange of goods and services impact on the identification of the needs and possibilities to develop new products and processes (Håkansson and Snehota, 1995). A diversified set of deep direct contacts between different corporate functions in a business relationship signifies dependence between the two firms. Thus, the higher the degree of business embeddedness, in terms of contact pattern and relational depth, the higher the possibility for conducive

product and production process development. Further, knowledge of a more complex type is likely to be understood and appreciated to a greater extent if the acquaintance of the partners resides in something more than the transfer of goods and services. As knowledge is situated (Blackler, 1995), product development and production development are dependent on incremental sense making and on incremental troubleshooting (Malmberg, Solvell, and Zander, 1996). This is facilitated by high degrees of business embeddedness, as this means that the partners have access to each others' capabilities more easily. Empirical research also supports such a conclusion (Håkansson, 1989). Therefore, the following hypothesis is formulated:

Hypothesis 1: The relational business embeddedness of a subsidiary is positively related to its relational technical embeddedness.

In the following two sections we will discuss how business and technical embeddedness influence the subsidiary's performance in its own market and its role as a contributor to competence development in other corporate units.

SUBSIDIARY EMBEDDEDNESS AND MARKET PERFORMANCE

It is commonly thought that an organization's performance is contingent on its ability to obtain resources from its environment (Lawrence and Lorsch, 1967; Pfeffer and Salancik, 1978; Egelhoff, 1988). Some scholars have related performance more directly to the ability to absorb new knowledge from the environment through the network of specific interorganizational relationships. For instance, Powell, Koput, and Smith-Doerr (1996) found empirical support for a positive relationship between rates of growth and network relationships among biotechnology firms. Furthermore, in a study of 23 entrepreneurial firms it is argued that organizational performance increases with the use of embedded ties with network partners (Uzzi, 1997). Zaheer, McEvily, and Perone (1998) found a positive relationship between interorganizational trust and performance in a sample of 107 buyer-supplier interfirm relationships in the electrical equipment manufacturing industry.

There are several reasons for a positive relationship between business embeddedness and performance. For instance, it has been suggested that

lower uncertainty in close relationships between customers and suppliers will lead to better inventory control and lower inventory costs on both sides (Trevelen, 1987; Landeros and Monenczka, 1989). Arm's-length relationships also imply that new relationships are developed every period, which would prevent the firm from being able to benefit from lower selling and marketing costs over time (Kalwani and Narayandas, 1995). Close relationships mean a better understanding of a customer's needs (and a supplier's ability) and therefore more efficient marketing (purchasing) activities. Previous research has shown that it can be much more expensive to obtain new customers than servicing existing customers (Kotler and Armstrong, 1991).

Furthermore, actors in long-term relationships have a much better knowledge of the counterparts' resource heterogeneity. This knowledge will increase the possibility of value creation through combining the resources and activities on both sides that goes beyond the simple pooling of resources, and consequently an increased 'opportunity space' (Håkansson and Snehota 1995: 387; Blankenburg Holm, Eriksson, and Johanson, 1996).

Consequently, we argue that a subsidiary's present degree of business embeddedness is positively related to its *expected* performance in its own market. The following hypothesis can be formulated:

Hypothesis 2: The relational business embeddedness of a subsidiary is positively related to its expected market performance.

Further, it has been argued that one of the key factors for a firm's value creation is its ability to innovate (Hitt *et al.*, 1996; Bartlett and Ghoshal, 1990; De Mayer, 1992) and it has been demonstrated empirically that a unit's level of innovation is positively associated with the extent of the exchange of information with other units (Tsai and Ghoshal, 1998). It is reasonable to expect that a high degree of information exchange with other units regarding new products or production processes, that is, a high degree of technical embeddedness, is important for the level of innovation, and, consequently, for a subsidiary's expected performance. In an MNC setting, the following hypothesis can therefore be formulated:

Hypothesis 3: The relational technical embeddedness of a subsidiary is positively related to its expected market performance.

SUBSIDIARY EMBEDDEDNESS AND COMPETENCE DEVELOPMENT WITHIN THE MULTINATIONAL CORPORATION

It is often maintained that transfer of knowledge *within* organizations is easier to accomplish than is the transfer of knowledge *between* organizations (Kogut and Zander, 1992; Grant, 1996). Thus, one of the main competitive advantages with MNCs is the possibility to transfer knowledge between subsidiaries located in different countries and business contexts (Ghoshal, 1986; Ghoshal and Nohria, 1989; Rosenzweig and Singh, 1991; Malnight, 1996). We would therefore expect that, within an MNC, knowledge would flow from subsidiaries with high levels of competence to subsidiaries with low levels of competence.

But knowledge flows between different MNC units are dependent on many factors. One such factor includes the different administrative devices employed by the MNC to stimulate vertical and horizontal integration between units (Galbraith, 1973; Edström and Galbraith, 1977). Another factor is the existence of shared values in the MNC (Bartlett and Ghoshal, 1989; Ghoshal and Nohria, 1997). A third factor is whether the MNC has applied a multidomestic, global, or a transnational strategy (Harzing, 2000).

However, differences in relational embeddedness between subsidiaries create differences in their level of competence. We can also assume that these different competencies will be recognized by the headquarters of the MNC and/or by the other MNC units. This recognition can take the form of an assignment by the corporate headquarters, or be the result of the subsidiaries' own initiative (Birkinshaw, Hood, and Jonson, 1998: 223). In the former case, the corporate HQ identifies leading-edge subsidiaries, for instance based on internal benchmarking. These subsidiaries are assigned formal roles as developers of competence within a special area, including a responsibility to share this competence with other MNC units. The corporate headquarters will try to stimulate these processes through different integrative devices. In the latter case, the special competence of the subsidiary is

recognized by and shared with other parts of the MNC without any formal recognition by the headquarters. Over time the different units learn where different competencies reside in the corporation and how to use different lateral linkages through which these competencies can be absorbed.

These forms are interrelated, in the sense that the informal recognition at the subsidiary level will often develop into a formal assignment by the corporate headquarters (Birkinshaw and Morrison, 1995: 731). However, irrespective of the form taken, the extent to which a subsidiary's specialized competence will be recognized by the MNC is dependent on the subsidiary's ability to develop such competence, and stand out from the rest of the corporation (Forsgren *et al.*, 2000: 48). The different abilities will to a large extent determine which subsidiaries will be givers and which will be receivers in the corporate system. We have argued above that a subsidiary's relational embeddedness has a positive influence on these abilities. Consequently, limiting our analysis to technical embeddedness and competence development in terms of product development and production process development, the following hypothesis can be formulated:

Hypothesis 4a: The relational technical embeddedness of a subsidiary is positively related to its importance for other MNC units' competence development.

