Maria Andersson

Creating and Sharing Subsidiary Knowledge in Multinational Corporations
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The conditions facing multinational corporations today reflect the increasing globalization of international business, in which knowledge is an important ingredient. Subsidiaries are important as they, to various degrees, possess unique knowledge, thus accounting for the strength of the multinational corporation, which is the topic under study in this thesis. The multinational corporation consists of geographically dispersed units, which are linked together in a complicated pattern. One of the issues explored in this thesis is what drives the knowledge creation of subsidiaries, as it is acknowledged that the strength of a multinational corporation resides in these globally dispersed units. Another issue is to investigate the role of headquarters’ recognition and of corporate relationships in sharing of subsidiary knowledge. A third issue explored is the use of Centres of Excellence and transnational teams as two organizational forms for knowledge creation and sharing.

A combination of research methods was used to provide an enhanced picture of the research phenomena. As a part of an international research project, a survey was undertaken, resulting in data from 2107 foreign-owned subsidiaries located in seven different countries. In addition, two case studies have been performed in order to gain deeper understanding of (i) how subsidiaries create knowledge and (ii) the use of different organizational forms in MNCs for processing knowledge.

The five papers included discuss creation and sharing of subsidiary knowledge. It was confirmed that subsidiaries create knowledge of significance for other units within the multinational corporation. The results show that that one of the main drivers for the creation of knowledge is interaction based on local market relationships, especially those with market customers. Corporate sharing of subsidiary knowledge is brought about by headquarters recognition of these units’ knowledge. This is facilitated if other corporate units have been involved in the creation of that knowledge. Another finding in the study is the use of Centres of Excellence and transnational teams for knowledge creation and sharing. Although the two different organizational forms serve the same purpose, they differ in organization and in antecedents to their knowledge processes.

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Andersson, M. and Lagerström, K. 2002. ‘Creation and sharing knowledge in MNCs through centers of excellence and transnational teams’. Submitted to Journal of International Business Studies

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Picture yourself in a subsidiary management position in a large multinational corporation (MNC) that is highly internationalised, with activities and employees geographically spread. During the last years your subsidiary has been successful in developing a specific line of products. Contributing factors to the success has been a group of people in one of your departments that not only has proven to be innovative and entrepreneurial, but also good at co-operating with important customers and suppliers. The success has contributed to the growth and performance of the subsidiary, and has strengthened its position in the MNC. From being a subsidiary dependent on the overseas headquarters and other subsidiaries for knowledge in product development, the subsidiary now is recognised within the MNC for its outstanding achievements. Currently, there is an increased focus in the corporation in achieving global synergies in activities, such as product development. This change in focus has lead to increased efforts in knowledge utilization across business units. You (as subsidiary manager) are now faced with demands of leveraging knowledge on a global level. There are several things that puzzle you, such as the benefits for your unit, the implications for your business when engaging in such efforts, and how to go about sharing knowledge with other units. What you anticipate is that engaging in intra-corporate transfer of knowledge implies re-allocating resources from local activities. It is a high price to pay if it is done at the expense of knowledge creation and ability to meet local market demands. On the other hand, if your subsidiary works out good solutions for co-operation with other units around the issues of knowledge creation and sharing, there is much to gain for your subsidiary as well as the MNC on a whole. Before taking any further actions such as evaluating different action plans or doing cost-benefit analyses, let’s stop a minute to look at what this thesis has to offer on these subjects - maybe the research undertaken and reported here can come to your rescue!
POINTS OF DEPARTURE
This brief scenario introduces the subject and some topics of this thesis by pointing out some of the issues of creating and sharing of subsidiary-derived knowledge in the multinational corporation (MNC). The following are some relevant basic observations. Firstly, some subsidiaries create knowledge that is useful in the activities of other subsidiaries. Secondly, a subsidiary’s knowledge is often the result of interaction with local counterparts and therefore created to serve a specific purpose. Sharing of that knowledge requires not only an ability of making that knowledge useful for other units, but also a will and interest on behalf of both the possessor and the receiver of knowledge.

It has recently been argued that the source of competitive advantage for MNCs is knowledge (Birkinshaw 2001; Grant 1996a; Gupta and Govindarajan 2000; Spender 1996). This argument reflects the transition from an industrial era, in which the crucial resource was capital, to an era in which the ability of managing knowledge determines a company’s performance vis-à-vis competitors (Birkinshaw, Bresman and Nobel 1999). This change in focus has resulted in MNC managers of today being more concerned with the distribution of knowledge in the corporation than with capital. It is proposed that the MNC should take advantage of its nature, that is, make use of knowledge that is globally dispersed within the MNC with the intent to create and exploit core corporate capabilities. By means of achieving knowledge sharing across locations, the global presence of MNCs can be converted into competitive advantage (Gupta and Govindarajan 2001a). Thus, it is now realized that certain knowledge of a subsidiary, if not used for other parts of the corporation, is of limited value. There are however a number of challenges involved in achieving knowledge sharing in the MNC. Knowledge, due to its nature, is often rooted in its context of origin, making it difficult not only to share but also to evaluate, regarding its value for other subsidiaries. The competitiveness of a corporation depends on taking advantage of the knowledge and other resources residing in its subsidiaries, either by benefiting from what several differentiated units can perform jointly, or by allocating activities to certain subsidiaries that have beneficial conditions.
In this study, I recognize that MNC subsidiaries are not just local implementers of corporate strategies. Rather, they are in addition pursuers of self-produced strategies designed for their specific circumstances. As subsidiaries evolve into large-scale multi-business enterprises, the traditional centre-periphery relationships view of the MNC, in which headquarters is the main hub of knowledge and resources, is altered. Rather, the MNC is to be conceptualised as a multi-centre organization, with MNC development contingent upon strategies and activities pursued at headquarters as well as at subsidiaries. Subsidiaries are to be regarded as important sources of knowledge in the corporation, with one of the central concerns being how market relationships and corporate relationships drive knowledge creation within subsidiaries. Another concern, in the form of a question, is whether knowledge of relevance to other units is being shared within the MNC, and if so, how?

**Outline of the summary**

Having introduced the topic of this study, the theoretical platform of this doctoral thesis is presented, which rests on the premise that subsidiaries are differentiated. The thesis focuses on creation and sharing of subsidiary knowledge, which represents the core of the theoretical part, and which anchors the related applied issue of appropriate organizational forms for supporting these knowledge processes. Thereafter the empirical base is presented. By combining survey- and case study research, empirical data concerning what drives creation of subsidiary knowledge and how subsidiary knowledge is recognised and shared, is collected. The thesis, comprised of five papers, is subsequently summarised. Finally, the conclusions, managerial implications, and issues for future research are presented.
THEORETICAL FOUNDATION

**MNC structures and differentiated subsidiaries**

The MNC can be conceptualised as an organization made up of geographically dispersed units that are engaged in various activities in different markets. Subsidiaries, being operative in different markets, confront different market conditions, shaping their behaviour and growth (Forsgren 1997; Ghoshal and Bartlett 1990; Nohria and Ghoshal 1997). A stream of literature on multinational corporations (MNCs)\(^1\) puts emphasis on the diverse environmental and organizational conditions facing MNC subsidiaries as they carry out activities in different countries. By means of organizational structures and management processes, the MNC seeks to combine global integration with local differentiation, and thus cope with the complex international environment (cf. Bartlett and Ghoshal 1989; Malnight 1996; Nohria and Ghoshal 1997; Prahalad and Doz 1987). Regardless of whether the competitive advantage of an MNC stems from having subsidiaries globally distributed with interdependent resources and activities, or from subsidiaries being located in local-specific environments, emphasis is put on subsidiaries as important drivers for MNC development.

Each subsidiary operates in its own unique environment, which constrains or determines its behaviour (Ghoshal and Nohria 1989). Subsidiary behaviour in terms of knowledge creation and sharing is contingent upon how the subsidiary perceives and seizes challenges and opportunities in its surrounding environment (Penrose 1980). Local subsidiaries that were originally established as extensions of headquarters may develop into important centres of gravity (Forsgren 1989; Hedlund 1986; Surlemont 1998) which influence further development of the MNC. This occurs because subsidiaries engage in business activities and become involved in business relationships separate from those of the rest of the corporation. The result is that subsidiaries tend to become increasingly host-market oriented, with each adjusting its activities to the specific needs of local counterparts.

\(^{1}\) The discussion is delimited to concern processes that occur once the MNC has made its initial foreign direct investment in the host country, hence issues of market entry are not considered (cf. Johanson and Vahlne 1977).
Subsidiaries become involved in their own sets of market- and corporate networks consisting of customers, suppliers, R&D units and other organizations (Andersson, Forsgren and Holm 2002). These relationships not only accomplish appropriate business exchange, but also information exchange and creation of knowledge. For example, through co-operation in business relationships, new products and processes are developed (Andersson, Johanson and Vahlne 1997; von Hippel 1988; Håkansson 1989). The ability of a subsidiary to establish relationships with counterparts in the local business market is an important means of creating knowledge within an MNC. In the interactions of these relationships, knowledge is shared and new knowledge is created (Håkansson 1989; Johanson and Mattsson 1985). These processes are not the result of deliberate planning, but rather occur as the outcome of responses to opportunities and challenges in the environment. This evolution of adjustments to the local environment introduces changes in a subsidiary’s activities within the market, and vis-à-vis, other units in the MNC; and its occurrence and direction is beyond the strategic control of headquarters (cf. Birkinshaw and Hood 1998; Forsgren 1989; Forsgren, Holm and Johanson 1992).

