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Johtamisen laitos
Organisaatiot ja johtaminen

INTRAFIRM KNOWLEDGE TRANSFER:

THE CASE OF NEDECON DO BRASIL

Pro gradu –tutkielma
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Kevät 2000

Johtamisen laitoksen johtajan päätöksellä 21 / 3 / 2000 hyväksytty arvosanalla erinomainen, 90 pistettä.

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ABSTRACT

Goals

This study aims to answer the following three research questions: firstly, what are the milestones of an intrafirm knowledge transfer, secondly, what are the factors of the transfer process which affect its successfulness, and finally, what kind of interdependencies can be found between those knowledge transfer factors.

Methodology

The few existing empirical and process-oriented studies on knowledge transfer form the theoretical basis of the present research, which is a case study examining an intrafirm knowledge transfer of Nedecon – Network Development Consulting Plc. Both static and dynamic frameworks are formed and applied in order to answer the research questions.

Results

According to the dynamic framework of the present study, the successfulness of a knowledge transfer can be hindered by two reasons. Firstly, ambiguity of knowledge affects the transferability of knowledge. There are two categories of factors that affect the level of ambiguity: tacitness and experience. Secondly, successfulness of a knowledge transfer may be hindered by ineffectiveness during the actual transfer. The ease of a transfer process is also affected by two categories of factors: relationship and structure & processes. Findings of the present study show that tacitness as well as structure & processes were the most important categories of barriers to successful knowledge transfer. Transfer partners' prior experience concerning the transferred knowledge also had a slight negative effect on the case knowledge transfer process. The only category with a positive impact on the successfulness of the process was found to be the category of relationship.

Key words: knowledge transfer, intrafirm, tacit knowledge

ACKNOWLEDGMENTS

I would like to express my gratitude and appreciation to those people who have participated in and supported me during my Master's thesis project. First of all, I would like to thank my supervisor, Professor Kari Lilja from Helsinki School of Economics and Business Administration for the guidance and support he provided throughout the research project. His wide experience in academic research as well as his expertise as a supervisor helped me significantly during my first research project.

I would also like to thank the personnel of Nedecon – Network Development Consulting Plc for their valuable contribution which made this study possible. In particular, I want to express my great appreciation to Esa Matikainen, whose comments and insights helped me especially when I was struggling with formation of the framework of this study. In addition, I am grateful that I had a possibility to attend the 19th Strategic Management Society's conference in Berlin. That gave me an extraordinary opportunity to gain valuable insight into the latest contributions in the field of knowledge management.

Especially I want to thank Juho Wallenius, who empathized me forbearingly during this interesting but sometimes quite demanding research process. He also contributed remarkably to this research by challenging my trains of thought as well as by providing many fresh opinions and ideas in different phases of the research. Finally, I would like to thank my mother, Pirjo Poutanen, for the encouragement she had always given to me. I am grateful also for the many supportive and constructive discussions we had especially in the beginning of my research project.

Helsinki, March 2000
Eeva-Maria Poutanen

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1. INTRODUCTION

1.1 Perspectives on Knowledge and Its Transfer

The notion that knowledge and brainpower supercede physical assets as the primary source of competitive advantage is now commonly accepted in the management literature. Thus, many researchers have recently contributed to the development of the knowledge-based theory of a firm. Grant (1996a, 1996b), for instance, suggests that a firm is an institution for integrating knowledge, and management's primary task is to facilitate the integration of knowledge within the organization. Zander and Kogut (1995, 76) propose that the transfer and recombination of organizational capabilities are the foundation of an evolutionary theory of the firm. They also argue that firms are social communities that specialize in the creation and internal transfer of knowledge (Kogut and Zander 1993, 625).

One of the most fundamental characteristics of knowledge which has been clearly recognized by the management literature is the distinction between tacit and explicit knowledge (Grant 1996a, 111). Polanyi (1967) was the first to introduce the concept of tacitness into social sciences by asserting that we can know more than we can tell. Since, numerous researchers have contributed to further develop and define the central concept of tacitness. For instance, Reed and DeFillippi (1990, 89) define tacitness as the implicit and noncodifiable accumulation of skills that result from learning by doing. According to Nonaka and Takeuchi, tacit knowledge is highly personal, action-orientated and context-specific, and therefore hard to formalize and communicate. Explicit knowledge refers to knowledge that is transmittable in formal, systematic language. (Nonaka and Takeuchi 1995, 59)

The critical distinction between tacit and explicit knowledge lies in their transferability and the mechanisms for transfer across individuals, across space, and across time (Grant 1996a, 111). Due to the relative novelty of

the research, there can be perceived disagreement among researchers whether knowledge can be transferred if it is tacit in character (Bloodgood and Bauerschmidt 1999, 2).

Polanyi (1967), for example, maintains that tacit knowledge can never be consciously known to anyone, which makes its transfer impossible. Nonaka and Takeuchi (1995), on the other hand, claim that tacit knowledge can, to some extent, be reflected by its holder and thus transferred to others, although at a high cost, with delay as well as with some loss of the knowledge. Also Winter suggests that tacit knowledge may be teachable even though not articulable (i.e., made explicit). According to Winter, transfer of tacit skills occurs through learning by doing and by apprenticeship (Winter 1987, 170-172).

Tsoukas, on the other hand, questions the whole distinction between tacit and explicit knowledge. He claims that tacit knowledge and explicit knowledge are mutually constitued and they should not be viewed as two separate types of knowledge. According to Tsoukas, tacit knowledge is the necessary component of all knowledge, and explicit knowledge is always grounded on a tacit component. (Tsoukas 1996, 14)

The definition of tacit knowledge and its transferability in the present study corresponds best with the definition of Nonaka and Takeuchi as well as the one of Winter. Thus, in this study, it is regarded that tacit knowledge can be transferred, even if the transfer may be troublesome and difficult.

O'Dell and Grayson, who have researched identification and transfer of internal best practices, state that firms' over-reliance on transmitting explicit rather than tacit knowledge is one of the reasons why internal benchmarking and transfer is difficult. According to them, most of the essential information that is needed to implement a practice cannot be codified or written down but it has to be shown to the recipient in person or

it requires dialogue and interactive problem solving. It was raised that even 80 % of the knowledge that needs to be transferred in internal best practice transfer is tacit in nature: know-how, judgement, intuition, little tricks, or oral stories. (O'Dell and Grayson 1998, 157)

Watson & Rodgers have summarized the above described discussion concerning knowledge and and its transferability into three statements. Firstly, scarce and specialized knowledge is a source of competitive advantage for organizations. Secondly, the knowledge must be integrated across individuals, i.e transferred and shared, for its competitive potential to be realized. Thirdly, knowledge, which is a source of competitive advantage, is more likely tacit than explicit. (Watson & Rodgers 1999, 3)

1.2 Research Gap and Focus of the Present Study

According to the above introduction, knowledge transfer has been recognized as one of the most integral activities of a knowledge-intensive firm. As an activity, knowledge transfer refers to sharing and spreading of firm's knowledge either inside the firm, i.e. intra-firm knowledge transfer, or between external partners, i.e. inter-firm knowledge transfer. Strategic alliances and international joint ventures as well as franchising and licensing are examples of interfirm knowledge transfer. Intrafirm knowledge transfer refers for example to knowledge transfer related to mergers and acquisitions, or internal transfer of best practices.

Simonin (1999, 595-596) notes that although the competitive nature of knowledge transfer and the process of organizational learning have acquired growing interest among both academics and practitioners, so far the research has been more theoretic than empirical and has concentrated more on outcomes of knowledge transfer and organizational learning than on processes they consist of. There are quite a few empirical studies that have approached the concept of knowledge transfer providing statistical

evidence (Mowery et al. 1996, 78) or insights into the process of knowledge transfer and the barriers to successful intraorganizational learning (Crossan & Inkpen 1994, 271; in Simonin 1999, 596).

Examples of the few empirical and process-oriented studies are Szulanski's (1996) research on impediments to the transfer of best practices within the firm, and Simonin's (1999) recent study of ambiguity on the process of knowledge transfer in strategic alliances. These two studies, which will be introduced in the second section of the report, basically form the theoretical ground of the present study.

Tight distinction between intra- and interfirm knowledge transfer is not always necessary or even wise: although Szulanski's research, for example, concentrated on intrafirm transfer while Simonin studied inter-firm knowledge transfer both these studies are relevant considering the present study. According the researcher, the most distinctive difference between the two modes of knowledge transfer lies in the presence of partner protectiveness (Simonin 1999) and the risk for involuntary imitation (Kogut and Zander 1992, 1993; Zander and Kogut 1995). These two are the characteristics of an inter-firm knowledge transfer, in which two separate companies cooperate in some selected area. The purpose of cooperation in inter-firm knowledge transfer rarely is to transfer for instance the whole business concept of the other partner. Due to the characteristics of the case examined in the present study, focus of the present study is on intraorganizational knowledge transfer, which refers to the sharing and spreading of firm's existing knowledge within a one single organization without any restrictions or divergent objectives.