However, several authors have pointed out that knowledge transfer within organizations is difficult to accomplish. The reason for this is related to the knowledge itself, as well as to the characteristics of the sender and the recipient, and the relationship between them. For instance, it has been argued that it is difficult to transfer idiosyncratic, specific, tacit, and/or noncodified knowledge from one unit to another, owing to the problem of separating such knowledge from the unit in possession of the knowledge, and adding it to another actor's knowledge base (Jensen and Meckling, 1992; Kogut and Zander, 1992; Szulanski, 1995, 1996; Zander and Kogut, 1995; Grant, 1996; Spender, 1996; Hansen, 1999). Other problems specified are related to the recipients' ability or willingness to absorb new information (Allen, 1977; Hayes and Clark, 1985; Porter, 1985; Cohen and Levinthal, 1990; Szulanski, 1996).

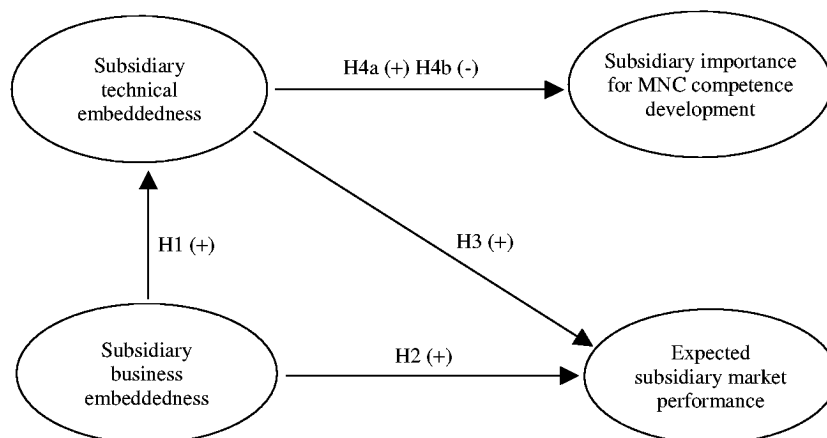


Figure 2. The hypothesized model

In an MNC, one barrier to knowledge transfer is especially interesting, namely, context specificity. The complex, idiosyncratic, interaction processes between the subsidiary and its local business partners create competence that cannot easily be used in other corporate units' business contexts. Knowledge development is context-specific, or may even be relation-specific. This specificity is positively correlated with the ability to absorb knowledge (Lane and Lubatkin, 1998). For instance, an extensive, long-term cooperation with a specific customer or supplier will improve the subsidiary's problem-solving capacity and its ability to create new knowledge. However, the more context-specific the solutions are, the more difficult it will be to apply the knowledge in another corporate unit's business context. Consequently, if we assume that subsidiary network embeddedness is positively related to competence development, and also to context specificity, we can argue that there is a trade-off between embeddedness and the possibility to transfer knowledge to other corporate units.

One can argue that the context-specificity problem is reflected in the degree of embeddedness of the subsidiary's network. The more the subsidiary is engaged in deep and intensive interactions with specific counterparts in its business context, the higher the context specificity of the relationships, and the more resources will be deployed in relation-specific activities. This trade-off problem is especially relevant for the subsidiary's development activities. For instance, the more the local subsidiary is involved in product development cooperation with specific external customers

or suppliers, the more context-specific are these activities.

Therefore, the following alternative hypothesis can be formulated:

Hypothesis 4b: The relational technical embeddedness of a subsidiary is negatively related to its importance for other MNC units' competence development.

Hypotheses 1–4 are summarized in Figure 2.

In the following, this model is tested on a sample of subsidiaries belonging to product divisions of Swedish MNCs.

SAMPLE AND DATA GATHERING

For practical reasons, our sampling frame is Swedish MNCs. The firms represent a wide spectrum of Swedish industry, though with an emphasis on manufacturing (hard materials, paper, power, petrochemicals, retailing, transportation, services, and telecommunications). Our initial contact with these firms was at the divisional headquarters (HQ) level, rather than at the corporate level. This was for two reasons. First, the divisional level of the firm is closer to the subsidiary operations and the divisional HQ has a direct management relationship with the subsidiaries. Second, knowledge about subsidiary activities is primarily an intradivisional issue since the divisionalization of the MNC separates different businesses from each other (Egelhoff, 1988; Stopford and Wells, 1972).



Data were collected from 97 subsidiaries—92 in Europe and five in North America—organized within 20 Swedish MNC divisions, all with divisional HQ located in Sweden. There are between two and nine subsidiaries within the different divisions, with the arithmetic mean being 4.85. The divisions are organized within 13 MNCs, seven of which had one division studied, five had two studied, and one had three divisions studied. This variation arose from the number of divisions in existence in the MNCs and the possibility of getting access to conduct face-to-face interviews with managers of division HQs and subsidiaries.

The average number of employees in the divisions is 5850, with a large variation, between 300 and 27,000. Turnover ranges from U.S. \$75 million to \$2.9 billion, with an average of about \$750 million. All divisions are highly international: five have between 14 and 42 percent of their employees outside Sweden and 15 divisions have more than 50 percent of their employees outside Sweden. Taken together, the divisions had more than 100,000 employees and an annual turnover exceeding \$12.5 billion.

Together with the divisions' HQ, we have selected subsidiaries that are representative of the divisions' business activities in order to increase the possibility for general conclusions to be drawn from the data gathered. On average, the subsidiaries in the sample account for over 50 percent of the divisions' combined operations measured in terms of the number of employees. In 25 percent of the divisions, the subsidiaries investigated account for more than 80 percent of the divisions' total operations, while they account for between 10 and 60 percent in the remaining divisions. The size of the subsidiaries varies between 50 and over 5000 employees. The subsidiaries investigated conduct their own production and sales. Product development and production process development are therefore important activities in every subsidiary.