Subsidiaries thus become, in various degrees, more autonomous vis-à-vis other units in the same MNC. Autonomy is argued as having positive effects for the performance of subsidiaries and for granting subsidiaries the possibility of exploiting their full potentials (Etemad and Dulude 1986; Forsgren and Pedersen 1998), and in addition, for allocating resources to new business opportunities without involving headquarters (Birkinshaw 1996). Thus, as Ghoshal and Bartlett (1988) indicate, the autonomy of a subsidiary affects its ability to create and share innovations within its corporation. In this way, the entrepreneurial efforts of subsidiaries imply actions of making itself known for its knowledge, thus paving the way for developing a more central position in the corporation (Birkinshaw 1997), but also for advancing the corporation’s ability to use or expand its resources. Thus, subsidiaries increase their influence within the MNC on the basis of actively creating knowledge in their own business networks (Andersson and Forsgren 2000). Knowledge creation by a subsidiary is subsequently the outcome of its level of influence in the corporation. This development pattern of subsidiaries is the reverse of that presented in the traditional
view, which argues that headquarters, by the allocation of resources and responsibilities, controls not only the knowledge creation of subsidiaries but also the sharing of knowledge between units in the corporation (Caves 1982; Hymer 1960).

Figure 1. MNC structure and differentiated subsidiaries

As presented in Figure 1, with a network approach to the MNC, the differentiated subsidiaries, linked to each other in multiple, complex patterns, are portrayed as being more or less specialized. Each subsidiary is engaged in its own specific network of market and corporate relationships, stressing thus the importance of the dynamic of subsidiary networks—by interacting with counterparts—in creating and accumulating certain skills and capabilities, of which some are critical for corporate-wide learning and for the strategic development of the corporation.
Knowledge creation of subsidiaries

Knowledge creation by subsidiaries, which has emerged as an important ingredient of MNC development (cf. Birkinshaw 2001; Grant 1996b; Gupta and Govindarajan 1994; 2001a; Spender 1994), is partly seen as the outcome of their interactions with counterparts in their local business environment (Forsgren 1989; Forsgren et al., 1992; Håkansson 1989; Malmberg, Sölvell and Zander 1996). However, because there is no coherent definition of what knowledge is in the context of knowledge creation and sharing within an MNC, a discussion of how the concept of knowledge is used in this thesis is required.

Considerable research on the creation and sharing of knowledge has distinguished two types of knowledge, explicit and tacit, that is, two sides of a coin, where each side exists relative to the other (Polanyi 1967). Explicit knowledge is possible to share, articulate, and to put into print (Nonaka 1994; Penrose 1980). Tacit knowledge on the other hand is dependent on individuals, since its existence and substance can only be inferred from the action of individuals. This statement assumes that individuals are the learners i.e., the ones that create knowledge. Tacit knowledge may reside in an individual or in an organization (Badarocco 1991). However, there is a difference between knowledge at the individual level and at the organization level. Individuals create knowledge, whereas organizations hold knowledge. This implies that organizational knowledge is contingent upon the ability to institutionalise or routinize individual-based knowledge and capabilities.

For the purpose of this thesis, knowledge creation is a matter of organizational learning. Due to the tacit nature of knowledge, its creation requires active interaction between individuals, and therefore processes of learning-by-interacting. From an organizational perspective, unless knowledge held initially by an individual is incorporated, it is little value. At a subsidiary level, knowledge creation can be promoted by actively creating links between individuals in the organization. Organizational arrangements such as departmentalization, face-to-face interaction, establishing teams and taskforces can encourage interaction among individuals (Galbraith 1973), and thus the creation of organizational knowledge.
One can argue that the more tacit the required knowledge for a specific activity, the more contingent the creation of that knowledge will be on interaction and relationships between individuals. The wider the span of individual knowledge being routinized, the more complex are the problems of converting that knowledge into organizational knowledge, and then managing it (Grant 1996b). Compared to activities such as product development, marketing know-how, and technology development, relatively lower degrees of tacitness are required for activities, such as the exchange of capital, raw materials, patents and licences. Knowledge creation of a subsidiary is largely rooted in the market and corporate relationships in which the unit interacts. These different relationships serve as drivers of subsidiary knowledge creation in various activities, and therefore I submit that it is important to study in what way they are involved. I thus propose that knowledge can appropriately be considered to be related to the corresponding activities of subsidiaries from which the knowledge derives. Interacting in relationships implies making use of knowledge, which brings up the issue of how different relationships serve as drivers of subsidiary knowledge creation.

Knowledge sharing in the MNC

How subsidiaries can serve as important units for knowledge sharing within MNCs is a debated issue among researchers. The core of the debate concerns whether it is doable and/or realistic due to barriers hampering knowledge sharing across geographically dispersed units involved in different markets. The barriers are related to how knowledge is created, implicating the characteristics of knowledge and also the interest and ability of both the sender and the recipient of knowledge i.e., motivational factors. These barriers are important to take into account, as they may increase the cost of sharing, retard the completion of sharing, or even compromise its success.

In this thesis, knowledge sharing is viewed as knowledge utilization within the MNC. This implies that knowledge is shared once it is put into use at the receiving unit. As in the case of knowledge creation of a subsidiary, knowledge sharing between units builds upon the interaction between individuals. By stressing that knowledge sharing is a relational concept, emphasis is put on utilization of existing knowledge at subsidiary units, within new contexts and circumstances.
Knowledge is argued to be rooted in the local context in which it originates, and thus it is difficult to reproduce that knowledge across organizational boundaries (Malmberg et al., 1996), even within the same MNC. Thus, creation and sharing of knowledge in the MNC faces a paradox, in that there are two strong forces at work. On the one hand, subsidiaries are involved in market relationships; those are important as they serve as a basis for knowledge creation. On the other hand, the knowledge created is context specific, which hampers the sharing of that knowledge with other units in the MNC (Forsgren 1997). The reason for this obstacle is that, firstly, tacit knowledge is more difficult to share with others, especially with others who are not directly involved in its creation (Holm, Johanson and Thilenius 1995; Kogut and Zander 1992). Secondly, insofar as the knowledge is created to fulfil a specific need in the local market, the usefulness of the specific knowledge may be difficult for others to understand and put into use. These knowledge-related barriers are closely associated with the ability of the recipient to take in and to understand how to put the knowledge to use (Cohen and Levinthal, 1990; Szulanski 1996). This ability - of exploiting outside sources of knowledge - is largely a function of the level of existing related knowledge. To complicate matters, this ability is related to both the sender and the receiver, and thus their respective prior related knowledge (Lane and Lubatkin 1998).

Considering the knowledge-related barriers of sharing knowledge, interaction becomes vital for successful sharing of tacit knowledge (Subramaniam and Venkatraman 2001). The success of sharing, i.e. knowledge of one unit is used in other units thus builds upon the amount and quality of interaction in the corporation (Hansen 1999; Leonard-Barton and Sinha 1993). Similarities between the knowledge bases of subsidiaries must also be taken into account, since they smoother knowledge sharing, along with possibilities for shifting technological activity across units in the multinational corporation (Zander 1998).

With some subsidiaries gaining a more independent position vis-à-vis headquarters and other units, there may be a lack of willingness to engage in knowledge sharing, and lack of willingness by the receiving unit to make use of the knowledge being shared (Allen 1977; Kostova 1999; Szulanski 1996). A more independent subsidiary position touches upon the topic of the motivation of units to
share their knowledge with other units. The possessor of the knowledge may fear losing its unique or independent position, or be unwilling to devote time and resources to participating in sharing efforts (Gupta and Govindarajan 2001a).

Viewing the corporation as a social community specialized in the creation and coordination of knowledge (Kogut and Zander 1992; 1993) puts emphasis on the capacity of organizational mechanisms and processes to share knowledge within the organization. That view also emphasises creation of knowledge by means of the ability to absorb the capabilities residing in each unit (Cohen and Levinthal 1990; Lane and Lubatkin 1998; Makhija and Ganesh 1997). Organizational structure affects knowledge processes, because it provides the framework not only for unit interaction but also for the roles the different units are perceived to have in terms of knowledge and influence. Perception gaps or misinterpretation of the strengths of units in the MNC may result in sharing knowledge with low usefulness. Knowledge sharing thus rests upon a shared understanding of where the valuable knowledge resides and on ways for leveraging and sharing that knowledge (Arvidsson 1999).

To summarize, knowledge sharing in the MNC is presumed as realized when the knowledge being shared is applied in the receiving unit. However, there are knowledge-related barriers to knowledge sharing which can be bridged by supporting interactions between units. Another challenge is closing the perception gaps between units, and persuading units of the possibilities of improved performance when participating in knowledge sharing, which can be favoured by organisational context, such as formal structures and systems, coordination mechanisms, and other behaviour framing attributes (Burgelman 1983; Ghoshal and Bartlett 1994).