1.3 Case Nedecon do Brasil

The case company examined on this research is a Finnish Internet company Nedecon – Network Development Consulting Plc, which is currently expanding its operations to foreign countries by acquisitions and green field operations. The knowledge transfer process that is examined is the case firm's recent green field operation in Brazil in cooperation with a Brazilian partner. The Brazilian operation was the first knowledge transfer process that Nedecon has been involved in, and consequently an important learning experience regarding the firm's plans to expand its operations also to other market areas.

Nedecon provides large corporations and public administration organizations with Internet-based solutions that generate business value added. Nedecon's business activities consist of IT consulting services, partially or totally tailored Internet, intranet, extranet and e-commerce solutions and wireless solutions. Core competence areas include business management, technical and visual expertise. (www.nedecon.fi 25.11.1999)

Nedecon has adopted a three-point internationalization strategy (www.nedecon.fi 25.11.1999):

1. Nedecon attempts to establish wholly or partly owned companies in markets with potential demand for its business idea and expertise and a promising competitive situation.
2. Nedecon seeks to carry out international customer projects in cooperation with its corporate clients.
3. Nedecon aims to supply profiled software programs based on Internet solutions via international distribution channels.

In the first part of 1999, as a first step in its internationalization process, Nedecon floated a joint venture specializing on Internet consulting, design and roll-out service in São Paulo, Brazil. The ownership base is divided 50/50 between a Nedecon affiliate, NetCenter Group NCGR Oy, which

runs a web department store at www.ostoksilla.com, and Brazilian Lince, a publicly traded textile and plastic industry firm. Nedecon's role in the joint venture is to make its business concept and technical know-how and experience available to the Brazilian corporate sector. Lince provides the undertaking with capital and knowledge of local conditions and markets. (www.nedecon.fi 25.11.1999)

The company strategy of Nedecon do Brasil is to attain rapid growth and a strong market position in the regional market area. The vision is that Nedecon do Brasil achieves a leading position in the Brazilian Internet market by end of the year 2000. The budgeted net sales for the first year were estimated to be FIM 3-4 millions. (www.nedecon.fi 25.11.1999)

1.4 Research Questions and Objectives of the Research

This study aims to contribute to the empirical and process-oriented research on knowledge transfer by examining the case company's intrafirm knowledge transfer process, and the factors of the transfer process that affect its successfulness.

The objectives of the study are, firstly, to describe in detail the process of transferring a business concept to another market area from the viewpoint of the knowledge source, i.e. as it was perceived by the Finnish personnel and managers involved in it. Secondly, the purpose of the study is to classify the different factors of the knowledge transfer process, which either impeded or improved the successfulness of the transfer. Finally, the research aims to highlight and analyze dynamics between the different knowledge transfer factors as well as to draw conclusions based on that analysis.

The research questions are

1. What are the milestones of an intrafirm knowledge transfer?

2. What are the factors of the transfer process, which affect its successfulness?

    Which characteristics of the transferred knowledge affect the successfulness of the process?

    Which characteristics of the knowledge transfer partners affect the successfulness of the process?

    Which actions taken by the knowledge source affect the successfulness of the process?

3. What kind of interdependencies can be found between the factors of the transfer process?

1.5 Limitations of the Study

As the primary viewpoint of the study is that of the source of knowledge, the emphasis of the case description and analysis will be on activities taken by the knowledge source, namely Nedecon – Network Development Consulting Plc. This is a clear limitation to this study, which results from the time and cost restrictions faced by the researcher. To be able to comprehensively describe also the activities taken by the recipient of knowledge, the researcher should have been able to visit the Brazilian unit and conduct same kind of interviews which were conducted in Finland. Since a visit to Brazil was not possible, the viewpoints of the personnel of the knowledge receiving organization were taken into account by asking

them a set of open-ended questions concerning the transfer via email. The purpose of those questions was to confirm and strengthen, contradict or complement the results gained from the interviews of the Finnish personnel.

Thus, the empirical data received from the source unit and the receiving unit are not symmetric. Due to the asymmetric empirical data, the viewpoint of the study is that of the knowledge source completed with insights of the knowledge recipient. Consequently, the present study may not be able to cover all the aspects of the knowledge transfer that may have had impact on its successfulness.

Time frame of the present study can be regarded as another limitation of the research. Due to the time restrictions, the examination of the case knowledge transfer had to be limited to the end of the year 1999. The knowledge transfer of Nedecon do Brasil is quite recent – it was initiated in the beginning of the year 1999 – and at the end of the year 1999 the transfer was not yet completed, i.e. the receiving unit had not yet achieved satisfactory results with the transferred knowledge. Thus, it was not possible to cover the whole development span of the case knowledge transfer within the present study.

The fact that the present study is based on only one case, Nedecon do Brasil, can also be regarded as a limitation of the study, especially considering the generalization of the results.

1.6 Structure of the Report

The paper is divided into seven sections. After the introduction, the second section takes a review to the literature and presents the most important previous studies on which the framework of the present study is built. Formation of the theoretical framework for the empirical analysis is also

presented in the second section. Methodology of the study as well as validity of the data are discussed in the third section. The milestones of the case company's process of transferring its business concept to another market area are described in detail in the fourth section.

The fifth and the sixth sections provide an in-depth empirical analysis of the case. In the fifth section, two most significant subprocesses of the knowledge transfer process – namely the transfer of Nedecon Application Server and the transfer of sales concepts – are examined. The aim is to find out and analyze different factors of the processes, which affect their successfulness. The sixth section highlights and analyzes interdependencies between those knowledge transfer factors, as well as presents implications based on the interdependencies.

The seventh section summarizes the whole report as well as reviews the findings of the study and managerial implications based on the findings. The last section of the report is completed with suggestions for further research.

2 KNOWLEDGE TRANSFER: A TRICKY PROCESS

2.1 Ways of Knowledge Transfer

According to Grant, there are three basic alternatives for knowledge transfer and integration: market contracts, relational contracts (i.e. interorganizational knowledge transfer), and internalization within the firm, (i.e. intraorganizational knowledge transfer). Because of the uncertainties related to knowledge appropriability and valuation, market contracts are typically inefficient means for transferring knowledge. (Grant 1996b, 383) Choi and Lee's (1997, 44) classification of different modes of knowledge transfer within and between firms illustrates the two latter alternatives for

knowledge transfer – relational contracts and internalization within the firm.

Choi and Lee's classification is based on the degree of tacit knowledge involved in the particular transfer mode. Regarding intraorganizational knowledge transfer, mergers and acquisitions are the knowledge transfer modes in which the degree of tacitness is highest. Thus, tacitness associated with the knowledge transferred in mergers and acquisitions has to be taken into account while planning the transfer as tacitness has great impact on the transferability of the knowledge.

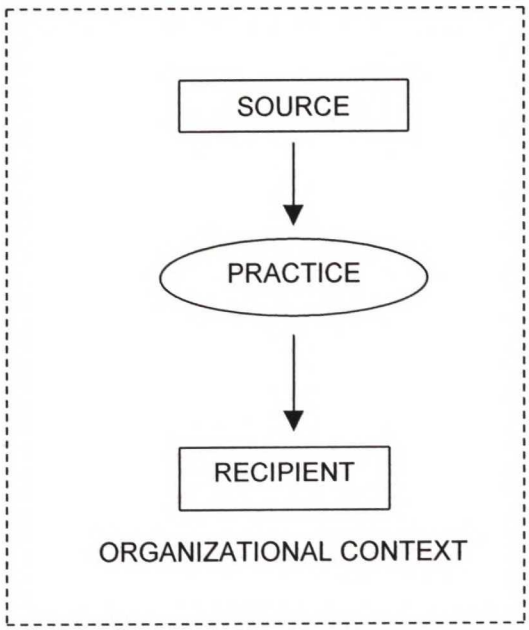
Table 1. Operational Model of Tacit Knowledge Transfer (modified from Choi and Lee 1997, 44)

Degree of Tacitness	Interorganizational Knowledge Transfer	Intraorganizational Knowledge Transfer
High	Joint ventures and alliances	Mergers and acquisitions
Medium	Franchising and licensing	Vertical integration of suppliers
Low	Strategic outsourcing	Transplants and relocation of production

2.2 Intraorganizational Knowledge Transfer

Intraorganizational knowledge transfer refers to the sharing and spreading of existing knowledge within a firm. The main actors and entities in an intrafirm knowledge transfer are the source unit, the recipient unit, and the organizational context in which the transfer takes place. An especially important actor is the practice that is being transferred. (Szulanski 1997, 214) (Figure 1)

Figure 1. Main Actors and Entities in an Intrafirm Knowledge Transfer (Szulanski 1997, 214)



2.2.1 Phases of Intraorganizational Knowledge Transfer

Szulanski (1994, 7-17; 1996, 28-29) identifies four stages of an intrafirm transfer of best practices, which can be applied also to a knowledge transfer like the one under inspection.