The data collection was made through face-to-face interviews with managers both in the subsidiaries and in the divisional HQ. First, the assessments of the subsidiaries' relationships with customers and suppliers were made with two different managers in each subsidiary: the sales manager and the manager responsible for purchasing. The choice of which subsidiary relationships to study was a critical issue. First, we had to limit the number of relationships to be investigated, as it would be an insurmountable task to gather information

about all kinds of relationships that a subsidiary has, especially as the study required face-to-face interviews in several countries. Thus for practical and analytical reasons, we have limited our investigation of subsidiary embeddedness to concern relatively few of each subsidiary's customers and suppliers relating to its most important field of business. Therefore, subsidiary managers were asked to describe and assess six relationships that they considered important in a general sense: three with customers and three with suppliers. In our personal interviews with responding managers we have been very careful not to make them select business relationships that are important for a pre-specified reason, but for any reason as long as it is important to their business activities. This does not mean that the relationships chosen were selected with regard to their degree of embeddedness, but rather for any reason at all. In a second step, specific indicators of business and technical embeddedness were measured by asking the managers to characterize the relationships, using a standardized interview guide. A number of specific variables relating to the subsidiary embeddedness in specific activities were measured, such as the number of functional areas involved in direct contacts between the subsidiary and its respective counterparts. Other measures concerned the degree of adaptation in business and technical aspects, measured on a 5-point Likert-type scale for each relationship. On this relationship level, the data show a normal distribution although mean values differ somewhat.

In order to identify the specific external relationships of the subsidiaries, the managers were also asked to indicate if the relationship in question was external to the MNC. Out of 514 relationships chosen by the sales and purchasing managers, 405 were external, i.e., 79 percent. It is these 405 external relationships that are used for the subsequent analysis of subsidiary external business and technical embeddedness.

After interviews with the subsidiary managers in one division, the next step was to go back to the divisional HQ and conduct a personal interview with the divisional manager, using the same type of standardized interview guide. Through these interviews, we gathered information about the HQ manager's view of the subsidiaries' expected market performance and their respective importance for the development of their sister units. Each personal interview lasted for about 1½ hours, during

which time problems involving concepts and interpretations in the questionnaire were discussed and explained.

CONSTRUCT ANALYSIS

The validity of LISREL models is estimated by the validity of the entire model, i.e., by the nomological validity. But before estimating the nomological validity of the model, with the causal relations specified, it is important to judge the convergent validity, i.e., the homogeneity of the constructs included in the model, and the discriminant validity, i.e., to what extent the constructs are independent. First, we will describe the operationalization of the constructs included, and then we will evaluate the different forms of validity.

Subsidiary business embeddedness

Business embeddedness should mirror a subsidiary's capacity to understand changing business conditions and its ability to adapt to these conditions through its business relationships. Business embeddedness is related to a subsidiary's general business activities, and should reflect to what extent its relationships with external suppliers and customers depart from arm's-length relations in its ordinary business operations (Uzzi, 1997). We therefore need sound indicators of how embedded the subsidiary is in its relationships, in terms of how it has adapted its business behavior and the breadth of its contact pattern with its external business partners.

We first asked the subsidiary sales manager and the manager responsible for purchasing in the subsidiary to estimate to what extent the subsidiary has adapted its *way of doing business* because of the relationships with the most important external customers and suppliers. A 5-point Likert-type scale from 1 (not at all) to 5 (very much) was used for the indicator. The responses indicate the degree of external business embeddedness in these relationships. Secondly, we also asked sales and purchasing managers to assess the *number of different functional areas that are involved in direct contacts* with customers and suppliers. These functional areas are the chief executives, the administration, the purchasing department, the sales department, the production department (technical staff), and the R&D department. The higher the number of

functional areas involved, the greater the investment in the relationship, and also, the higher the possibility to absorb useful knowledge about the general business conditions. To assess a general measure of business embeddedness external to the MNC, the scores on adaptation of business conduct in each external relationship were added together and thereafter divided by the number of external relationships of the subsidiary. This produced an average score, indicating the subsidiary's degree of external business embeddedness. The score for the number of functional areas was treated in a similar way.

Subsidiary technical embeddedness

Technical embeddedness should reflect the value of a business relationship in terms of the subsidiary's capacity to absorb new technology through a relationship. It is often argued that development of technology is reflected, above all, in a company's development of new products and/or production processes (see, for example, Mansfield, 1968). We therefore chose the *development of new products* and *development of new production processes* as our two indicators of external technical embeddedness. The subsidiary's sales and purchasing managers were asked to assess to what extent a specific relationship with an external customer or supplier, respectively, had caused the subsidiary's product and production development to be adapted. A 5-point Likert-type scale from 1 (not at all) to 5 (very much) has been used for each indicator. In the same way as for business embeddedness, the subsidiary's average technical embeddedness was calculated by adding the scores of each of the subsidiary's external relationships and then dividing this score by the number of external relationships identified for each subsidiary.

It should be stressed that the emphasis in the interviews with the subsidiary managers has been on the subsidiary's most important product or group of products. This means that all questions about business relationships, adaptation, product development and production development refer to a specific product or market area, rather than to the subsidiary's overall activity. This means that embeddedness concerns customers and suppliers that relate to the same system of subsidiary business activity, which increases the relevance of our indicators.

Expected subsidiary market performance

As our intention is to investigate how present embeddedness impacts on future conditions, we use *expected* market performance as our construct. Expected market performance is measured by expected *profitability*, *sales volume*, and *market shares*, as perceived by divisional HQ managers. Apart from the advantage of separating the responses relating to embeddedness from those concerning performance, the measure also has the virtue of giving the divisional HQ the possibility to make comparisons across subsidiaries and countries. A 5-point Likert-type scale from 1 (very small) to 5 (very high) was used to separate the answers.

Subsidiary importance for MNC competence development

To receive valid and reliable measures of the subsidiary importance for MNC competence development, we used indicators reflecting the divisional HQ management's assessment of the subsidiary's importance for technical development in terms of product and production development for other sister units. A benefit of using the divisional management's responses to these questions is that it separates them from the responses relating to embeddedness. It also gives the divisional management the possibility to compare the contribution different subsidiaries make to competence development. A 5-point Likert-type scale from 1 (very small) to 5 (very high) was used.

A measurement model was created in order to assess convergent and discriminant validity. In Table 1, convergent validity is judged by the R^2 -values measuring the strength of the linear relationships, the t -values, a significance test of each relationship in the model, and the factor loading for each indicator (Jöreskog and Sörbom, 1993). The constructs in this LISREL model all have good convergent validity, i.e., they are homogeneous constructs. As can be seen in Table 1, the strength of the linearity in relations between constructs and indicators is in most cases relatively strong. For the indicators 'number of functional areas involved in direct contacts with people from this counterpart' and 'how does the HQ judge this subsidiary's future increase in profitability,' the linearity of the relations is somewhat

weaker, with R^2 -values of 0.33 and 0.24 respectively. Although the R^2 -values of these indicators are lower, they nevertheless are highly significant judging from their high t -values (see Table 1). This and the fact that they constitute important dimensions of their respective constructs from a theoretical point of view are the reasons for keeping them as indicators. From Table 1 we can also conclude that the t -values for all other indicators are highly significant (lowest t -value 3.36) and that their factor loadings are strong. A correlation matrix of the indicators is provided in the Appendix.