**Headquarters’ recognition of subsidiary knowledge**

Subsidiaries can be recognized by headquarters for their contribution and/or non-contribution of knowledge, and then, by the use of various mechanisms, knowledge flows within the MNC are presumably facilitated. The appointment of specific subsidiary roles prompts coordination and dispersal of knowledge and activities on a global scale in the MNC (cf. Bartlett and Ghoshal 1989; Ghoshal and Bartlett 1988; Gupta and Govindarajan 1994; Hedlund 1986). The knowledge flow to and from the
subsidiary varies relative to the activities that the subsidiary is expected to perform (Gupta and Govindarajan 1994). Headquarters is thus assumed to play an important role in evaluating and, by various means, tapping valuable knowledge of local subsidiaries for global reach (Bartlett and Ghoshal 1986). Considering that the MNC evolves into an organization made up of several differentiated units, one can imagine that headquarters has a burdensome task, that of making correct evaluations of what knowledge each and every subsidiary has that is of use for other subsidiaries (Forsgren, Johanson and Sharma 2000; Holm et al., 1995). The strategic role assigned to a subsidiary may overlap with the actual role of that unit. The actual role of a subsidiary, and its knowledge base, is created and shaped through interaction with market and corporate counterparts (Forsgren and Johanson 1992).

Knowledge of both headquarters and subsidiaries becomes important for overall MNC development, which makes headquarters and corporate units both recipients and contributors of knowledge. There are thus not only benefits to gain from utilizing knowledge of a single unit, but also from combining and re-combining knowledge within the MNC (Kogut and Zander 1992). The dispersal of global roles and responsibilities creates system-wide interdependencies, which in turn require effective intra-corporate communication. Consequently, to support sharing of knowledge, there are much greater requirements for information processing between headquarters and subsidiaries and among subsidiaries (Egelhoff 1991; Galbraith and Edström 1976). Headquarters may learn about an innovative solution developed by one subsidiary and encourage its adoption in another subsidiary where it knows that they are struggling with the same problem. However, the recognition of relevant knowledge, residing in other units could be even higher if the subsidiaries had direct links with one another (Nohria and Ghoshal 1997). Some subsidiaries may be mandated by headquarters to realize knowledge sharing, although much research has shown that lateral relationships between MNC units are not only increasing, but they are also affecting knowledge creation and sharing in MNCs (cf. Chew, Bresnan and Clark 1990; Ghoshal, Korine and Szulanski 1994; Zander 1998).
Organizational forms for knowledge creation and sharing

By recognising the strategic significance of knowledge creation occurring in dispersed MNC units, the issue of how to make useful knowledge available in the corporation needs to be solved. Knowledge sharing is reliant upon the use of organizational mechanisms and forms that give the possibilities for interacting across and within units (Galbraith 1973; Spender 1994). Organizational forms and mechanisms serving to support knowledge creation and sharing include, for example, centres of excellence, transnational teams, information technology systems, and transfer of best practices and communities of practices (cf. Birkinshaw 2001; Grant 1996; Gupta and Govindarajan 2000; Spender 1994).

In this thesis, the focus is placed on two organizational forms, centres of excellence (CoE) and transnational teams, as both organizational forms serve the purpose of creating and sharing subsidiary knowledge within the MNC (cf. Birkinshaw 2001; Ghoshal and Bartlett 1989; Nohria and Ghoshal 1997). CoEs represent efforts of leveraging locally created knowledge of one subsidiary to a global level in the MNC. A transnational team on the other hand serves as a means of creating global knowledge encompassing many subsidiaries. Global level in this respect refers to a transnational team as being an organisational constellation spanning units and borders in the MNC. The two organizational forms that of CoEs and a transnational team, make use of different mechanisms for knowledge transfer, although these mechanisms are not explicitly in focus (Kostova 1999; Szulanski 1996).

A CoE is a subsidiary, or part of a subsidiary, that has created knowledge as a result of interactions with counterparts in the business environment. In their daily contact with customers, suppliers, and other counterparts, they create knowledge of considerable use for other units in the same MNC (Andersson 2000; Forsgren et al. 2000; Holmström 1999). Because the development of this kind of strategic role is often neglected (Birkinshaw and Hood 1998; Holm and Pedersen 2000), there is a lack of understanding of how these subsidiaries create knowledge and how that knowledge can be shared with other units. Knowledge sharing from a CoE faces challenges such as being context bound and being difficult for units, other than the originator, to comprehend fully and put into use. Moreover, the subsidiary builds its role by
continuously creating specialized knowledge; but at the same time, its ability to take part in sharing of knowledge within the MNC is lowered (Forsgren et al., 2000). Over time, being a CoE may be a task too cumbersome to uphold due to resource constraints in managing the interactions in the subsidiary’s environment (for knowledge creation) and interactions with other parts of the MNC as well (for knowledge sharing). Sharing its knowledge without being able to continuously upgrade its knowledge base may result in undermining its excellence.

In some cases, no single unit in the MNC develops into being excellent, but rather, several subsidiaries tend to emerge as specialized in certain fields. The knowledge of these subsidiaries can overlap, giving rise to clearly recognized benefits of combining, within the MNC, the knowledge of several of these subsidiaries (Zander 1998). The benefits can be achieved by organizing certain activities in an MNC’s transnational team, as a work group composed of individuals of different nationalities, working in different cultures, businesses, and functions (cf. Govindarajan and Gupta 2001b; Snow, Snell, Davidson and Hambrick 1996). Co-operation between different kinds of group constellations, such as transnational teams, are claimed to increase coordination and knowledge flows within corporation, and therefore not only used to find a solution to a corporate problem (Lagerström 2001). It thus may serve as a deliberate mean of easing the transfer of information and knowledge within corporations by promoting relationships between individuals within the MNC.

Knowledge creation by the transnational team is faced with the challenge of how to institutionalise and routinize individual-based knowledge. These processes require active interaction among the geographically dispersed members of the transnational team. Knowledge sharing of the developed solution is facilitated because the transnational team members have their permanent position in the line of organization. A transnational team is dissolved once the task for which it was created is accomplished. To organize by transnational teams is however not without drawbacks. First, it takes resources from the ordinary activities in the organization, and secondly, people from different countries with diverse backgrounds, both professionally and culturally, are put together to co-operate. Organizing by transnational teams puts great demands on smooth information flows, and can limit the possibility of meeting face-
to-face on a regular basis—a requirement that is resource demanding as the team members are geographically dispersed.

**FRAMING THE RESEARCH PROBLEM**

The argument that competitiveness is achieved by taking advantage of subsidiary knowledge gives rise to a number of opportunities and challenges, some of which have been dealt with in the discussion on the theoretical foundation on which this thesis is based. With the overall aim of the study being to examine the creation and sharing of subsidiary knowledge within the multinational corporation, three important issues were investigated, and these were formulated as illustrated in figure 2.

*Figure 2. Framing the research problem*

Firstly, since it assumed that subsidiaries create knowledge and that the sources of differentiation resides in subsidiaries carrying out different activities in different networks of market and corporate relationships, one issue is the following: *how does the subsidiary network of corporate- and market relationships drive knowledge creation?*

Secondly, certain subsidiaries create knowledge on a particular activity or area that can be of wider corporate use. The question then is “to what extent?” since these subsidiaries must be recognised for their knowledge either by headquarters or by other corporate units. The role of headquarters and other corporate units in recognizing and then supporting the sharing of that knowledge is somewhat ambiguous. Subsequently,
the second issue under investigation can be stated thus: *What is the role of headquarters’ recognition and of corporate relationships in sharing of subsidiary knowledge?*

Thirdly, an issue related to sharing of subsidiary knowledge is the use of organizational forms in the MNC. Different organizational forms also serve as a means for creation and management of subsidiary knowledge. For the purpose of this thesis, the organizational forms in focus are CoEs and transnational teams: *How do Centres of Excellence and transnational teams serve the purpose of creating and sharing subsidiary knowledge?*
THE EMPIRICAL BASE
In order to examine the creation and sharing of subsidiary knowledge in MNCs, the empirical base of this study is a combination of quantitative methods (survey research) and qualitative methods (case study research). These methods serve as tools in identifying important characteristics of creation and sharing of subsidiary knowledge in MNCs. In this work, the quantitative studies served as means of testing hypotheses concerning creating and sharing of subsidiary knowledge. The qualitative studies, on the other hand, served as means of developing hypotheses and of gaining a deeper understanding of the phenomena of creating and sharing knowledge. There are advantages to be gained through the use of multiple methods to examine the same aspects of a problem. The weakness of one method will be compensated by the counter-balancing strengths of another, and thus the validity and reliability of the research is strengthened (cf. Jick 1979; Lincoln and Guba 1985).