2.2.1.1 Initiation

The initiation stage includes all events that lead to the decision to transfer. The transfer can begin when both a need and the knowledge to meet that need coexist in the organization. The discovery of a need may trigger the search for potential solution or, alternatively, the discovery of superior knowledge may reframe as unsatisfactory a hitherto satisfactory situation. When the need and a potential solution to that need are identified, their fit – that is, the feasibility of the transfer – is explored. (1996, 28)

2.2.1.2 Implementation

The implementation stage begins with the decision to proceed and ends when the recipient is ready to start operations according to the transferred practice. During this stage, physical resources, knowledge and people flow between the recipient and the source. During the implementation stage, a communication link is created between the source and the recipient. The transferred practices are adapted to suit the anticipated needs of the recipient, and the required systems, procedures and facilities are planned, implemented, and tested. The personnel at the recipient unit are trained, and new personnel required by the transfer may be hired. (1994, 9-11)

2.2.1.3 Adaptation

The adaptation stage begins when the recipient starts using the transferred knowledge. At first the recipient is likely to use the new knowledge ineffectively, but gradually improves performance and moves toward a satisfactory level. During this stage, the recipient will be mostly concerned with identifying and resolving unexpected problems. A quick and effective resolution of the unexpected problems is essential for a successful adaptation, but the recipient may not have the required knowledge and experience to solve the emerging problems. Thus, during the adaptation phase, the role of knowledge source is essential in identifying existing problems, in solving some of these problems and in anticipating and forestalling incipient or potential ones.

2.2.1.4 Integration

The integration stage begins after the recipient achieves satisfactory results with the transferred knowledge. The transferred knowledge and practices gradually become routinized, lose their novelty and become part of the taken-for-granted reality of the organization.

2.2.2 Manifestation of Difficulties in Knowledge Transfer Projects

"The project will be on time, on budget and it will achieve its stated goals. Pick two out of the three." (anonymous)

Knowledge transfer, like any complex project management undertaking, is likely to involve deadlines, budgets, expected results and uncertainty. Thus, difficulties in transferring knowledge may be manifested in the form of cost overruns, delays in timetables, and unsatisfactory performance. During the transfer, deviations from budget or from schedule will most likely be caused by unexpected problems. Because of uncertainty associated with transferring knowledge, forecasted problems may never appear and unexpected ones may surge during the execution. The ultimate consequence of insuperable difficulties in the transfer process is the failure of the entire effort. (Szulanski 1994, 17-18)

2.3 Barriers to Knowledge Transfer

Szulanski summarizes in his study that barriers to transfer skills and capabilities have broad consequences also beyond the domain of internal best practice transfer. According to Szulanski, barriers to transfer knowledge "reduce organizational flexibility (cf. Kogut 1985), the potential value of an acquisition (cf. Haspeslagh and Jemison 1991), the chances for success of strategic alliances, technology partnership and technology transfer agreements (cf. Hamel and Prahalad 1988; Hamel, Doz and Prahalad 1989) and more broadly the ability of an organization to leverage current knowledge (cf. Bartlett and Ghoshal 1989)". (Szulanski 1996, 37)

This chapter introduces the findings of the most important previous studies, which all approach the subject – knowledge transfer barriers – from a slightly different basis. Firstly, Gabriel Szulanski's study of impediments for intrafirm transfer of best practices is presented. Secondly,

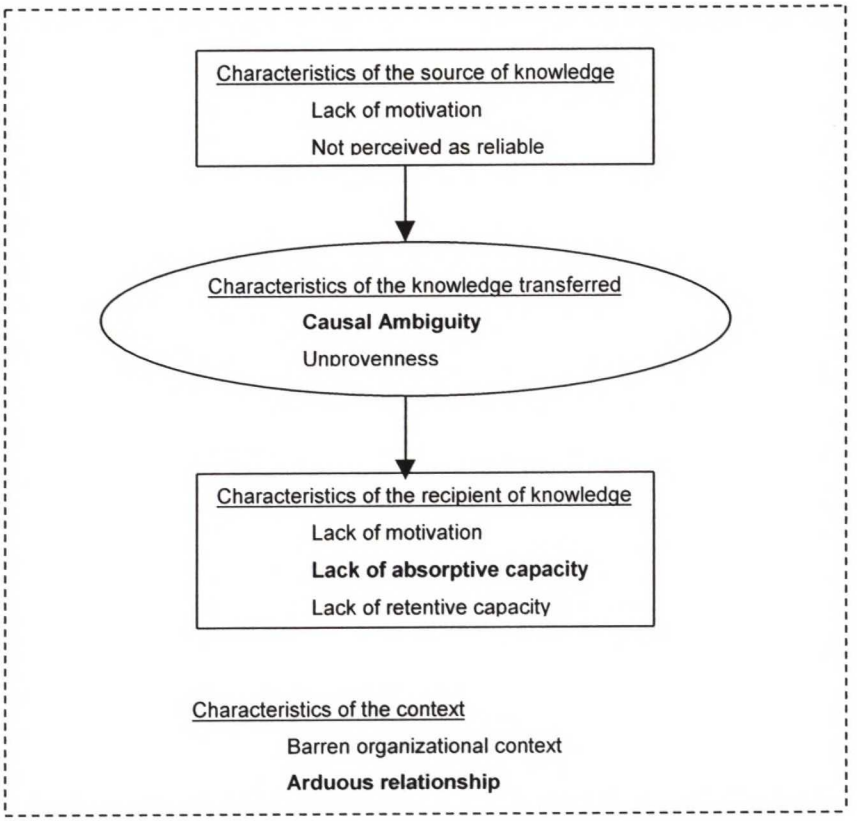
the results of Bernard L. Simonin's research concerning the effect of knowledge ambiguity in knowledge transfer processes in strategic alliances are summarized. Thirdly, the findings of Richard Schoenberg's study of knowledge transfer and resource sharing in European cross-border acquisitions are introduced.

2.3.1 Impediments for Intrafirm Transfer of Best Practices

Szulanski (1994, 1995, 1996) has examined internal stickiness of knowledge in order to identify impediments for the transfer of best practices within the firm. He defines knowledge as non-sticky when its transfer is a "non-event", which means that the transfer is costless, instantaneous, and successful. Conversely, knowledge is defined as sticky, when its transfer is an event. Eventfulness of a transfer means that the transfer fails to reach one or more of the above conditions. Thus, transfer of sticky knowledge is costly, consumes a remarkable amount of time or misses some or all of its stated goals. More broadly, Szulanski connects the eventfulness of a transfer to the degree of surprise, or the gap between expectations and actual results. (Szulanski 1995, 3)

Based on his definition of the main actors and entities of an intrafirm knowledge transfer, Szulanski suggests "that four sets of factors are likely to affect the difficulty of knowledge transfer: characteristics of the knowledge transferred, of the source, of the recipient, and of the organizational context in which the transfer takes place" (Szulanski 1996, 30). The following figure illustrates the variables Szulanski included within each set of factors.

Figure 2. Origins of Internal Stickiness (based on Szulanski 1996)



The findings of Szulanski's research show that the recipient's lack of absorptive capacity, causal ambiguity of the transferred knowledge, and an arduous relationship between the source and the recipient of knowledge are the major barriers to internal knowledge transfer (Szulanski 1996, 27). The results of Szulanski's research highlight especially that the above mentioned knowledge-related barriers dominate the motivation-related barriers, which have primarily been blamed to be the major barriers for knowledge transfer. Szulanski's major barriers to internal knowledge transfer are presented below.

2.3.1.1 Recipient's Lack of Absorptive Capacity

Recipient's lack of absorptive capacity (Cohen & Levinthal 1990) refers to the ability of the recipient to recognize the value of new, external information, assimilate it, and apply it. According to Cohen and Levinthal

(1990), the level of absorptive capacity depends largely on the level of prior knowledge.

2.3.1.2 Causal Ambiguity

Huber (1999, 74) notes, that "much learning in organizations is incorrect; the learned associations are not causal but merely correlational." That results in causal ambiguity of knowledge. Lippman & Rumelt (1982) were the first to define the concept of causal ambiguity which, according to them, refers to how well different factors of a practice can be distinguished and how well interactions between those factors are understood. Simonin (1999, 597) defines causal ambiguity as the lack of understanding of the logical linkages between actions and outcomes, inputs and outputs, and causes and effects.