Our set of latent constructs has high discriminant validity as key statistical estimates show absence of unidimensionality. In one case, though, the variation of one of the indicators, *Expected increase in sales volume*, which is indicated by the construct *Expected subsidiary market performance*, is to some degree also explained by the latent construct *Subsidiary importance for MNC competence development*. This negatively affects the discriminant validity of these two constructs. However, between the two constructs, which together comprise five indicators, only one indicator has this problem. Further, as the convergent validity is good and each of the indicators assigned to the construct *Subsidiary importance for MNC competence development* has a stronger relationship with the construct than the indicator *Expected increase in sales volume*, we proceeded with the analysis without omitting this indicator. Moreover, the indicator is the strongest one in the construct *Expected subsidiary market performance*.

The second step in the analytical process was to form the structural model by specifying the causal relations in accordance with the hypotheses. We tested single causal relations with t -values and factor loadings between the constructs in the model. We assessed the entire model by chi-squares (*normal theory weighted least squares*) and degrees of freedom and a probability estimate (p -value), which is a test of a nonsignificant distance between data and model, i.e., nomological validity (Jöreskog and Sörbom, 1993).

RESULTS

Through repeated iterations a LISREL analysis proceeds with the fine-tuning of the model to

Table 1. Constructs and indicators

Constructs and indicators	Factor loading	<i>t</i> -value	<i>R</i> ² -value
<i>Subsidiary business embeddedness</i>			
To what extent has the relationship with this counterpart caused adaptation to the subsidiary concerning business conduct?	0.70	6.13	0.49
Number of functional areas involved in direct contacts with people from this counterpart	0.57	5.17	0.33
<i>Subsidiary technical embeddedness</i>			
To what extent has the relationship with this counterpart caused adaptation to the subsidiary concerning its:			
Product development?	0.92	3.36	0.85
Production development?	0.70	3.53	0.50
<i>Expected subsidiary market performance</i>			
How does the HQ judge this subsidiary's future increase in sales volume?	0.90	8.69	0.82
How does the HQ judge this subsidiary's future market share expansion?	0.82	8.05	0.67
How does the HQ judge this subsidiary's future increase in profitability?	0.49	4.72	0.24
<i>Subsidiary importance for MNC competence development</i>			
To what extent is this subsidiary important for other Divisional units':			
Product development?	0.70	5.25	0.50
Production development?	0.79	5.20	0.62

obtain a more coherent representation of the empirical data. The purpose of the LISREL analysis is to arrive at and confirm a model consisting of specified casual relations. When a specific relation cannot be verified, it is omitted from the subsequent estimation of the model (Bollen, 1989; Jöreskog and Sörbom, 1993). Thus in our test we generated a structural model that contains significant relationships in accordance with the stipulated hypotheses (Figure 3).

The first step was to test all hypothesized causal relationships simultaneously. Although the overall model was significant ($\chi^2_{(d.f. 23)} = 24.16$, $p = 0.39$), the result revealed only two significant relations between the four constructs: the one between business embeddedness and technical embeddedness and the one between technical embeddedness and importance for competence development. However, the statistics indicated that eliminating insignificant relations could improve the model. First, we therefore omitted the most insignificant relation, the one between business embeddedness and expected market performance (Hypothesis 2), which has a factor loading of -0.00 and a *t*-value of -0.01 . In the next step, we tested Hypotheses 1, 3, 4a, and 4b. The statistical output for the overall

model was again significant ($\chi^2_{(d.f. 24)} = 24.16$, $p = 0.45$).

The remaining relations between the constructs were significant: business embeddedness and technical embeddedness (factor loading = 0.83, *t*-value = 6.55), technical embeddedness and expected market performance (factor loading = 0.27, *t*-value = 2.34), and finally, technical embeddedness and importance for competence development (factor loading = 0.46, *t*-value = 2.98). The statistics also indicated that no further development of the model was needed since the RMSEA measure (root mean square error of approximation) is as low as 0.008, which indicates a very good fit (Browne and Cudeck, 1989).

The resulting model is based on three relations. The first is a significant positive relation from subsidiary business embeddedness to subsidiary technical embeddedness, thus supporting Hypothesis 1. In other words, the result indicates that external business embeddedness is positively related to external technical embeddedness. Second, Hypothesis 3 is supported, as there is a significant and positive relation between subsidiary technical embeddedness and expected subsidiary market performance. The data thus support the

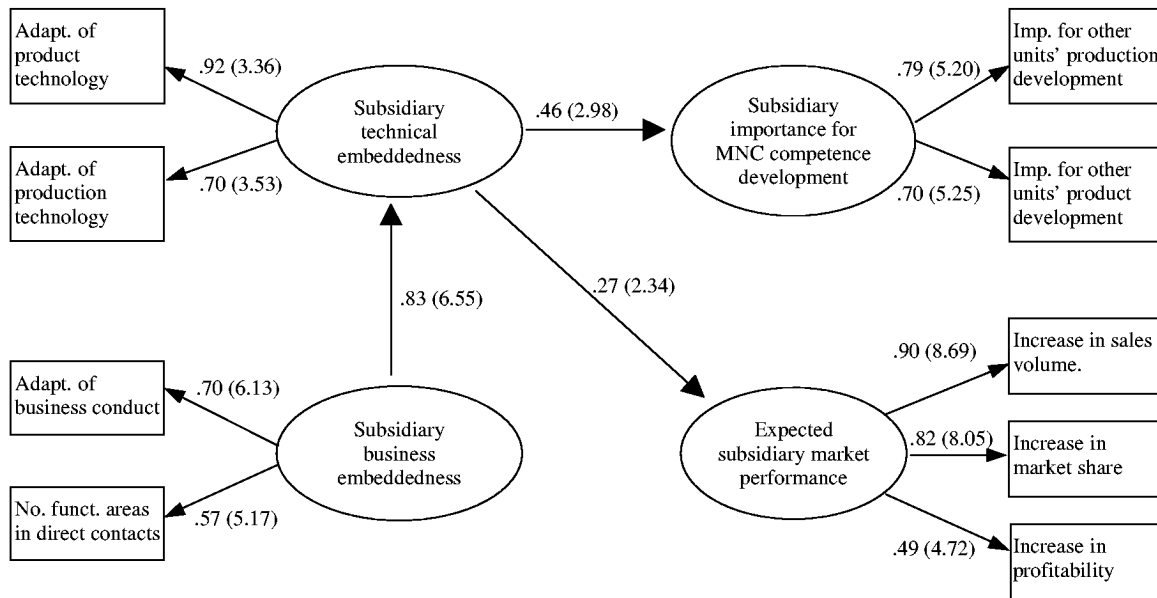


Figure 3. The final model. Model chi-square is 24.16 with 24 degrees of freedom, at a probability of 0.45. The figures given are factor loadings of causal relations with *t*-values in parentheses