Survey research on creation and sharing subsidiary knowledge
This study, which comprises data from seven countries, is connected to a larger international research project: ‘Developing Centres of Excellence (CoEs) in Multinational Corporations (MNCs)’. The project was initiated by researchers from the Department of Business Studies at Uppsala University and the Institute of International Economics and Management at the Copenhagen Business School and launched in May 1996. I participated in project meetings in the fall of 1996, and I joined the Swedish research team full-time as a PhD student in March 1997. The overall purpose of the project is to investigate the drivers of knowledge creation in MNC subsidiaries, and whether subsidiaries, by sharing their knowledge, have an impact on the knowledge creation of the whole MNC. Co-operation within the project included designing and carrying out a joint survey and in discussing methodological issues related to the overall purpose of the project. The unit of analysis was foreign-owned subsidiaries, chosen from different data registers, evaluated to be up to date.

2 The CoE project is thoroughly discussed in Andersson (2000), Holm and Pedersen (2000) and Holmström (1999).
3 Hereafter referred to as ‘the project’.
with subsidiaries of foreign parent companies, such as Ekonomisk Litteratur in Sweden, Greens in Denmark, and Dun & Bradstreet in Finland and Norway. For being selected as a unit for analysis, the basic criterion was that the unit had to be part of a company with activities in more than one country.

The data was collected during 1997/1998 by different research teams in Austria, Denmark, England, Finland, Germany, Norway and Sweden, by using a common questionnaire and common instructions concerning how to perform the data collection\(^4\). The questionnaire was distributed to managers of the foreign owned subsidiaries - rather than to the HQ management - since they are assumed to be the most familiar with the conditions influencing creation and sharing of subsidiary knowledge. Approximately 70 percent of the respondents were subsidiary managers, while the remaining respondents were financial directors, vice presidents, marketing managers, information managers, or controllers.

The questionnaire\(^5\) used in the data collection consisted of four main areas. The first area covered background questions on basic subsidiary characteristics, such as age, size, field of business, level of internationalisation, and mode of establishment in the MNC. The second area dealt with the subsidiary’s business operations and knowledge. Questions were posed about the level of subsidiary knowledge and the level of the MNC’s use of that knowledge, for various subsidiary activities. The activities evaluated were purchasing, research (applied and basic), development (of products and processes), production (of goods and services), marketing and sales, logistics and distribution. Other issues included in the second part concern to what extent the subsidiary is formally (by headquarters) and informally (by other MNC units) recognised for its knowledge. Another set of questions concerned driving forces of knowledge development in the subsidiaries, divided into MNC factors and market factors. These are conditions, in the market and in the MNC, that have influenced the subsidiary’s development of knowledge, and the impact of specific business relationships in the corporation and in the market. The third area in the questionnaire was the role of the subsidiary in the MNC, its influence over a variety of decisions

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\(^4\) For details on data collection, see Appendix A ‘Survey research within the CoE. project’.
\(^5\) Questionnaire on foreign owned subsidiaries, see Appendix B.
concerning the business of the MNC, and its impact on the development of other MNC units. The final area covered by the questionnaire involves questions about the local business environment in which the subsidiary operates.

The survey resulted data from 2107 foreign-owned subsidiaries. Consistency between the data collected in the serveral countries was achieved through applying the same routines and procedures for checking the data. The response rate varied from 16 to 53 percent depending on the country investigated. Baruch (1999) gave a typical response rate of 20 to 30 percent for mail surveys. The quality of the data is quite high with a general level of missing values of not more than 5 percent. As the response rate is one of the basic parameters for evaluating a survey (Fowler 1993:39), it is valid to compare responding and non-responding subsidiaries, i.e. a non-response analysis. Non-response analysis was controlled by each country’s research team, and so far with no bias sufficiently significant to have an impact on the data (cf. Moore 2000). The results from the non-response analysis of the Swedish data revealed that there were no pronounced differences between responding and non-responding subsidiaries regarding turnover and number of employees (for details see Appendix A).

Some characteristics of the total sample
The total sample contains 2107 foreign-owned subsidiaries located in seven European countries, of which 314 are from Austria; 310 from Denmark; 238 from Finland; 254 from Germany; 261 from Norway; 530 from Sweden; and 200 from the UK. The sample comprises all kinds of subsidiaries in all fields of business6. Due to the large amount of data, the total sample is presented by country.

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6 All industries, according to ISIC two-digit activity code numbers.
Table 1 presents characteristics of the sub-samples from the different countries, such as size, average number of employees, and average total sales and mode of establishment. Foreign-owned subsidiaries located in Germany and the UK are relatively large business units with an average of 1573 and 900 employees, respectively, and sales of 465.28 million US$ and 380.89 million US$, respectively. Foreign-owned subsidiaries located in Austria and the Nordic countries (except Norway) are rather similar in terms of business unit size, with the average number of employees ranging from 200 to 317 and sales of 50.24 million US$ to 73.85 million US$. The foreign owned subsidiaries in Norway, however, have fewer employees for an equivalent sales volume. The average number of employees is 129 and sales of 62.57 million US$. The divergence is partly explain by the difference in industry structure between countries, since those differences between the country samples are also an explanation for share of exports from the subsidiaries in each country.

Subsidiaries in Denmark, Austria, and Germany show the highest average share of exports: 31.5 percent, 28.2 percent, and 26.7 percent, respectively. The lowest average shares of exports are represented by subsidiaries in Norway with 14.2 percent. In terms of average years that the subsidiaries have been part of the MNC, the range is from 14 years in Finland to 21 years in Germany. In the other countries, the average years that the subsidiaries have been part of the MNC are 17 years for Sweden and Norway; 18 years for Denmark; and 19 years for Austria and the UK.
In this thesis, the data used in the two quantitative papers varies because the data collection by the different research teams was concluded at different times. This thesis focuses on subsidiaries of the subset whose activities are development, production, and marketing, which are considered value-adding activities (Birkinshaw 1996; Roth and Morrison 1992). Earlier studies were devoted to studying single activity, such as the marketing activity (Arvidsson 1999), or the R&D activity (Håkansson and Nobel 1993). Thus, studies including all three activities can add to existing research on creating and sharing knowledge within MNCs. Marketing and sales was the most common activity conducted by 95.0 percent of the subsidiaries. Of the subsidiaries, 67.1 percent were production units. Subsidiaries conducting development represented 54.2 percent of the sample.

**Case study research**

In addition to the quantitative analysis of creation and sharing of subsidiary knowledge, two case studies were conducted. As expressed by Huber and Van de Ven (1995:VII) “Process studies are fundamental to our understanding of the dynamics of organizational life and to the development and testing of theories of organizational adaptation, change, innovation and redesign”. The case studies made it possible to study how subsidiaries create knowledge over time, and to clarify cause and effect relations on how different organizational forms support knowledge sharing (cf. Lincoln and Guba 1985; Merriam 1988; Yin 1993). The use of CoEs and transnational teams represent two ways of facilitating creation and sharing of knowledge in organisations such as MNCs (cf. Birkinshaw 2001). Although the two case studies represent two organisational forms, they nevertheless have common denominators: (i) they are studies of systems development, and (ii) the strategic intent of establishing CoEs and the transnational team is to avoid duplication of efforts in the corporation.

The first case study (paper IV) elucidates from a subsidiary management perspective, how a subsidiary, by interacting with important market customers and corporate suppliers over time, has created knowledge, and thereby gained the role of being a CoE in the MNC. This implies that the subsidiary has impact on the overall
business development of the MNC by contributing its knowledge and expertise to other units in the MNC. To collect empirical data, seven semi-structured interviews and written material were used. The data was analysed using a two-step procedure. The first step was to categorize chronologically the development of the subsidiary in order to map the process behind this development. The next step was to identify critical events in each of the periods identified in the first step.

The second case study (paper V) was carried out to investigate the organization and management of a transnational team in a multinational corporation. This paper provides empirical verification for the creation and sharing of knowledge in the transnational team. Thirteen interviews, which took place in three different countries, were made with persons who had different roles and responsibilities in the transnational team. Although the analysis of the case study is made from a managerial perspective, the manner of collecting and analysing the data contributed to a more multi-facetted view of the phenomenon.

**Validity and reliability of the study**

When performing quantitative studies, the researcher should consider the reliability and the validity of the major measures used in the survey study. Reliability refers to the consistency of a measure over time; in other words, to what extent is it possible to obtain the same results in a new study using an identical method (Bryman 1989). Validity, on the other hand, concerns whether one measures what was intended.

Using a standardised questionnaire enhances, *per se*, the possibility of reproducing the study, since all respondents answer exactly the same questions. An additional advantage is that a relatively large data base can be generated for hypothesis testing (cf. Snow and Hambrick 1980). Furthermore, in the execution of the survey, the same instructions were given to all respondents, and attempts were made to make the questionnaire simple to answer. The questionnaire is addressed to managers of the subsidiaries, as they are supposed to be the most familiar with the operations of the subsidiary and are employed in comparable positions. The indicators are measured on a seven-point Likert scale, aiming at reflecting the extreme positions on a continuum,

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7 Interview guides in Appendix C and D.
items with which people are likely either to agree or disagree (Bryman 1989; Kidder and Judd 1986). This type of scaling is suitable for research with a behavioural approach in that it measures managers’ perceptions of a given situation and the cause of events. This enables more reliable comparisons between subsidiaries in the sample.