2.3.1.3 Arduous Relationship between the Source and the Recipient

Arduous (i.e., laborious, distant) relationship refers to a situation where effective communication between a source unit and a recipient unit is impeded because of physical, technological, or social factors. In other words, ease of communication and intimacy of the relationship are typical characteristics of a relationship that is not arduous in nature.

Szulanski (1995, 10) maintains that a transfer of knowledge is likely to be not singular event but rather an iterative process of exchange consisting of numerous individual exchanges, whose success depends on the ease of communication, i.e. lack of arduousness, between the source and recipient of knowledge. Also Nonaka (1994, in Szulanski 1996, 32) stresses the role of effective communication as a knowledge transfer may require numerous individual contacts, especially when the transferred knowledge has tacit components.

Smooth inter-unit communication is considered one of the key devices in enhancing the intraorganizational transfer and sharing of knowledge also

by Marschan, who has examined inter-unit communication in a large Finnish-based MNC (Marschan 1997, 174). "Without intensive inter-unit communication, resources and competencies embedded in the subsidiaries may remain underutilized from the viewpoint of the total organization." (ibid. 168)

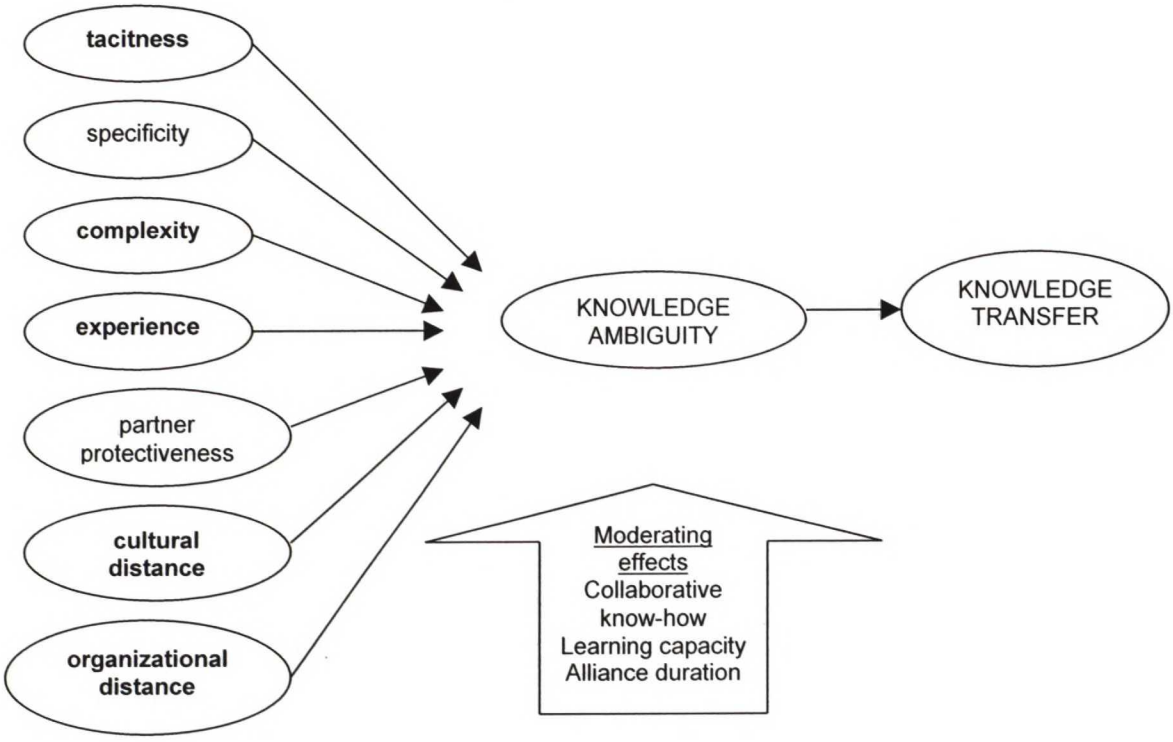
The results of Marschan's research show that the main constraints in communication between organizational units are lack of language skills, limited information about the right communication partner, feeling of isolation and disconnectedness, and ethnocentrism in the form of strongly perceived organizational boundaries (Marschan 1997, 173).

2.3.2 Knowledge Ambiguity and its Antecedents

Simonin (1999) has examined ambiguity in the process of knowledge transfer in strategic alliances. In contrast to prior research, Simonin highlights the integrative role of knowledge ambiguity, defined as a "lack of understanding of the logical linkages between actions and outcomes, inputs and outputs, and causes and effects related to technological or process know-how". According to Simonin, Szulanski's concept of internal stickiness corresponds his concept of knowledge ambiguity (Simonin 1999, 597).

In his study, Simonin introduces and empirically investigates seven factors hypothesized to affect knowledge ambiguity and further the successfulness of a knowledge transfer: tacitness, specificity, prior experience, complexity, partner protectiveness, cultural distance, and organizational distance.

Figure 3. Conceptual Model of Simonin (1999, 598)



The results show that knowledge ambiguity plays an important role as a full mediator of tacitness, prior experience, complexity, cultural distance, and organizational distance on knowledge transfer. (Simonin 1999, 595-597) It was also found that the effects of these antecedents of knowledge ambiguity are mitigated by the firm's collaborative know-how, its learning capacity, and the duration of the alliance (Simonin 1999, 595). The next chapter presents in more detail Simonin's antecedents as well as the moderators of knowledge ambiguity.

2.3.2.1 Antecedents for Knowledge Ambiguity

Tacitness

Reed and DeFillippi (1990, 89) define tacitness as the implicit and noncodifiable accumulation of skills that result from learning by doing. Tacit knowledge cannot be easily communicated and shared, and it is

highly personal, deeply rooted in action and in an individual's involvement within a specific context (Nonaka 1994 in Simonin 1999, 599).

Complexity

"Complexity refers to the number of interdependent technologies, routines, individuals, and resources linked to a particular knowledge or asset." (Simonin 1999, 600) Simonin notes that complexity is expected to affect the comprehension of the totality of an asset and to impair its transferability. That is because "the full information spectrum of a particular competence may be diffused across the organization so that the totality of the knowledge cannot be easily integrated or understood" (Simonin 1999, 600-601).

Prior Experience

Simonin asserts, in accordance with von Hippel (1994) and Szulanski (1996), that knowledge transfer is limited by the degree of experience of the knowledge recipient. Von Hippel (1994, 431) states that "organization must have or acquire related information and skills to be able to use the knowledge that may be transferred to them..."

Cultural Distance

Most of the problems faced in international joint ventures can be tracked back to cultural factors, either national or organizational (Meschi 1997, in Simonin 1999, 602). It has been found out that in international strategic alliances cultural differences produce additional difficulties and challenges for managers who must allocate more time on communication, design of compatible work routines, and development of common managerial approach (Olk, 1997).

Organizational Distance

Simonin's concept of organizational distance represents the degree of dissimilarity between the partners' business practices, institutional

heritage, and organizational culture (Simonin 1999, 603). Simonin relates organizational distance with Szulanski's arduous relationship.

2.3.2.2 Moderating Effects of Collaborative Know-how, Learning Capacity, and Alliance Duration

Simonin establishes that the relationship between knowledge transfer, ambiguity and its antecedents is moderated by three variables: collaborative know-how, learning capacity, and alliance duration (Simonin 1999, 603). Collaborative know-how is defined as the ability of firms to understand and adopt proper procedures for information gathering, interpretation, and diffusion (Simonin 1997). The results of Simonin's research establish that under conditions of greater collaborative know-how, the effects of complexity and cultural and organizational distance on ambiguity disappear (Simonin 1999, 613).

Learning capacity refers to the deployment of proper resources and organizational capabilities to the transfer of knowledge (Simonin 1999, 603-604). It was found out that under conditions of greater resource deployment, the effect of tacitness on ambiguity is smaller and the effects of complexity, prior experience, and cultural distance disappear.