view that close relationships with external customers and suppliers, in terms of product and process development, have a positive impact on the subsidiary's success in its own market. Further, the received model shows that a subsidiary's external technical embeddedness also predicts its role within the MNC. Among the two competing and mutually exclusive hypotheses, 4a and 4b, Hypothesis 4a is supported, as there is a positive and significant relationship between subsidiary technical embeddedness and the subsidiary's importance for other units' competence development. Expressed differently, the subsidiary's ability to contribute to other units' competence development is not counterbalanced by the problem of transferring knowledge from one subsidiary to other subsidiaries, owing to context specificity.

Hypothesis 2—the relation between subsidiary business embeddedness and expected market performance—is not supported. This indicates that external business embeddedness has no direct impact on the subsidiary's expected performance. However, the LISREL analysis suggests that business embeddedness has an indirect impact on expected market performance and on the importance of a subsidiary for other units' competence development through its impact on technical embeddedness. This result confirms that the two types of embeddedness play different roles. Close

business relationships with external customers and suppliers stimulate relation-specific adaptation of resources and activities directed to product and process development. This, in turn, will improve the subsidiary's position in its own market place, as well as its possibility to contribute to other units' development of their products and production processes.

There are two possible complications related to the fact that multiple subsidiaries in our sample belong to the same division/firm. First, some divisions/firms can drive the overall results more than others. Second, the positive relationships between embeddedness and expected performance/importance for other MNC units' competence development may reflect differences between divisions/firms, due to the fact that they belong to different industries, rather than differences between subsidiaries *within* divisions/firms. In order to control for the first problem we have carried out a so-called jack-knife procedure on the resulting model (see for instance, Chatfield, 1988). First we excluded one division from the original sample to receive a subsample and then we reran the model to test if there were any significant changes on the original factor loadings between the relations. This procedure was repeated for each subsample, i.e., 20 times, with each and every division in the sample being omitted from the original sample. The 20



tests resulted in no significant changes of the factor loadings in the model, as no change was significant at a 5 percent level. Concerning Hypothesis 1, the mean value of the factor loadings of the 20 tests was 0.85, which clearly is within the 5 percent significance level where the cut-off points, i.e., maximum and minimum values, are 0.96 and 0.70. The corresponding value for Hypothesis 3 was 0.29, which also is close to the value for the entire data set and within the 5 percent significance level, where the cut-off points are 0.39 and 0.15. Finally, the mean value of the factor loading for Hypothesis 4a is 0.46, which also is well within the 5 percent significance level where maximum and minimum values are 0.61 and 0.31. These values are very close to the results of the overall model and all *t*-values remained significant through the tests. To control for any firm effects we have carried out a corresponding jack-knife procedure for MNCs. In this case we omitted one firm (MNC) at the time and then reran the model on the remaining subsidiaries. This procedure was repeated for each subsample, i.e., six times, as there are only six MNCs for which more than one division has been studied. No significant changes could be found.

The second problem deals with whether our results also are applicable within divisions/firms. Our possibility to test the model, holding divisions/firms constant, is limited due to the low number of subsidiaries within each division/firm. However, in order to make a preliminary test whether the results reflect an industry rather than a subsidiary effect, the model has been tested on subsidiaries belonging to engineering firms in our data ($n = 54$). The factor loadings for Hypotheses 1, 3, and 4a are 0.72, 0.20, and 0.49, respectively. All values are within the 5 percent significance level and the *p*-value for the model is 0.50. This result supports the conclusion that the relationships between embeddedness and expected market performance/subsidiary importance for MNC competence development are relevant also for subsidiaries within the same industry. Moreover, when investigating divisions with the largest number of subsidiaries we can conclude that there is a large variation between subsidiaries regarding the indicators used. This is also an indication that the results are not limited to the division /firm level.

CONCLUDING REMARKS

The conceptualization of the MNC as a differentiated network highlights the differences between subsidiaries arising from differences in resources, business context, history, type of establishment, etc. (Ghoshal and Nohria, 1989, 1997; Ghoshal and Bartlett, 1990; Malnight, 1996). A special challenge for the MNC is to reap the benefits of the diverse resource structure by transferring and using capabilities in other parts of the MNC than where they originated, as well as creating new values by combining resources from several subsidiaries. It is assumed that, in terms of horizontal ties between subsidiaries, the network plays a crucial role in these processes. The exchange and combination of resources will be carried out through these networks, and the role of the different subsidiaries in these processes will differ depending upon their positions in the network.

Except for a few contributions (see, for example, Ghoshal and Bartlett, 1990), the use of the network concept for the differentiated MNC has primarily focused upon intraorganizational issues. It is the network, in terms of the exchange of goods, services, and information between the subsidiaries, rather than the business or social links that each subsidiary has with external actors, that is highlighted. However, there are several reasons to extend the analysis to include the subsidiaries' external network. First, from a subsidiary perspective, the external network is as important as its internal network for its daily business life and competitiveness. Second, a challenging research question is not only how competence can be transferred from one subsidiary to other MNC units, but also how competence is created in the subsidiary in the first place. The external network can play a crucial role as a strategic source for such competence development.

The result of our study confirms that the conception of the MNC as a differentiated network should be extended to include the external network of the MNC (Ghoshal and Nohria, 1997), because our results indicate that external network embeddedness matters. First, external technical embeddedness has a positive impact on subsidiary expected market performance. This is in line with research showing that firms that are connected to their networks by embedded ties have a greater chance of survival than firms that are connected through

arm's-length ties (Powell *et al.*, 1996; Uzzi, 1996; Zaheer *et al.*, 1998).