Validity of the study was assessed by doing a pre-test survey, and in that way ensure that the questions address what they are intended to address. The questions are also operationalised, drawing upon experience from similar operationalisations used in earlier related studies (Forsgren and Pahlberg 1992; Sandström 1990). The respondents of large, diversified subsidiaries may find it difficult to identify single relationships that have had impact on subsidiary knowledge creation. When selecting units for analysis and determining how the questions were to be addressed, two direct actions were taken in order to overcome anomalies: the large and diversified subsidiaries were identified, and questionnaires were distributed to division level instead of top management. The questions in the survey were articulated so as to ask the respondent to think of knowledge in different activities.

Since the respondents are single informants, and because just one measurement method was used, the occurrence of common-method bias may have artificially inflated observed relationships between variables (Campbell and Fiske 1959). The data collected from the questionnaire is based on the subjective perceptions of the subsidiary managers (or equivalent). To avoid seeing just one side of the coin, it would have been advantageous if we had also been able to obtain data from the sister units to which the focal subsidiary refers; but to identify and to collect data from headquarters and other corporate units of each of the 2107 subsidiaries was too costly and time consuming.

On the other hand, it can be argued that the advantage of addressing research questionnaires is that managers’ perceptions and opinions largely determine the organisation’s strategy, and in addition, managers are most familiar with their own activities and their business relationships. The problem of reliable information remains if we choose to ask headquarters for their view of the level of knowledge of the subsidiary, since it can be assumed that headquarters do not have an adequate knowledge of their geographically dispersed subsidiaries, or of the activities of their
subsidiaries and their network relationships, which impacts on the development of each.

The integrity of the respondents was preserved by guaranteeing anonymity, which also served as a way of overcoming the problem of social desirability, which is a tendency of respondents to portray their subsidiaries in a favourable light and which can cause an upward shift in the distribution of responses (Podsakoff and Organ 1986:353). This may be the case, for example, when asking subsidiary managers about the extent to which headquarters use, and have had impact on, the focal units’ knowledge creation.

To assess the degree to which common-method bias might present a problem, the scale items for the variables can be subjected to a principal components analysis using varimax rotation (Harman 1967). The absence of cross-loadings among the items provides confidence that common-method bias is not a problem. For the study reported in paper II, Harman’s one-factor test was used to assess common-method bias (c.f. Podsakoff and Organ 1986). The factor analysis revealed three factors with eigenvalues greater than 1, which accounted for 63 percent of the total variance. Since several factors were identified and since the first factor did not account for a majority of the variance (32 percent), there seems to be no substantial amount of common-method bias in that study.

Data gathered and then analyses made by applying qualitative methods are evaluated according to other premises than quantitative studies (Lincoln and Guba 1985). Validation of the data becomes a matter of establishing trustworthiness, that is, of persuading the reader that paying attention to the findings and taking them into account is worthwhile. Establishing trustworthiness to ensure that different aspects of the qualitative study are properly performed becomes an issue for the researcher. Firstly, one needs to collect data such that additional data will not contribute with any new information or knowledge of the studied phenomena. Moreover, one needs to ensure that the respondents can identify themselves with the researcher’s view of the same phenomena. In addition, it is important to render it possible to repeat the enquiry with similar respondents to ensure that the interpretations coincide with the reality that
the researcher attempts to convey. Finally, the developed concepts drawn from the empirical findings must be genuinely applicable to avoid becoming irrelevant.

Both case studies were validated by letting those being interviewed read through the manuscript of the case. This enabled misinterpretations to be corrected, and ensured that critical events in the development of the subsidiary from which the conclusions were to be drawn did not get excluded. In addition, credibility of case V was assured by organizing a workshop with the people involved in the study. The workshop entailed an oral presentation of the preliminary results and related discussion. The data gathered from the interviews was complemented with written information, such as annual reports and project reports, so multiple sources were employed. The applicability of the empirical findings may be of a normative nature or of a descriptive nature. The research issues addressed in the case studies (see Paper II and V) are descriptive rather than normative, with the intention of elucidating how subsidiaries and transnational teams fulfil specific roles in the corporation by virtue of their knowledge.

The question of how and to what extent access is gained by the interviewers is important, not only for conducting the case study, but also to influence outcomes. In both case studies, management at each company sanctioned the performance of the case studies. Access was gained by presenting the research issue and related intentions. At both companies, management served as gatekeeper by proposing suitable interviewees (initially), and thereafter we selected suitable interviewees. Although our initial impressions of the case companies and how they related to the research issue were somewhat directed by management, objectivity was ensured by maintaining our independence. Case study research is sometimes criticized for devoting too much attention to success examples instead failures. In the case of the transnational team, there were team members located in countries that did not contribute to the knowledge creation process for various reasons. From a theoretical development perspective, interviews with those members would probably have provided interesting empirical findings. However, bearing in mind that inasmuch as we, as researchers, must maintain our integrity, the same goes for the respondents at the case company. It thus becomes an issue of being sensitive to the research issue in its real-life context.
PRESENTATION OF THE PAPERS
The content of the five papers included in the thesis and the findings will be discussed in this section. Although the papers are to be seen as autonomous, they all deal with creating and sharing of subsidiary knowledge in the MNC. The sequence of the papers more or less follows the workflow of the research process. During the course of the research, the role of different organisational forms for knowledge processes came more in focus.

Paper I presents a quantitative study of the impact of relationships, - market and corporate -, on subsidiary knowledge creation. The findings reported and the network approach in Paper I are further elaborated in Paper II, which is a case study of how a subsidiary has created knowledge over time, and, based on its knowledge creation, has emerged as a CoE in the MNC. In Paper II, the roles of corporate relationships and of headquarter’s recognition emerge as important for knowledge sharing. Both roles are further elaborated in a quantitative study in Paper III. Paper IV presents a conceptual development of the two organizational forms (CoEs and transnational teams) used for creating and sharing of knowledge in the MNC. Paper V, aimed at providing empirical evidence, is a qualitative study exploring how a transnational team as an organizational form supports knowledge creation aimed for several units of the same MNC.

Figure 3. Presentation of the papers
The papers represent parts of the research forming this thesis. A general proposition pervading the theoretical framework of the research is the importance of the relationships, market and corporate, to subsidiary knowledge creation. However, as discussed from a theoretical perspective, market relationships have been emphasized by some (cf. Andersson and Pahlberg 1997; Andersson et al., 2002) whereas the role of corporate conditions and relationships for knowledge creation has been stressed by others (cf. Hedlund 1986; Zander and Kogut 1995). The first paper brings these two streams together, building on the notion that in studying knowledge creation there are reasons to include market relationships along with the corporate ones (Ghoshal and Bartlett 1990; Grant 1996b).

Paper I, entitled “Relationship Configuration and Competence Development in MNC subsidiaries”\(^8\), stresses the impact of business relationships on subsidiary competence\(^9\) development in three activities: sales and marketing, development (of products and processes), and production (of goods and services). By studying the impact of different configurations of market relationships and corporate relationships on subsidiary competence development, an increased understanding of what conditions influence competence development was gained. The main argument is that subsidiaries develop different levels of competence in different activities through their engagement in different sets of market and corporate relationships. The proposition was tested by examining 3346 subsidiary relationships of 577 subsidiaries in Sweden, Finland, Norway, and Denmark. The subsidiaries are grouped according to critical relationships, market and/or corporate—that is, relationships with decisive impact on a subsidiary’s competence development. This classification resulted in four groups: those with no critical relationship; those with only critical corporate relationships; those with only critical market relationships; and those with critical relationships, both market and corporate. In an ANOVA analysis, the impact of relationships on competence development in the four groups of subsidiaries was tested.

The results confirmed our general proposition that development of competence can be explained by interaction in a limited set of critical relationships in the

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\(^8\) co-authored with Ulf Holm, and Christine Holmström, Uppsala University, and published in Håkansson and Johanson (2001).

\(^9\) In Paper I, II and III the word ‘competence’ is used as synonym to ‘knowledge’.
subsidiary environment. Conclusions drawn from the study were that corporate relationships, as well as market relationships, have to be included in the analysis of subsidiary competence development. The findings also indicate that the antecedents of subsidiary competence development are activity specific. Activities, such as development involving a high level of tacitness, were more sensitive to a limited set of relationships. Either the market or the corporate context drove subsidiary competence development. Production activities, on the other hand, benefited from the general impact of several relationships, independent of the corporate or market context. Marketing was connected to corporate relationships and/or the combination of market and corporate relationships. An activity relying on competence that was largely experience-based depended more on context-specific relationships, which lowered for other units the possibility of using that specific competence within the MNC. The issue whether it is doable and/or realistic to share subsidiary knowledge with other units in the same MNC is elaborated in paper III.

An issue for future research, identified in paper I, is to investigate how interactions in relationships, over time, lead to manifestations of high competence in development, production, and marketing. By adopting a network approach, the impact of several relationships on competence development can be better understood. These thoughts are further developed in Paper II by formulating a research question: “What is the impact of different relationships on the competence development of a subsidiary over time?”