Concerning the moderating effect of alliance duration, it is established that for older alliances, the effects of prior experience and complexity disappear. For younger alliances, the effects of cultural and organizational distance disappear. The effects of ambiguity and tacitness are found to last in spite of the alliance duration. (Simonin 1999, 613)

2.3.3 Market-orientation of an Activity as a Barrier to Knowledge Transfer

Schoenberg who has examined European cross-border acquisitions establishes, that the firms' ability to successfully transfer functional

knowledge consistently falls short of their expectations and that the firms also consistently underestimate the difficulty in implementing planned operational synergies (Schoenberg 1999, 11). The results of Schoenberg's study indicate that acquirers that emphasize the transfer of non-market orientated resources, such as R&D, production or administrative activities, achieve their goals more often than acquirers that focus on activities that require local market knowledge for their successful conduct (i.e., marketing, distribution, customer service etc.) (ibid. 9-10)

Schoenberg implies that the successful transfer of these "market-orientated" activities, which often is the primary motivation in acquisitions, may be hindered by the impediments introduced by Szulanski (1996), namely the presence of causal ambiguity and arduous relationship.

Considering the transfer of explicit knowledge, Schoenberg connects causal ambiguity with the challenge to correctly recognize and codify the exact knowledge elements that must be transferred in order to replicate the capability (Schoenberg 1999, 10). The importance of codification is emphasized also by other researchers. Winter (1987, 172) suggests that the failure to articulate what is articulable may be even more severe barrier to the transfer of knowledge than the tacitness of knowledge itself. Singh and Zollo (1998, in Schoenberg 1999), who have examined domestic acquisitions aiming to achieve high levels of integration, have shown that the ability to codify knowledge is associated with superior performance.

As tacit knowledge is often embedded in specific individuals within an organization, its transfer often requires personal exchange between the source and the recipient (Szulanski 1996). Regarding the transfer of tacit knowledge, Schoenberg relates causal ambiguity to the challenge of identifying and bringing together the specific individual knowledge holders and appropriate recipients. Arduous relationship may hinder the creation

of a fertile atmosphere for facilitating the personal exchanges. (Schoenberg 1999, 10)

2.4 Specifying the Research Task

In the present study, analysis of the empirical data is mainly based on the contributions of Szulanski and Simonin, which are presented in detail earlier in this section. As neither the research of Szulanski nor the study of Simonin exactly correspond the focus of the present study, the conceptual models of those researchers are modified according to the needs of the present study. Hence, the purpose of this chapter is firstly, to introduce the conceptual framework of the present study and link it to the research questions of the study. Secondly, the aim is to clarify the connections between the framework of the present study and the conceptual models of both Szulanski and Simonin.

2.4.1 Concentrating on the Two Most Significant Subprocesses

The knowledge transfer of Nedecon do Brasil consists of many different subprocesses, which will be described in the next section of the report. A decision was, however, made not to analyze in detail the whole transfer process, but to concentrate the analysis on the two most interesting and significant subprocesses.

Different kind of problems can be naturally identified regarding all the subprocesses of the knowledge transfer of Nedecon do Brasil. That is especially true as the knowledge transfer was the first one Nedecon has ever been involved in. When selecting the subprocesses that will be further analyzed, it has to be taken into account that the subprocesses would have also characteristics resulting from other reasons than only the lack of experience or the novel nature of the transfer. Thus, in the selection of the subprocesses it is emphasized, firstly, that the

subprocesses would include as wide a spectrum of different characteristics effecting the transfer as possible.

Secondly, the selection of the most significant subprocesses is based on the degree of ambiguity associated with the transferred knowledge. Szulanski's concept of sticky knowledge is useful when assessing the degree of ambiguity. According to Szulanski's definition, stickiness effects the transferability of knowledge: transfer of sticky knowledge is either costly, consumes a remarkable amount of time or misses some or all of its stated goals (Szulanski 1995, 3). Based on the information gathered from different data sources during the present study, two subprocesses – namely the transfer process of NAS-technology and the transfer process of sales concepts – were selected for closer examination since they seem to meet best the characteristics of transfer of sticky, i.e. ambiguous knowledge.

Thus, in order to answer the first research question – what are the milestones of an intrafirm knowledge transfer – case description of the next section provides an overall description of the whole transfer but concentrates more on the two selected subprocesses.

Considering the time frame, the case description covers the time from the initiation of the transfer process in the end of year 1998 until the end of year 1999, when the process was still unfinished. The emphasis of the case description is on the phases of implementation and adaptation. This is for two reasons. First, the purpose of this research is to examine the actual transfer of knowledge, not the processes or reasons that led to the transfer decision. Thus, the purpose is not, for example, examine or question Nedecon's internationalization strategy or its operationalization. That is why the initiation phase is not examined in detail. Second, as the knowledge transfer of Nedecon do Brasil is quite recent and still going

through the adaptation phase, it is not possible to examine the forthcoming integration phase within this research.

2.4.2 Creating Categories for the Knowledge Transfer Factors

The second research question – what are the factors of the transfer process which affect its successfulness – is addressed by classifying the data into three categories of factors, which reflect the origins of possible knowledge transfer barriers:

1. characteristics of the transferred knowledge,
2. characteristics of the knowledge transfer partners, and
3. actions taken by the knowledge source.

The classification of the present study is modified from Szulanski's (1996, 30-32) model (see chapter 2.3.1). The most significant difference between the classification of the present study and the one of Szulanski is, that Szulanski's "characteristics of the context" is replaced with "actions taken by the knowledge source". The researcher regards that characteristics of the organizational context can be included, if needed, in the present classification's third category, while many significant features of the present study would not fit in the category of Szulanski.

Each category is further divided into three to five factors, which best reflect the empirical data of the study. The factors included in each three category originate either from previous research or from the special events of the case Nedecon do Brasil. The origins of each factor will be indicated as the findings related to it are presented. Table 2 provides an example.

Table 2. Factors Included in the Category "Characteristics of the Transferred Knowledge"

	NAS	Sales Concepts
Knowledge documentation		
Knowledge robustness		
Knowledge complexity	no effect	— —
Market-orientation of the activity	+	—

As Table 2 illustrates, knowledge documentation, robustness and complexity as well as market-orientation of the knowledge asset are regarded as the most important factors of the knowledge transferred in case Nedecon do Brasil.

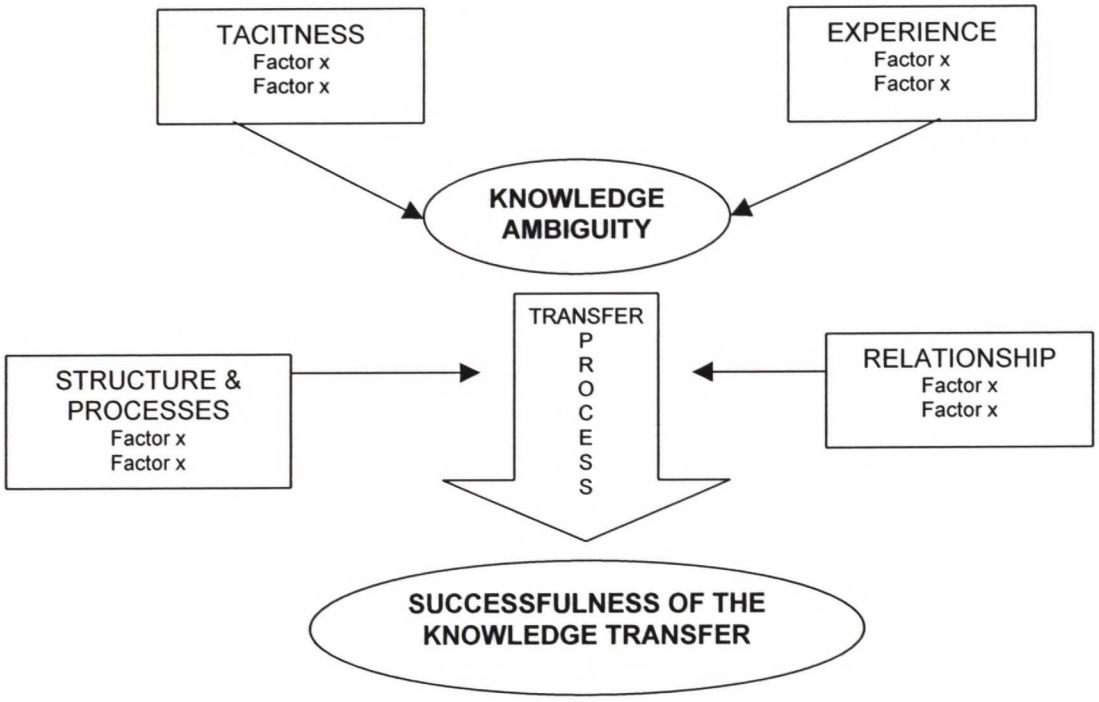
The effect of each factor to the transfer of the two subprocesses is estimated by using a comparative method (Ragin 1987) and a scale of - - / - / no effect / + / ++. For example, knowledge complexity, defined by Simonin (see chapter 2.3.2.1), neither improved nor impeded the transfer of NAS-technology, which is indicated by "no effect". The same factor, however, impeded remarkably the transfer of sales concepts, which is expressed by "— —". Market-orientation of the activity (see chapter 2.3.3), on the other hand, facilitated slightly the transfer of NAS-technology (+), and hindered in some extent the transfer of sales concepts (—).