Second, the subsidiary's external network also affects its role within the MNC. Although arguments can be found for expecting a negative relationship between a subsidiary's technical embeddedness and its importance for competence development in the rest of the MNC, no such relationship was found. On the contrary, there seems to be a positive link between the degree of technical embeddedness of the subsidiary's external network and its role as a provider of knowledge about product and production process development to other MNC units.

Third, our results also point to the fact that external embeddedness is multifaceted. They indicate that, in terms of sales and purchases, embeddedness has no direct impact on either subsidiary performance or the development of products and production processes within the MNC. However, such embeddedness influences the development of technical embeddedness. These processes impact the subsidiary that engages in selling and purchasing with external actors and an adaptation of resources on both sides will occur, including more and more personal contact—that is, a higher degree of business embeddedness. This process stimulates cooperation between the parties within the R&D function, manifested by a high degree of mutual adaptation in terms of product and production process development activities—that is, technical embeddedness. Our results suggest that business embeddedness has a strong positive impact on technical embeddedness and, consequently, an indirect impact on both subsidiary performance and competence development within the MNC.

IMPLICATIONS FOR MANAGEMENT AND FUTURE RESEARCH

A possible reason for the positive effect of external technical embeddedness on MNC competence development is related to the role of management. Several authors have pointed out that there are integrative devices that can be used by the HQ to stimulate cooperation and coordination between subunits, including competence development (Galbraith, 1973; Edström and Galbraith, 1977; Hedlund, 1986; Ghoshal and Bartlett, 1988, 1990; Grant, 1996). One possible explanation for the insignificance of Hypothesis 4b can be the relative

success of such devices. Expressed differently, the negative impact of context specificity on the subsidiary's importance for competence development in other units can be reduced or eliminated due to successful knowledge management by the corporate or divisional HQ. From a managerial point of view, the HQ managers need to recognize the importance of and the difference between subsidiaries' external embeddedness. The HQ's knowledge of subsidiary relationships becomes crucial. If we assume that competence developed in these relationships is of tacit nature, the involvement of the HQ in these relationships is a necessity. The HQ must take part and develop its own relationships with important customers and suppliers in the subsidiary's network. Thus, a task of importance for the strategic management of the differentiated MNC is the ability to 'bring the environment back in,' as Pfeffer (1987) expresses it, or to 'bring the HQ management back out,' as we would like to express it.

The subsidiary involvement in business relationships with other corporate units also relates to the HQ's ability to stimulate the diffusion of subsidiary competence within the MNC. Thus, subsidiary corporate embeddedness strengthens the possibility that competence developed in the subsidiary through external relationships can be transferred to these units. Consequently, the negative influence of context specificity and the lack of motivation to participate in knowledge transfer within the MNC, which follows from being externally embedded, are counteracted by corporate embeddedness.

This line of thought can be carried a bit further. Often an MNC subsidiary functions as a bridging tie between the external and the internal network. The assimilation and commercialization of new knowledge are carried out through the relationships with external actors and with sister units. There is no immediate contradiction between deploying resources in, on one hand, relationships with external customers and suppliers and in, on the other hand, relationships with sister units. New competence is not primarily developed in exchange with external actors and then transferred to other corporate units. Rather, it is developed in a constant and simultaneous interplay with external and corporate units. If this is a relevant scenario, Hypothesis 4b is of limited relevance and external network embeddedness—business and technical—has a strategic impact on the MNC, mediated by the subsidiary.

Because of the geographical and operational diversity of the MNC, these bridging-tie roles of subsidiaries are especially relevant for future research. Such research would probably have to include a deeper analysis of the nature of the external and internal networks as strategic resources. For instance, a usual argument is that ties to other business actors are important as channels for the assimilation and transfer of information. However, as indicated above, they are also important for the *development* of such information gained through cooperation between the actors and the combination of the actors' resources. Or expressed differently, one subsidiary role can be to function as a channel for the transfer of information from its own local market to sister units within the MNC. But another, and maybe more developed role, is to connect the competence development taking place in the MNC's external relationships with similar activities in its internal relationships. Maybe this role constitutes the most relevant aspect of what is sometimes called the multinational advantage.

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REFERENCES

- Allen TJ. 1977. *Managing the Flow of Technology*. MIT Press: Cambridge, MA.
- Almeida P. 1996. Knowledge sourcing by foreign multinationals: patent citation analysis in the U.S. semiconductor industry. *Strategic Management Journal*, Winter Special Issue **17**: 155–165.
- Andersson U, Forsgren M. 1996. Subsidiary embeddedness and control in the multinational corporation. *International Business Review* **5**(5): 487–508.
- Andersson U, Forsgren M. 2000. In search of centres of excellence: network embeddedness and subsidiary roles in multinational corporations. *Management International Review* **40**(4): 329–350.
- Bartlett CA, Ghoshal S. 1989. *Managing across Borders: The Transnational Solution*. Harvard Business School Press: Boston, MA.
- Bartlett CA, Ghoshal S. 1990. Managing innovation in the transnational corporation. In *Managing the Global Firm*, Bartlett CA, Doz Y, Hedlund G (eds). Routledge: London; 215–255.
- Birkinshaw JM. 1997. Entrepreneurship in multinational corporations: the characteristics of subsidiary initiatives. *Strategic Management Journal* **18**(3): 207–229.
- Birkinshaw JM, Morrison AM. 1995. Configurations of strategy and structure in multinational subsidiaries. *Journal of International Business Studies* **26**(4): 729–754.
- Birkinshaw JM, Hood N, Jonson S. 1998. Building firm-specific advantages in multinational corporations: the role of subsidiary initiative. *Strategic Management Journal* **19**(3): 221–241.
- Blackler F. 1995. Knowledge work and organizations: an overview and interpretation. *Organization Studies* **16**: 1021–1046.
- Blankenburg Holm D, Eriksson K, Johanson J. 1996. Business networks and cooperation in international business relationships. *Journal of International Business Studies* **28**(5): 1033–1053.
- Bollen KA. 1989. *Structural Equations with Latent Variables*. Wiley: New York.
- Browne MW, Cudeck R. 1989. Single sample cross validation rules for covariance structures. *Multivariate Behavioral Research* **24**: 445–455.
- Burt R. 1992. *Structural Holes: The Social Structure of Competition*. Harvard University Press: Cambridge, MA.
- Cantwell J. 1990. A survey of theories of international production. In *The Nature of the Transnational Firm*, Pitelis N, Sugden R (eds). Routledge: London; 16–63.
- Chatfield C. 1988. *A Statistician's Guide*. Chapman and Hall: London.
- Cohen W, Levinthal DA. 1990. Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly* **35**: 128–152.
- Cunningham MT, Homse E. 1986. Controlling the marketing–purchasing interface: resource development and organisational implications. *Industrial Marketing and Purchasing* **1**(2): 3–27.
- Dacin TM, Ventresca MJ, Beal BD. 1999. The embeddedness of organizations: dialogue and direction. *Journal of Management* **25**(3): 317–356.
- De Mayer A. 1992. Management of international R&D operations. In *Technology Management and International Business*, Granstrand O, Håkanson L, Sjölander S (eds). Wiley: Chichester; 163–179.
- Doz Y, Prahalad CK. 1993. Managing DMNCs: a search for a new paradigm. In *Organization Theory and the Multinational Corporation*, Ghoshal S, Westney DE (eds). St Martin's Press: New York; 24–50.
- Dunning JH. 1996. The geographical sources of the competitiveness of firms: some results of a new survey. *Transnational Corporations* **5**(3): 1–29.
- Dyer JH, Chu W. 2000. The determinants of trust in supplier–automaker relationships in the U.S., Japan, and Korea. *Journal of International Business* **31**(2): 259–285.
- Dyer JH, Singh H. 1998. The relational view: cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review* **23**(4): 660–679.
- Edström A, Galbraith J. 1977. Transfer of managers as a coordination and control device in multinational