Paper II, entitled “The Dilemma of Developing a CoE—a Case Study of ABB Generation”10, is a case study of a subsidiary in the ABB corporation, addressing the questions of “How?” and “Why?” it has created knowledge. The study revealed what drove the subsidiary’s competence development, and it provided evidence that business relationships were advantageous for the development of competence. The method applied was a case study approach; data was collected by performing semi-structured interviews with managers at the subsidiary, and with those perceived by the subsidiary as important customers and suppliers.

10 co-authored with Christine Holmström, Uppsala University, and published in Holm and Pedersen (2000).
ABB Generation identified the most critical relationships for creating significant knowledge in one of its core products. Those relationships were with a single market, and with a single corporate relationship, which the subsidiary cultivated for a long time. The two counterparts, furthermore, were located in the geographical vicinity, which facilitated close interaction and tandem development processes. Another factor that proved important in the creation of significant knowledge was entrepreneurship of subsidiary management. The subsidiary took the initiative in establishing a development department, thus supporting further knowledge creation, and gave them a knowledge advantage vis-à-vis competitors, but also vis-à-vis subsidiaries within the same business area. Headquarters recognised the activities and knowledge developed at the subsidiary by appointing it a role as CoE (defined as a subsidiary unit with specialised knowledge on which other units depend, and which has impact on overall MNC development). As a CoE, the unit served as a tool for centralising and disseminating critical competence in the organisation ABB. For example, the unit enabled available technology to be secured, and promoted further technological development. For the subsidiary, being granted the role of CoE implied increased authority along with recognition and activity as the central hub for information flows among the subsidiaries within the same business area. Being a CoE thus involved two tasks: (i) being a hub of business and technology development in a specific activity and (ii) supporting MNC competitiveness. At the same time, the business unit actively supported other MNC units in their business and technology development.

Findings from the study revealed and clarified important factors in the emergence of a CoE, as well as the implications of being a CoE. Market and corporate relationships were identified as important drivers of competence development of the subsidiary. However, without the entrepreneurial drive of subsidiary management in setting up a development department, the subsidiary was unlikely to emerge as a CoE. The formation of a development department gave the subsidiary unit experience in managing development activities. The mix of business and technological competence proved to be crucial in its becoming a CoE. The implications of being a CoE department are discussed in the context of the dilemma faced by the subsidiary: it had to upgrade its own competence whilst disseminating that competence to other MNC
units. Over time, because the critical competence of the subsidiary was shared within the organisation, the knowledge was no longer unique, making it difficult for the subsidiary to maintain its role as CoE. Nonetheless, on the part of the subsidiary, there was a desire to maintain a CoE role, as this implies a good bargaining position with headquarters, and with other MNC units.

Findings emerging from the study and subject to further investigation include two issues. Headquarter’s recognition of subsidiary competence was identified in the case study as having enabled the creation and sharing of knowledge. Corporate relationships were another important variable in driving subsidiary competence creation as well as in sharing. The next paper includes a quantitative study of these variables.

Paper III entitled “Intra-corporate transfer of subsidiary competence: the role of headquarter’s recognition and inter-unit relationships”\(^{11}\) was motivated by consideration of the nature of the MNC, which has units geographically dispersed, and diversified in terms of activities, competence, and other resources. The benefits of realizing intra-corporate transfer of subsidiary competence, regardless of the barriers, were acknowledged as contributing to increased competitiveness and performance.

In this study, subsidiaries were acknowledged for having developed competence of significance for other units in the MNC. The objective of the paper was to analyse the role of headquarter’s recognition of subsidiary competence and inter-unit relationships in enhancing intra-corporate transfer of subsidiary competence in the MNC. These two variables were chosen on the basis of representing two distinct mechanisms for affecting intra-corporate transfer of competence. Headquarter’s recognition of subsidiary competence implies actions on behalf of corporate management to facilitate intra-corporate transfer of competence, referred to as strategic mechanisms. Such transfer was achieved by means of certain organizational principles, such as differentiation of subsidiary roles, which implies delegating responsibilities for activities without duplicating use of resources in the corporation. In the paper, it is argued that headquarter’s recognition of competence had to be in line

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\(^{11}\) co-authored with Christine Holmström, Uppsala University, and revised and submitted to the Academy of Management Journal.
with what other subsidiaries in the MNC perceived as being important, as the reverse can be counter-productive. Inter-unit relationships between units in the same MNC went beyond the administrative linkage that existed; thus they were referred to as organic mechanisms. These relationships were valuable for transferring tacit knowledge. The applicability of the competence developed in one subsidiary depended largely upon adaptation to the corporate context. A subsidiary that drew upon its experiences of interacting with other corporate units was able to adapt and refine its behaviour and routines.

Based on the theoretical framework, three hypotheses were formulated concerning the impact of headquarter’s recognition and inter-unit relationships on intra-corporate transfer of competence. These hypotheses were tested on a sample of 973 foreign-owned subsidiaries in seven countries (Austria, Finland, Denmark, Germany, Norway, Sweden and the United Kingdom)—all carrying out the activities development, production and marketing. The analysis of intra-corporate transfer of subsidiary competence was done in two steps. First, a stepwise hierarchical regression analysis was used to test the relevance of the hypotheses formulated. The control variables were entered into the equation, and thereafter the predictor variables, and because the results indicated support for the hypothesis, to proceed with the analysis was appropriate. Secondly, the sample was split into four groups. Group 1 consisted of subsidiaries that headquarters recognised for their competence, and that were involved in inter-unit relationships with high impact. Group 2 were also subsidiaries that were highly involved in inter-unit relationships, but were not recognised by headquarters. Subsidiaries in group 3 were recognised by headquarter’s for their competence, but their involvement in inter-unit relationships was low. Group 4 consisted of subsidiaries that were not recognised by headquarter’s for their competence, and their involvement in inter-unit relationships was low. The four-group solution was subject to an ANOVA test to see whether there were significant differences between the groups. The groups were subjected to comparison of means and to a least significant test.

The findings supported the hypothesis that headquarter’s recognition and corporate relationships were important variables for intra-corporate transfer of competence. Subsidiaries that were both recognized by headquarters for their
competence and were highly involved in inter-unit relationships had the highest value for intra-corporate transfer of competence in all three activities. Intra-corporate transfer of subsidiary competence was moreover found to be activity specific. Competence in development was more used in the MNC than competence in marketing, and between these two activities fell competence in production. There is thus reason to believe that high value-adding functions were more integrated in the MNC. Moreover, the findings show that the subsidiaries were differentiated; that is, they had different roles in the MNC based on competence flows. This is line with extensive research that has been presented regarded the development of subsidiary roles. However, much research is done from a management perspective, and what we present in our study is research from a subsidiary’s perspective on how they perceive their relationship to headquarters and to other units. In the study, based on the subsidiaries of the MNC being differentiated, a focal subsidiary’s contribution became related to what activities it had undertaken and what specific competencies it had developed.

Choice of organizational form for realizing intra-corporate transfer of competence is an associated issue. The case study (Paper II) showed the significance of using a CoE as organisational form for pinpointing knowledge of a subsidiary and for making it available to other units in the MNC. However, as the findings indicated, over time there was a dilemma inherent in being a CoE, namely, being the leading edge in the corporation had some negative consequences, so that the positive consequences had to be weighed against the negative ones, and a balance struck. Hence, the question arises as to whether there other organizational forms can be used in MNCs that support creation and sharing of knowledge and offset some of the negatives inherent in being a CoE?

In this thesis, this question is addressed by focusing on CoEs and transnational teams, as these two organisational forms, are identified as useful for the purpose of leveraging subsidiary knowledge. However, because there are differences between these two organizational forms in manner of creating and sharing knowledge, the aim of paper IV is to discuss and to contrast how and why they differ. Paper IV develops
conceptually the use of organizational forms for leveraging subsidiary knowledge in the MNC.

Paper IV, entitled "Creation and sharing of knowledge in MNCs through Centers of Excellence and Transnational teams"\(^{12}\), conceptualises two different organizational forms, CoEs and transnational teams, which are used for knowledge creation and sharing in MNCs. A CoE is a subsidiary (or a department in a subsidiary) that has created knowledge to meet local market demands, and that is thus encouraged to share that knowledge globally within the MNC. A transnational team assembles knowledge from members of the MNC’s units for knowledge creation, and upon return of team members to their units, knowledge sharing occurs locally. The appointment of CoEs and transnational teams give formal recognition to the need of exploiting knowledge, regardless of where the knowledge is located within the MNC. Even if the two organizational forms seemingly fulfil a similar purpose, they differ in terms of organizational configuration, that is, in terms of structure and practices, and absorptive capacity, i.e. knowledge base and communication.