2.4.3 Analysing Interdependencies between the Factors

As Szulanski's classification of knowledge transfer barriers might be characterized as quite a static one, and as it became apparent that there

were clear causal and correlational relationships between the factors, it was decided to apply to Simonin's more dynamic conceptual model to examine interdependencies between the different factors, i.e. the third research question. Figure 4 illustrates the modified framework of the present study.

Figure 4. Framework for Analyzing Interdependencies between the Knowledge Transfer Factors (modified from Simonin 1999)



The basic idea of this dynamic framework is that the categories of tacitness and experience affect the level of ambiguity of knowledge, which is being transferred. As defined already earlier, knowledge ambiguity impedes the knowledge transfer by decreasing transferability of knowledge. The two other categories, relationship and structure & processes, on the other hand, mitigate or aggravate the effects of ambiguity during the transfer process.

Thus, the knowledge transfer factors classified according the modified model of Szulanski (characteristics of the transferred knowledge, characteristics of the knowledge transfer partners and actions taken by the knowledge source) are next grouped into the categories of the dynamic framework: tacitness, experience, relationship and structure & processes.

By doing so, it becomes possible to perceive more easily the relatedness of factors and the dynamic nature of the case. Most importantly, the framework highlights the relative effect of each category on the successfulness of the transfer, and thus enables the researcher to draw conclusions resulting from interactions between many different factors.

According to the findings of Simonin's research, tacitness, complexity, experience as well as cultural and organizational distance are the most significant sources of knowledge ambiguity (see chapter 2.3.2). In the present study, it was needed to modify Simonin's model to better meet the requirements of the examined case. The formation of the four categories is briefly explained below.

Tacitness

The first change compared with the Simonin's conceptual model is that it was decided to combine "tacitness" and "complexity" into one category. That is because both tacitness and complexity clearly reflect the characteristics of transferred knowledge. Hence, this category draws together all the knowledge transfer factors associated with tacitness.

Experience

Secondly, Simonin's "experience" is used to describe the level of prior knowledge of both the source and the recipient. Hence, the category includes not only the absorptive capacity of the recipient but also the level of source's prior know-how regarding the transferred knowledge asset. These two categories – tacitness and experience – are defined to affect

the degree of knowledge ambiguity (Simonin 1999, 597), which in turn affects the transferability of knowledge and consequently the ease of the transfer process.

Relationship

The categories of structure & processes and relationship are both regarded as moderating effects (Simonin 1999, 603), which may mitigate or aggravate the effect of knowledge ambiguity on the successfulness of the transfer. The category of relationship replaces Simonin's "cultural and organizational distance", which was left out since it was found in Simonin's research that the effects of cultural and organizational distance on knowledge ambiguity are insignificant for recent alliances, i.e. alliances younger than two years (ibid. 613). Simonin explained that interesting finding with so-called honeymoon effect, which is usually connected with expatriates' adaptation to a strange culture (ibid. 616). Thus, cultural and organizational distance was replaced with "relationship" to describe for instance motivational, personal etc. factors, which may facilitate or hinder the transfer of ambiguous knowledge.

Structure and processes

The category of structure & processes corresponds quite well Simonin's initial "moderating effects". The purpose of this category is to summarize factors that reflect especially the source organization's ability and know-how – which usually take the form of processes and structures – to mitigate the effect of knowledge ambiguity and to effectively transfer knowledge.

3 METHODOLOGY

The purpose of this section is to outline the research design of the present study. The data gathering and analysis strategies as well as the validity and reliability issues are also discussed in this section.

3.1 Choice of the Case Company

As Nedecon has recently participated in an extensive knowledge transfer process, it was a suitable case company to be studied in a research, which focuses on intra-firm knowledge transfers. On the other hand, as Nedecon is planning to continue its internationalization process by establishing new subsidiaries to other market areas also in the future, it was interested in to participate in the study and allocate time and other resources for it.

The researcher contacted the case company in June 1999 in order to discuss the possibility of cooperation within her master thesis study which was at the time planned to deal with intellectual capital. The researcher knew from before one of the top managers and founders of the company, Ville-Matti Koskinen, and first contacted him to ask his opinion of the idea. Mr. Koskinen delegated the issue to Mr. Esa Matikainen, the director of strategy and the main responsible for the strategic development of Nedecon. Mr. Matikainen and the researcher met couple of times and adjusted the initial research subject to better meet the needs of Nedecon. As a result, it was decided to shift the research focus from intellectual capital to intraorganizational knowledge transfer. The negotiations resulted in a contract in the beginning of July 1999, after which the researcher had a two-month initiation period at Nedecon.

The research questions and the objectives of the study were formulated in cooperation with the researcher and Esa Matikainen, who became the

researcher's primary contact person in Nedecon. The researcher got an employee identity and access to the Nedecon Intranet Service and general document archives as well as user rights for Nedecon email system for the time of the study. In general, the researcher had a possibility to proceed very independently with her study.

3.2 Data collection

The present research used multiple sources of data: participant observation, documentation, and interview data obtained both by face-to-face interviews and email questionnaires.

3.2.1 Participant Observation

After the cooperation contract was signed, the researcher spent some two months at Nedecon between July and September 1999, during which time she created a knowledge repository by collecting and organizing different documents needed in the Brazilian knowledge transfer process. The knowledge repository consists of material concerning market entry, marketing and sales, production processes, products and technologies, coordination, and office procedures. The aim of the project was firstly to facilitate the future knowledge transfers by organizing the documents to one single place and secondly to preliminary initiate the researcher to the research area.

The initiation period described above allowed the researcher to observe the case company's way of doing things and gather additional data by participating the daily operations of the firm. Patton (1990, 202) supports this kind of observation by suggesting that "the purpose of observational data is to describe the setting that was observed, the activities that took place in that setting, the people who participated in those activities and the meanings of what was observed from the perspective of those observed."

The participant observation period helped the researcher for instance to develop a more comprehensive understanding of the case company's business concept. The period enabled the researcher also to find out who were the key persons concerning the knowledge transfer to the Brazilian unit and to develop close relationships with those persons to ease the interviewing situation and thus ensure more subtle and accurate acquisition of information.

3.2.2 Documentation

Wide variety of different documents concerning both the Brazilian knowledge transfer process in particular and Nedecon in general were used as a data source in the present study. Documents used in the study included for example internal newsletters, process and product descriptions, and earlier studies and reports concerning Nedecon's operations.

3.2.3 Interviews

The primary source of information of the research was the interviews of the selected Finnish Nedecon employees and managers with key positions concerning the knowledge transfer to the Brazilian unit. The interviewees were selected in cooperation with Esa Matikainen, who was the main responsible for the Brazilian operation and consequently had a best overall picture of the person involved in the transfer. Before the actual interviews, the researcher conducted also a couple of informal background interviews in order to gain some kind of preliminary understanding of the knowledge transfer process under examination. That facilitated the formation of the interview guide as well as the selection of the interviewees. The researcher also discussed several times the case and

the preliminary findings of the research with her contact person, Mr. Matikainen, in order to eliminate misunderstandings and biases.

Altogether, 10 persons – 7 employees and 3 managers – were interviewed in Nedecon premises in Espoo during November 1999. Duration of the interviews varied from 30 minutes to one and half an hour. Each interview was taped with permission, and field notes were also taken. Right after each interview, the researcher wrote up a brief memo of the interview. Later the contents of the tapes were summarized in the form of memos, which were sent back for factual verification to each interviewee.

The approach selected for the interviewing was a theme interview approach (Hirsjärvi and Hurme 1991). An interview guide consisting of issues that are to be explored in the course of each interview was used in the interview situations as a checklist to make sure that all the aspects are discussed with all the interviewees.

After the interviews of the Finnish Nedecon personnel it was decided to try to gain deeper understanding of the transfer by questioning also the Brazilian personnel. As it was not possible for the researcher to travel to Brazil because of time and cost restrictions, an interview guide with open-ended questions was sent by email to the Brazilian personnel. The interview guide was formulated and emphasized according the preliminary results from the interviews of the Finnish personnel. The purpose of the questionnaire was not to try to gain a deep understanding of the transfer seen from the point of view of the receiving unit, but to either confirm and strenghten, complement or find counterarguments considering the results gained from the interviews of the Finnish personnel. Altogether, the researcher received five questionnaires from both the technical solutions – employees (three questionnaires) and the consultants (two questionnaires).