- organizations. *Administrative Science Quarterly* **22**: 248–263.
- Egelhoff WG. 1988. *Organizing the Multinational Enterprise: An Information-Processing Perspective*. Ballinger: Cambridge, MA.
- Ford D (ed.). 1997. *Understanding Business Markets*. Dryden Press: London.
- Forsgren M, Johanson J, Sharma D. 2000. Development of MNC centres of excellence. In *The Emergence and Impact of MNC Centres of Excellence*, Holm U, Pedersen T (eds). Macmillan Press: London; 45–67.
- Galbraith J. 1973. *Designing Complex Organizations*. Addison Wesley: Reading, MA.
- Ghoshal S. 1986. The innovative multinational: a differentiated network of organizational roles and management processes. Doctoral dissertation. Harvard Business School.
- Ghoshal S, Bartlett CA. 1988. Creation, adoption, and diffusion of innovations by subsidiaries of multinational corporations. *Journal of International Business Studies* **19**: 365–387.
- Ghoshal S, Bartlett CA. 1990. The multinational corporation as an interorganizational network. *Academy of Management Review* **15**(4): 603–625.
- Ghoshal S, Nohria N. 1989. Internal differentiation within multinational corporations. *Strategic Management Journal* **10**(4): 323–337.
- Ghoshal S, Nohria N. 1997. *The Differentiated MNC: Organizing Multinational Corporation for Value Creation*. Jossey-Bass: San Francisco, CA.
- Grabher G. 1993. Rediscovering the social in the economics of interfirm relations. In *The Embedded Firm*, Grabher G (ed.). Routledge: London; 1–31.
- Granovetter M. 1985. Economic action and social structure: the problem of embeddedness. *American Journal of Sociology* **91**(3): 481–510.
- Granovetter M. 1992. Problems of explanation in economic sociology. In *Networks and Organizations: Structure, Form and Action*, Nohria N, Eccles R (eds). Harvard Business School Press: Boston, MA; 25–56.
- Grant RM. 1996. Toward a knowledge-based theory of the firm. *Strategic Management Journal*, Winter Special Issue **17**: 109–122.
- Gulati R. 1998. Alliances and networks. *Strategic Management Journal* **19**(4): 293–317.
- Gulati R. 1999. Network location and learning: the influence of network resources and firm capabilities on alliance formation. *Strategic Management Journal* **20**(5): 397–420.
- Gulati R, Nohria N, Zaheer A. 2000. Strategic networks. *Strategic Management Journal*, Special Issue **21**: 203–215.
- Gupta A, Govindarajan V. 1991. Knowledge flows and the structure of control within multinational corporations. *Academy of Management Review* **16**(4): 768–792.
- Gupta A, Govindarajan V. 1994. Organizing for knowledge flows within MNCs. *International Business Review* **3**(4): 443–457.
- Håkansson H. 1989. *Corporate Technological Behaviour: Cooperations and Networks*. Routledge: London.
- Håkansson H, Snehota I. 1995. *Developing Relationships in Business Networks*. Routledge: London.
- Håkansson H, Snehota I. 1998. The burden of relationships or who's next. In *Network Dynamics in International Marketing*, Naudé P, Turnbull PW (eds). Pergamon: Oxford; 16–25.
- Halinen A, Törnroos J-Å. 1998. The role of embeddedness in the evolution of business networks. *Scandinavian Journal of Management* **14**(3): 187–205.
- Hansen MT. 1999. The search–transfer problem: the role of weak ties in sharing knowledge across organization subunits. *Administrative Science Quarterly* **44**(1): 82–111.
- Harzing A-W. 2000. An empirical analysis and extension of the Bartlett and Ghoshal typology of multinational companies. *Journal of International Business Studies* **31**(1): 101–132.
- Hayes RH, Clark KB. 1985. *Exploring the Sources of Productivity Differences at the Factory Level*. Wiley: New York.
- Hedlund G. 1986. The hypermodern MNC: a heterarchy? *Human Resource Management* **25**(1): 9–35.
- Hitt MA, Hoskisson RE, Johnson RA, Moesel DD. 1996. The market for corporate control and firm innovation. *Academy of Management Journal* **39**: 1084–1119.
- Holm U, Johanson J, Thilenius P. 1995. Headquarters' knowledge of subsidiary network contexts in the multinational corporation. *International Studies of Management and Organizations* **25**(1–2): 97–120.
- Jarillo JC, Martinez JJ. 1990. Different roles for subsidiaries: the case of multinational corporations in Spain. *Strategic Management Journal* **11**(7): 501–512.
- Jensen MC, Meckling WH. 1992. Specific and general knowledge and organizational structure. In *Contract Economics*, Weir L, Wijkander H (eds). Blackwell: Oxford; 251–274.
- Johanson J, Mattsson L-G. 1988. Internationalization in industrial systems: a network approach. In *Strategies in Global Competition*, Hood N, Vahlne J-E (eds). Croom Helm: New York; 214–287.
- Jöreskog KG, Sörbom D. 1993. *LISREL 8: Structural Equation Modeling with the SIMPLIS Command Language*. Lawrence Erlbaum: Hillsdale, NJ.
- Kalwani MU, Narayandas N. 1995. *Journal of Marketing* **59**: 1–16.
- Kogut B. 2000. The network as knowledge: generative rules and the emergence of structure. *Strategic Management Journal* **21**(3): 405–425.
- Kogut B, Zander U. 1992. Knowledge of the firm, combinative capabilities and the replication of technology. *Organization Science* **3**(3): 383–397.
- Kotler P, Armstrong G. 1991. *Principles of Marketing*. Prentice-Hall: Englewood Cliffs, NJ.
- Kumar R, Nti KO. 1998. Differential learning and interaction in alliance dynamics: a process and outcome discrepancy model. *Organization Science* **9**(3): 356–367.
- Landeros R, Monenczka R. 1989. Cooperative buyer/seller relationships and a firm's competitive posture. *Journal of Purchasing and Materials Management* **25**(Fall): 9–18.