The organizational structure of a CoE is permanent, with practices that have evolved over time. The initial knowledge creation takes place locally, within a given organizational structure and with actors that share a history of having worked together. This implies that there are common practices and routines, and a shared knowledge base, and that often the actors have a common native language. In a transnational team, the organisational structure is temporary, and the team members represent the organizational practices of the team. As the team members are selected from different units in the MNC; each brings its unit-specific knowledge base to the team. The diversity of the team members’ knowledge bases gives leeway for knowledge creation, but at the same time, there are no given structures to support the process. The team members have to agree upon common norms for acting and communicating to overcome the functional, cultural, and language barriers. Sharing of knowledge from a CoE implies making context-specific knowledge non-location bound, whereas in the

\(^{12}\) Co-authored with Katarina Lagerström, and submitted to *the Journal of International Business Studies*. An earlier version of this paper was presented at a poster session, the AIB conference, Puerto Rico, July 2002.
case of the transnational team, it is a matter of making non-location bound knowledge location bound.

CoEs and transnational teams can be viewed as systematic means of managing and supporting both knowledge creation and sharing, even if these two organizational forms differ in terms of how they create and share knowledge. In a CoE, it is a question of exploiting for the MNC locally created knowledge, which therefore needs to be adapted to global conditions. In transnational teams, knowledge creation is global with the intention of being usable at many units. In both cases, it requires interaction between actors who have been involved in the knowledge creation, and actors from the receiving units. This implies that the creation and sharing of knowledge cannot be viewed as two separate processes, but rather as two intertwined processes. It is only possible to determine whether created knowledge has been shared once it is being used.

In paper V, the role of transnational teams as an organizational form for leveraging subsidiary knowledge is presented in a case study. The study is in line with the observation that lateral mechanisms have emerged as an important ingredient in contemporary MNCs in catering for knowledge creation and sharing.

Paper V, entitled “Knowledge creation and sharing in a transnational team—the development of a global business system”\(^\text{13}\), is a case study of the use of a transnational team in a multinational corporation. The purpose of the study is to investigate how knowledge can be shared on a global basis in an MNC by the use of a transnational team. The setting of the case study was a multinational corporation that, over the years, had increasingly become decentralized, implying that the business units had enjoyed autonomy over strategic decisions concerning their activities, and supporting devices such as choice of business systems. As a result, the business units were able to respond to local market demands, and thus the corporation had become diversified. The diversity in business systems used at different business units led, however, to problems with coordination and knowledge sharing across and within business units. The adoption of a common business system solution for order and delivery, serving as a means of increasing co-ordination and utilizing knowledge

across units, was part of the scenario. Moreover, the solution being developed had to incorporate local demands and at the same time be a common solution usable for all business units involved. These demands implied that local knowledge of the existing business system and of key-users’ demands had to be understood and had to be taken into account in the solution.

In order to fulfil these demands, a transnational team was formed comprised of members from the six units concerned. Each member assigned to the transnational team had experience with his or her local system, and knowledge of what was necessary to include in the new business system. Having a team of people that could work with development, implementation, and support of the business system on a worldwide basis was another important prerequisite. Therefore, some of the team members were appointed as global team members. After having been appointed, although each organisationally belonged to the main coordinating unit in Sweden, each remained located at his or her local business unit. They were perceived as resources for contributing to the MNC at the global level.

The case study was executed by performing interviews with people related to the transnational team in three different countries, who were classified into groups according to role and responsibility in the transnational team. The classification served as an important analytic tool in detecting differences within and between the groups.

The findings from the case study were that the transnational team did in fact serve its purpose, that of leveraging local knowledge on a global level in the MNC. The team made possible global use of originally local knowledge of business and technically related matters for developing the new business system. In this process, the team members served as creators and bearers of knowledge. The choice of organizational form initiated contacts and interactions across units that otherwise would not have occurred. In addition, the individuals involved in the transnational team were motivated by the new opportunities and challenges they were facing during the development of the uniform corporate business system for local units.

The mode of operation was not ideal, however. For example, lack of opportunities to meet face-to-face on a regular basis hampered the creation and sharing of knowledge in the transnational team. On the other hand, the existence of several
information-technology mechanisms was important for information updates and support in daily work, but this focus on information technology was limited by insufficient personal interaction, which needed to be intensified to capitalize on the available information technology.

Other obstacles in handling the transnational team were related to administration and communication skills. The first to be mentioned is the lack of information concerning who was on the team, who was doing what, and what was the next phase in developing and implementing the business system. The global team members were never sufficiently informed on what their roles were supposed to be during and after the development and implementation of the business system. This deficiency in communicating of roles concerned proficiency in the required language—not only in theory but also in practice. The principal problem when knowledge was managed by relying on the use of information technology was the tendency to focus too much on sharing existing knowledge at the expense of creating new knowledge. These findings are in line with theories on knowledge management, which advocate that the core of knowledge processes in an organization relies on socialization of team members, with information technology support (although needed) being of secondary importance.

CONCLUDING DISCUSSION AND REMARKS
The overall aim of the research reported and discussed in this thesis was to contribute to the understanding of creation and sharing of subsidiary knowledge in the MNC. A general conclusion is that subsidiary knowledge is of importance for other MNC units, which highlights a need to examine how subsidiaries create knowledge, and what knowledge can be shared and used by other MNC units.

A research issue addressed is the importance of network relationships as the driving force behind subsidiary knowledge creation. Regarding this issue, there are two findings stemming from the fact that certain relationships have a decisive impact on subsidiary knowledge development. Firstly, the knowledge of a MNC subsidiary is largely derived from the market context within which the unit operates. Market relationships are identified as main drivers of knowledge creation in subsidiaries. This finding is explicitly derived from Paper I and II, but implicitly discussed in Paper V.
Corporate relationships are also identified as important drivers of subsidiary knowledge creation. Secondly, as found in Paper I, the impact of market and corporate relationships on knowledge creation within MNC subsidiaries is activity specific, and depends on the nature of the knowledge required to fulfill the activity. Development activities seem to be more sensitive to a limited set of relationships, either in the corporate- or market context, than production, marketing, and sales activities. Knowledge in production and marketing relate to both corporate and market relationships.

Concerning the extent to which subsidiary knowledge is recognized and of corporate use, the general conclusion is that appropriation of knowledge is smoother when corporate relationships between subsidiary units already exist. As identified in Paper II, sharing of knowledge between a subsidiary appointed as CoE and a receiving unit is facilitated by earlier experience in working together. Paper III confirms the causal relationships between involvement in corporate relationships and sharing of subsidiary knowledge. However, in order for knowledge sources to be utilized efficiently, an understanding of intra-corporate interdependencies and relationships is required. Considering that knowledge is more or less possible to articulate, one can assume that appropriation of tacit knowledge becomes smoother for those actors that have been involved in the creation of that knowledge. As found in Paper III and in the two case studies, for corporate units’ – and especially for headquarters’ – recognition of a subsidiary’s knowledge involves efforts in making that knowledge shared. Organizational forms and knowledge management tools are set up to facilitate both creation and sharing of knowledge. These findings have possible implications for managing knowledge creation and sharing in MNCs. The headquarters seems to be an important source for managing knowledge in the MNC, maybe not as a driver in terms of providing knowledge and other resources, but rather, as a conductor that recognizes subsidiaries for their knowledge, and promotes further leverage of that knowledge by allocating resources and by promoting organizational forms that establish links between units.

Concerning the use of various organizational forms for creation and sharing of subsidiary knowledge, a general conclusion is that they support the leverage of
subsidiary knowledge. In paper II, IV, and V, CoEs and transnational teams serve as two organizational forms by which locally created knowledge is given a structure, thus enhancing further knowledge creation. A transnational team assembles locally created knowledge of several units whereas a CoE pinpoints knowledge created by one subsidiary unit. The strategic intent of the two organizational forms is to minimize duplication of efforts in the corporation. Studying these two different organizational forms raises the question: *What are the multitude of options facing MNC subsidiary management when it comes to controlling and co-ordinating knowledge creation, and ensuring that knowledge is shared and applied by other MNC units?*

In Paper II, some units within the same business area had similar types of knowledge bases. By appointing the unit perceived as having the leading edge knowledge as being a CoE, that unit was expected to co-operate with other units and to lead knowledge creation. A contributing factor in becoming a CoE was the entrepreneurial drive of the subsidiary management of the local subsidiary. The benefits of designating a local sub-unit as being a CoE was that sources of locally created knowledge useful for other units were put on the corporate map. A preventing factor in sharing locally created knowledge was the applicability of that knowledge in a new context.

To accomplish knowledge sharing and application of that knowledge within an MNC requires that the subsidiaries have a mutual understanding of one another’s business and technological contexts e.g., histories of performing activities jointly, as in the case study presented in Paper II. Individuals at the Swedish unit had been working at the receiving unit, and thus there was a history of having worked together as well as a mutual understanding of one another’s cultural and business contexts. However, as Paper II shows, there is an inherent conflict between a subsidiary’s ability to create knowledge and its ability to assure that the knowledge will be used by other units in the MNC. The dilemma of simultaneously creating knowledge and sharing that knowledge may not solely stem from the difficulty of making context-bounded knowledge available for use at other units. The dilemma could equally be viewed as stemming from an insufficient degree of motivation to participate in the sharing of knowledge within the MNC. As indicated in the case study of the CoE, there might be
a danger in becoming too involved in the knowledge sharing processes of the MNC, since there might not be enough time and resources left for knowledge creation of the local subsidiary. Basically, when an ‘excellence’ subsidiary becomes a ‘centre’, a process may be started that deteriorates its excellence due to the time and cost of fulfilling its centre role. The task of alleviating this problem is cumbersome for corporate management.