3.3 Validity of the Empirical Data

The validity of a research refers to the ability of the research to study the particular phenomenon to which the examination is aimed. The reliability of a research, on the other hand, deals with the reproducibility of the study.

In the present study, validity was seeked by reviewing widely related previous research as well as familiarizing with the case company and the knowledge transfer process under examination before finally determining the most appropriate conceptual model for the study. The careful selection of the interviewees can also be regarded as raising the validity of the study; all the interviewees were key persons regarding the knowledge transfer process of Nedecon do Brasil.

As reliability of a research is about reproducibility, explicitly described research procedures are considered as a means to raise the level of reliability (Kirk and Miller 1986, 41). The methodological describtion of the present third section complemented with related appendices aim to fulfill the requirement of explicit research procedure.

In addition, reliability of the present study has been taken into account by following ways. To begin with, the same kind of interview guide was used in all the interviews. The method of the present study, theme interview, enabled that it was possible to clarify the purpose of the study in general as well as separate themes and questions during the interview together with the interviewee. Secondly, all interviews were taped, then summarized into memos and partly transcribed in order to enable straight quotations. Thirdly, due to the researcher's role as a kind of member of the examined organization, it was easy to contact the interviewees also afterwards and clarify and complement the interview data. Moreover,

verification of the data was also conducted during the discussions between the researcher and her contact person.

Kirk and Miller (1986) note, while discussing the reliability and validity in qualitative research, that qualitative research focuses on meanings and interpretations, rather than on frequencies. In other words, qualitative research identifies presences and absences of something, in contrast to quantitative research that involves measuring the degree to which some feature is present. (in Kulkki 1996, 112-113) "In the case of qualitative observations, the issue of validity is not a matter of methodological hair-splitting about the fifth decimal point, but a question of whether the researcher sees what she of he thinks she or he sees." (Kirk and Miller 1986, 21)

4 CASE DESCRIPTION

The case description is divided into two parts. First, the milestones of the knowledge transfer process of Nedecon do Brasil are presented applying to Szulanski's phase model for intrafirm knowledge transfer. The purpose of the first part is to provide a comprehensive overall picture of the transfer process, and introduce and describe in some detail the subprocesses it consisted of.

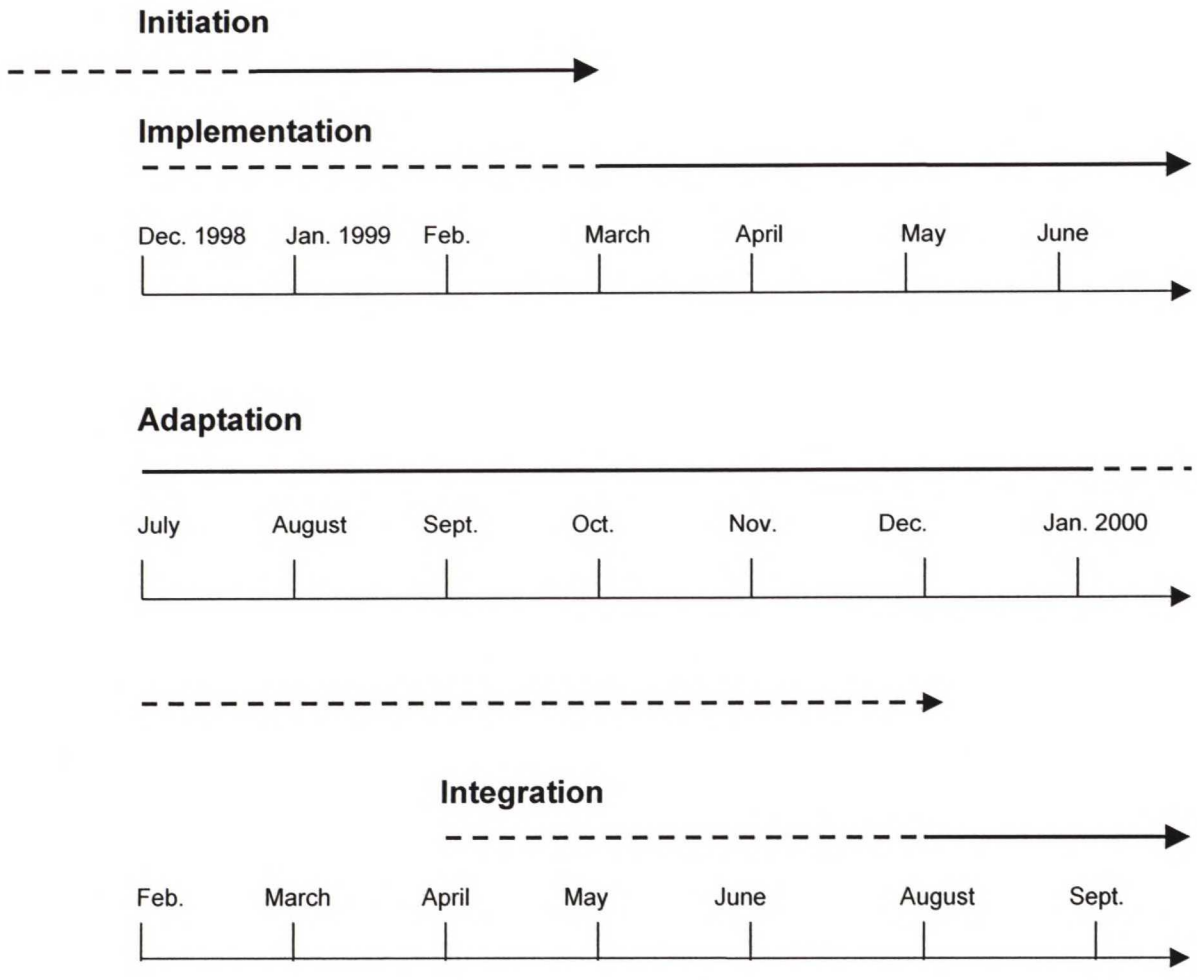
In the second part, the two most interesting and significant subprocesses of the knowledge transfer – the transfer of Nedecon Application Server (NAS) and the transfer of sales concepts – are brought up for an in-depth description. The analysis of the fifth section will be based on those subprocesses' characteristics, which impeded or improved the successfullnes of their transfer. Thus, the objective of the second part of the describtion is to provide the reader with more detailed information of the subprocesses to help her or him to assess the empirical analysis in the

next section of the report. Consequently, descriptions of the transfer of Nedecon Application Server and the transfer of sales concepts are mainly passed over quickly in the first section to avoid unnecessary repetition. The other subprocesses of the transfer process are instead described in more detail, as they are not reviewed later anymore.

4.1 Phases of the Knowledge Transfer to Nedecon do Brasil

The phases of a typical knowledge transfer profiled by Szulanski (1994, 1996) can be clearly identified from the knowledge transfer case of Nedecon do Brasil. The following figure summarizes the whole knowledge transfer process and its most significant milestones.

Figure 5. Phases of the Knowledge Transfer Process of Nedecon do Brasil



4.1.1 Initiation Phase

According to Szulanski's definition, the initiation phase includes all the events that lead to the transfer decision. In the case of Nedecon do Brasil, the initiation phase could be identified to have started when Nedecon – Network Development Consulting Plc and the Brazilian partner Lince were first connected by NetCenter NCGR representative Peter Gylfe, who knew both partners from before. During the initiation phase, Mr. Gylfe acted as an intermediate between the partners who had convergent interests concerning the Brazilian Internet market. Nedecon Plc aimed to the internationalization of its operations, and Lince was interested in investing in the developing Brazilian Internet market.

During the initiation phase, the partners negotiated several times in order to agree on the terms of the joint venture and to formulate the strategy of Nedecon do Brasil.

The initiation phase is defined to end when the decision to proceed with the transfer is taken, usually in the form of an approval and signing of a formal contract. The negotiations between the partners began in the end of year 1998 resulting in the signing of the legal contracts in the beginning of March 1999.

4.1.2 Implementation Phase

According to Szulanski, the implementation phase begins with the decision to proceed and ends when the recipient is ready to start operations according to the transferred practices. During this stage, physical resources, knowledge and people flow between the recipient and the source. (Szulanski 1994, 1996) That can be identified also in the knowledge transfer process of Nedecon do Brasil. During the four-month

implementation phase, codified knowledge in the form of documents, templates, and manuals etc. as well as people from both the source unit and the recipient unit flew between the transfer partners.

The implementation phase of case Nedecon do Brasil was initiated in the form of recruitment before the initiation phase actually ended. Recruiting of the personnel started already in December 1998 when most of the key personnel were hired. The recruiting was completed in January and February.