- Lane PJ, Lubatkin M. 1998. Relative absorptive capacity and interorganizational learning. *Strategic Management Journal* **19**(5): 461–477.
- Larson A. 1992. Network dyads in entrepreneurial settings: a study of the governance of exchange processes. *Administrative Science Quarterly* **37**: 76–104.
- Lawrence PR, Lorsch JW. 1967. *Organization and Environment: Managing Differentiation and Integration*. Harvard Business School Press: Boston, MA.
- Malmberg A, Sölvell Ö, Zander I. 1996. Spatial clustering, local accumulation of knowledge and firm competitiveness. *Geografiska Annaler* **78B**(2): 85–97.
- Malnight TW. 1996. The transition from decentralized to network-based MNC structures: an evolutionary perspective. *Journal of International Business Studies* **27**(1): 43–65.
- Mansfield E. 1968. *Industrial Research and Technological Innovation*. W.W. Norton: New York.
- McEvily B, Zaheer A. 1999. Bridging ties: a source of firm heterogeneity in competitive capabilities. *Strategic Management Journal* **20**(12): 1133–1156.
- Mowery DC, Oxley JE, Silverman BS. 1996. Strategic alliances and interfirm knowledge transfer. *Strategic Management Journal*, Winter Special Issue **17**: 77–91.
- Nahapiet J, Ghoshal S. 1998. Social capital, intellectual capital, and organizational advantage. *Academy of Management Review* **23**(2): 242–266.
- Pfeffer J. 1987. Bringing the environment back in: the social context of business strategy. In *The Competitive Challenge: Strategies for Industrial Innovation and Renewal*, Teece DJ (ed.). Ballinger: Cambridge, MA; 119–135.
- Pfeffer J, Salancik GR. 1978. *The External Control of Organizations: A Resource Dependence Perspective*. Harper & Row: New York.
- Polanyi K. 1957. *The Great Transformation*. Beacon Press: Boston, MA.
- Porter ME. 1985. *Competitive Advantage: Creating and Sustaining Superior Performance*. Free Press: New York.
- Powell WW, Koput KW, Smith-Doerr L. 1996. Interorganizational collaboration and the locus of innovation: networks of learning in biotechnology. *Administrative Science Quarterly* **41**(1): 116–137.
- Rosenzweig P, Singh J. 1991. Organizational environment and the multinational enterprise. *Academy of Management Review* **16**(2): 340–364.
- Rowley T, Behrens D, Krackhardt D. 2000. Redundant governance structures: an analysis of structural and relational embeddedness in the steel and semiconductor industries. *Strategic Management Journal* **21**(3): 369–386.
- Spender J-C. 1996. Making knowledge the basis of a dynamic theory of the firm. *Strategic Management Journal*, Winter Special Issue **17**: 45–62.
- Stopford JM, Wells LT. 1972. *Managing the Multinational Enterprise: Organization of the Firm and Ownership of the Subsidiaries*. Longman: London.
- Szulanski G. 1995. Unpacking stickiness: an empirical investigation of the barriers to transfer best practice within the firm. *Academy of Management Journal*, Special Issue: 437–444.
- Szulanski G. 1996. Exploring internal stickiness: impediments to the transfer of best practice within the firm. *Strategic Management Journal*, Winter Special Issue **17**: 27–43.
- Trevelen M. 1987. Single sourcing: a management tool for the quality supplier. *Journal of Purchasing and Materials Management* **23**(Spring): 19–24.
- Tsai W, Ghoshal S. 1998. Social capital and value creation: the role of intrafirm networks. *Academy of Management Journal* **41**(4): 464–476.
- Uzzi B. 1996. The sources and consequences of embeddedness for the economic performance of organizations: the network effect. *American Sociological Review* **61**(August): 674–698.
- Uzzi B. 1997. Social structure and competition in inter-firm networks: the paradox of embeddedness. *Administrative Science Quarterly* **42**: 35–67.
- von Hippel E. 1988. *Sources of Innovation*. Oxford University Press: Oxford.
- Walker G, Kogut B, Shan W. 1997. *Organization Science* **8**(2): 109–125.
- Webster FE Jr. 1979. *Industrial Marketing Strategy*. Ronald Press: New York.
- Williamson OE. 1979. Transaction-cost economics: the governance of contractual relations. *Journal of Law and Economics* **22**: 232–262.
- Zaheer A, McEvily B, Perrone V. 1998. Does trust matter? Exploring the effects of interorganizational and interpersonal trust on performance. *Organization Science* **9**(2): 141–159.
- Zander U, Kogut B. 1995. Knowledge and the speed of transfer and imitation of organizational capabilities: an empirical test. *Organization Science* **6**(1): 76–92.
- Zukin S, DiMaggio PJ (eds). 1990. *Structure of Capital*. Cambridge University Press: Cambridge, UK.

APPENDIX

Correlation matrix for the items used in the LISREL analysis

	1	2	3	4	5	6	7	8	9
1. Adaptation of product technology	1.00								
2. Adaptation of production technology	0.65	1.00							
3. Adaptation of business conduct	0.54	0.39	1.00						
4. No. of functional areas in direct contact	0.44	0.37	0.40	1.00					
5. Importance for other units' product dev.	0.31	0.13	0.28	0.12	1.00				
6. Importance for other units' production dev.	0.33	0.27	0.18	0.09	0.56	1.00			
7. Increase in sales volume	0.22	0.20	0.16	0.05	0.15	0.27	1.00		
8. Increase in market share	0.19	0.25	0.16	0.11	0.02	0.09	0.74	1.00	
9. Increase in profitability	0.08	0.06	0.18	0.03	0.10	0.04	0.44	0.40	1.00