In Paper V, a transnational team is established as a means of leveraging local subsidiary-created knowledge to a global level. The knowledge creation in the transnational team thus required assembling the diverse knowledge bases of the units in a temporary organisation in search for a new solution, in this case, development of a business system. The members were geographically dispersed and worked in different market environments. Although the team members were part of the same corporation, by belonging to separate units, differences may appear in terms of organizational behaviour, communication, and interaction patterns. The case study of the transnational team shows that although existing knowledge could be codified by means of information technology into information that was appropriate for sharing, knowledge creation concerning the business system largely relied on face-to-face interaction, preferably during a long period of time. Due to these constraints and the fact that the knowledge created was supposed to be suitable for several units, the knowledge that was created could be viewed as a compromise between the different knowledge bases of the units. In order to contribute to the receiving unit’s performance, the shared knowledge had to be adapted to local conditions.

Earlier research has treated knowledge creation and sharing as two separate processes. However, during the course of this research, it became more and more evident that there is not only a lack of research on the links between knowledge creation and sharing (cf. Schulz 2001), but also that these processes are interdependent. Knowledge, due its nature of being more or less tacit, depends on individuals for creation, and on interaction between individuals for sharing. These two processes, being intertwined, make knowledge use a critical matter. Sharing of knowledge implies making use of knowledge in interactions between individuals, accentuating the link between how knowledge is created and the potential for sharing
that knowledge. Creation of organisational knowledge is realized when individuals share knowledge, which is largely based on experience.

In recent writings, including my own, there seems to be a consensus that knowledge utilization is contingent upon the manner of co-ordination and application of knowledge in an intra-organisational perspective — a task which has to take into consideration where knowledge resides and to what extent it can be articulated and shared. The core co-ordinating capabilities for creating and sharing knowledge within an MNC emerge during the process of co-ordination rather than before. Thus, created knowledge \textit{per se} is not of interest, but rather, the capability of using that knowledge in the organization (Grant 1996b). The \textit{utilisation of subsidiary-derived knowledge} in the MNC thus emerges as the critical source of competitive advantage, rather than the \textit{knowledge itself}. This idea is not revolutionary, however, because in the seminal writings of Penrose (1959), she argued that it is difficult to separate creation and sharing of knowledge as it involves making use of knowledge.

\section*{Future research}
This thesis is devoted to investigating creation and sharing of subsidiary knowledge, and building upon different network relationships as drivers of such processes, and also the role of management in resolving issues, such as headquarter’s role and organizational forms, and finding solutions to unforeseen problems.

During the course of writing this thesis, some issues emerged as interesting topics for consideration in future research. From the case studies and quantitative analyses, various subsidiary management issues emanate, which are related to the complexity of knowledge management, not only in terms of how to make the most of such management and the knowledge processes that it implements, but also the issue of whether it is worth the effort. Regarding these issues, some points to ponder follow.

In this thesis, the subsidiary’s perspective on creating and sharing of knowledge dominates. If possible, it should be counter-balanced by the headquarter’s perspective, and the sister unit’s perspective as well, in order to avoid the possibilities of common-method bias. In the last paper, interviews were made with people in different positions and located at geographically dispersed units. The study’s approach made it
possible to identify perception gaps that affected not only knowledge flows but also expectations about company activities.

In paper I and III, creation and sharing of subsidiary knowledge is found to be activity specific. These findings could be further explored by conducting more statistical tests on how variation of different relationships’ impact on different types of subsidiary knowledge along with how over time interactions in relationships support knowledge creation and sharing in MNCs. For this issue, I suggest a network approach to be useful, as it makes it possible to study the utilization of knowledge in specific relationships and how they may be connected to other relationships within and outside the MNC.

In this thesis, the focus has been on CoEs and transnational teams as organizational forms for creation and sharing of knowledge. Future research can look into other organizational forms, such as task forces, and mechanisms, such as frequency of face-to-face meetings, and communication tools for knowledge creation and sharing in corporations. A related aspect is knowledge sharing between the permanent organization and temporary organizational forms, such as teams and projects. This aspect involves the question of which knowledge transfer mechanisms are most suitable. For the purpose of taking the results of this thesis further, a suitable case study would be to study the implementations of the business systems elaborated on in Paper V.

The focus of this thesis has been on the corporate role of subsidiaries and how different market relationships serve as drivers of subsidiary knowledge creation. As discussed, knowledge creation does not build upon a one-way knowledge flow, but rather, occurs through interaction processes. In future research, it would be interesting to reverse the casual relation between the local market and subsequent knowledge creation of MNC subsidiaries by studying the societal role of MNC subsidiaries. To what extent do MNC subsidiaries contribute to the local environment concerning the growth of other companies, institutional development (such as education), and regional development.

How the subsidiary became part of the corporation is likely to have implications for its role in knowledge flows and for possibilities of using that knowledge in the
corporation. The motives for acquiring a subsidiary may not be related to its knowledge assets but rather the significance of its being located in a strategically important market. In this respect, a subsidiary may be granted autonomy with low connections to other units. However, if a unit is acquired due to its activities being related to the core competence of the corporation, suitable means for integrating that unit should be considered.

**MANAGERIAL IMPLICATIONS**

We return now to the troubled subsidiary manager introduced in the beginning of this thesis. Based on the findings of this thesis, *what are my words of wisdoms to her?*

It goes without saying that knowledge sharing is not easy, nor is all knowledge sharing for the better, as it involves costs. If it is so resource consuming, and if there are so many constraints—*why bother?*

The assembled knowledge of a corporation is argued to be its source of success. Knowledge of a subsidiary can subsequently be of use for several units, and in this way, contribute to corporate competitiveness. The various ways by which knowledge sharing is motivated include efforts in minimizing slack and unnecessary costs in corporations. Arguments commonly heard are to avoid duplication of efforts, ‘not to re-invent the wheel’, and achieving economies of scale and scope. With insights into which units have capabilities of performing which activities, strategic decisions concerning out-sourcing, re-allocation of production, and development can be aligned with what is in the interest of the corporation. These are examples of the benefits of proper knowledge management. However, as pointed out, there are a number of obstacles and considerations to take into account.

As the findings of this thesis show, subsidiary knowledge creation is primarily an outcome of interactions occurring with local counterparts. Consequently, these findings have implications for identifying important sources of knowledge, and for sharing that knowledge with other units. The complexity of the MNC as an organization implies that there are different perceptions concerning the strengths and weaknesses of each subsidiary unit. These perception gaps can be narrowed—although never abolished—by allowing and supporting links between units in the MNC.
Between units with a history of having performed joint activities, subsidiary knowledge sharing is smoother than between those that are completely indifferent to one another’s activities and business environments.

Other managerial implications concern choice of organizational form and related characteristics of creation and sharing of subsidiary knowledge. Firstly, knowledge created by a CoE unit, through being locally developed, is distinct; but sharing of that knowledge with other units demands standardization. Compared with local-derived subsidiary knowledge, knowledge created by a transnational team is aimed at multiple units, making it more standardized. Once shared on a local level, it is made more differentiated.

Secondly, a CoE builds its role of being excellent on the ability of continuously upgrading its knowledge. However, as the findings of Paper II show, there is an inherent dilemma in continuously creating and sharing knowledge. The implications for management derived from this study raises the issue of how to have a CoE appointment maintained, given that it continues to serve its purpose. A related issue is how to phase out a CoE once it has fulfilled its role, without incurring significant losses of resources at the subsidiary level. There may also be complications in resource-dependence relationships within the MNC, affecting overall development and growth.

Thirdly, a transnational team builds upon the organizational principle of bringing people of several units together. For the purpose of knowledge creation, it may be argued that the greater the variety of knowledge brought to the transnational team, the more innovative the knowledge creation process. However, knowledge can be overly diverse, and then hamper the knowledge creation processes. Thus, the problem of finding the right balance between innovativeness and realizable knowledge creation processes has managerial implications, because of the possibility of excessive and overly diverse input of knowledge. Management of transnational teams is resource demanding, for it takes resources from the ordinary business operations, and requires extensive co-ordination efforts e.g., information flows and regular face-to-face meetings of geographically dispersed team members.
Finally, the issue of investments aimed at facilitating knowledge flows, because it is a multi-unit issue, is realized through uniform decision-making involving several units. A complicating matter for subsidiary management in ratifying and lobbying for such investment is the need to correctly assess the pay-off rate. An investment concerning knowledge management is not likely to pay off during the first year, but rather a couple of years later, one of the reasons being that these types of investments concern changing the way people work. However, it is extremely difficult to isolate (e.g., in the fourth year) the direct cause of improved performance, especially in terms of investments in certain knowledge management tools. Other factors, for example, such as changes in market prices, supply of raw material, and regulations are likely to have greater bearing on the evaluation of corporate performance.
REFERENCES