4.1.2.1 Training period

The implementation phase continued with a five-day intensive training period in Finland in March 1999. The whole Brazilian organization, at the time consisting of 8 persons (managing director, two Technical Solutions – employees, two consultants, web designer, AD, and coordinator) participated in the training which took place in Nedecon premises in Espoo.

The main purpose of the intensive training was to give the Brazilian employees a good overall picture of Nedecon's business concept and Internet technology in general. On the other hand, the purpose of the training period was to make possible face-to-face meetings between the Brazilian and the Finnish Nedecon employees and consequently facilitate the forthcoming knowledge transfer and the cooperation between the units in general. Emphasis of the training was on describing the Nedecon concept implemented in Finland rather than on planning how operations should be organized in the Brazilian subsidiary. Also the suitability of the Finnish concept for Brazilian markets was, however, brought up for discussion from time to time.

Training program is presented next.

1st day, Overview and strategy
2nd day, Sales and marketing
3rd day, Production
4th day, Products
5th day, Conclusion

The training schedule was quite tight and it consisted of both general parts aimed for all participants and tailored parts for different groups. A typical schedule for one day consisted of presentations lasting from half an hour to couple of hours. Presentations were held by different lecturers, e.g. top managers, project managers, consultants, and product managers. Customer perspective was provided by cases presented by some clients.

The program of the first day started with an introduction to Nedecon's business idea and operation concept and with an overview to the Internet industry. Nedecon's most important events of the year 1998 were also reviewed. Strategies of both Nedecon Finland and Nedecon do Brasil were presented next. Before the tailored training, employee and customer satisfaction survey methods and recent results were presented. The first day training session, like all the other sessions as well, finished with a couple of hours tailored training for which the participants were divided into two groups. The other group concentrated on issues concerning e.g. technological solutions and production techniques, and the other more business-oriented group focused on issues like strategy, budgeting, sales and marketing, and customer cases.

The second training day covered issues like marketing and sales concepts, marketing materials and measurement of consultants. During the third day e.g. production process, project manager concept and project management tools, Project Monitoring System as well as production tools

were presented. The subject of the fourth training day was Nedecon's products. Internet, intranet, extranet, e-commerce and wireless solutions were all introduced by discussing some customer cases and by presenting tools and modules available for each product. The couple of hours concluding session of the last training day provided an opportunity for bringing up additional concerns and for planning next steps of the knowledge transfer.

Short face-to-face meetings between the Finnish and Brazilian employees with similar job descriptions were also arranged during the training period. The aim was to create an opportunity for the employees working with similar issues to discuss different aspects of their work and share knowledge and experiences concerning their work. The aim of the meetings was also to establish personal connections between people to facilitate interunit communication.

4.1.2.2 Setting up the São Paulo Office

During April, the São Paulo office was set up including acquisition or leasing of technical equipment, furniture, and other necessary office equipment, creation of the technical infrastructure and transfer of office procedures and materials.

Technical Infrastructure

Technical infrastructure consists of local network and external communication. The local area network includes cabling, firewall, servers, and working stations with PCs and software. The external communication primarily consists of telecommunications, data communications and the needed machines and equipment.

The planning of the technical infrastructure of the São Paulo office was initiated during the training period in Finland. Based on that planning

session, Teemu Linkoaho and Toni Willberg, the Finnish responsibles for the technical infrastructure, drew up a memo of the requirements for the technical infrastructure including a description of the Finnish technical infrastructure and a complete list of necessary equipment to be acquired. Based on that list, the Brazilians ordered the needed machines and equipment including copying machine, fax, printers, dataprojectors, portable computers, PCs with necessary software, servers, and telephonesystem. Other office equipment and office furniture were also acquired.

Teemu Linkoaho and Toni Willberg visited the Brazilian unit in April during the office set up period. The purpose of their visit was firstly to set up the technical infrastructure. Secondly, the visit aimed to transfer know-how about information system policies at Nedecon, especially including data security issues. Nedecon Intranet was also installed during their visit, and the basics of the NAS-technology, on which the Nedecon Intranet is based, were briefly introduced at the same time. During the second week of his visit, Toni Willberg also introduced Nedecon's web products to the Brazilian production team.

During the set up of the technical infrastructure, Teemu Linkoaho and Toni Willberg were faced with many practical problems. First, language difficulties arose from the fact that the local suppliers and service providers do not speak English. Thus, the communication between the Finnish experts and the suppliers happened indirectly, the inexperienced Brazilian Nedecon personnel acting as middlemen, which sometimes caused misunderstandings and breakdowns in communication. That resulted in delays in the form of late or wrong kind of deliveries.

Second, the Finnish technical support personnel realized differences in technical quality standards between Finland and Brazil concerning both telephone connections and distribution of electricity. Power outages are

common in São Paulo, so UPS-system was acquired to secure direct current voltage.

Third, the climate had to be taken into account: without a proper air conditioning, inside temperature in São Paulo may go up to 50 centigrades, which is not suitable considering the technical equipment. Fourth, Teemu Linkoaho and Toni Willberg had to give full directions in a very concrete level for example for the cleaning personnel about what must be done, what can be done and what must not be done. It was necessary to instruct for example that the computer screens must not be cleaned using wet cloths, and that the windows must not be left open. Access control issues had to be controlled as well. It had to be checked and documented who had pass to the Nedecon office and who had possession to the office keys.

The Finnish technical support persons also reported that although the know-how of the Brazilian technical personnel in general was very good, more detailed know-how especially of Windows NT-environment could have made the transfer even more effective.

Office Procedures and Marketing Material

Mirva Mustonen, the Finnish office manager, and Ana-Cristina Moraes, the Brazilian office coordinator, had a central role in transferring office procedures as well as marketing and communications material. The transfer was initiated during the training period, when Mirva Mustonen briefly introduced the Finnish office procedures to her Brazilian colleague for couple of hours. After the training period, Mustonen and Moraes were closely in touch via email for some two months.

The actual transfer of office procedures and marketing material was mainly implemented via email in the form of email attachments. Office

procedure material included for example different financial templates, instructions for financial procedures, internal reporting and communication templates etc. Marketing material consisted of different templates as well as instructions and formats for Nedecon's visual image etc.

In April, at the same time when the São Paulo office was set up, there was a company-wide image management project going on in Finland. The purpose of the project was, on one hand, to renew Nedecon's visual appearance and image. On the other hand the project aimed to integrate and document all marketing and communication material in order to facilitate transfer and updating of the material. As a result of the project, an Image Management handbook completed with a CD including all formats, templates, pictures etc. in soft copy format were created.

As the knowledge transfer of Nedecon do Brasil was the first one in Nedecon's history, there had not been a need for systematic knowledge documentation before. Thus, most of the problems faced during the transfer of office procedures and marketing material resulted from the fact that the needed material had to be collected from different sources or often even be created from nothing. Especially explicit instructions for example for financial procedures were missing. Almost always the existing material had to be adjusted somehow or at least be translated in English before it could be transferred.

The image management project was not completed when the knowledge transfer started, which delayed the transfer according to some estimations for almost a month. Since the new-established Brazilian unit needed the marketing material to be able to start the operations, it was often necessary to transfer outdated versions to give the Brazilians at least an idea of the issue. That had to be taken into account later when the updated versions became available. Minor technical difficulties also impeded the actual transfer of the office material: email attachments did

not always open without problems, and different software version used in Finland and in Brazil caused some difficulties in the transfer.

Despite the delay in transferring the Image Management concept, the Finnish management considers the transfer in question as one of the most successful in the whole knowledge transfer of Nedecon do Brasil. When the successes of the transfer were asked to be named, almost all interviewees mentioned that the new company is visually an integral part of the corporate or that the transfer of Nedecon brand was successful.

Transfer of office procedures and marketing material was primarily planned at the managerial level. The personnel that implemented the transfer in practice felt that it may have been useful to participate also in the planning phase of the transfer. The fact that the planning and implementation were distributed resulted sometimes in misunderstandings that could have been prevented, if it had been known exactly what can and cannot be delivered in the given timetable.

In general, the office set up period took much longer that it was expected beforehand. The delay resulted on one hand from practical problems like unexpected delays in office furniture deliveries and problems in getting telephone connections to function. On the other hand, the Finnish organization faced some difficulties in fulfilling promises given to the Brazilian unit as well as meeting the expectations they had set to their own ability to assist the new-established unit to start its operations.

4.1.2.3 Other Activities during the Implementation Phase

The transfer of Nedecon's most significant production technique, Nedecon Application Server (NAS), was started during the implementation phase. NAS-technology was first introduced briefly in the training. In May, a Brazilian key technical person spent ten days in Finland studying and practicing NAS-technology.

Marketing activities were also started during the implementation phase in April. In May, a press conference was held in order to inform the market about the new player entering the industry. The most significant marketing activity during the implementation phase was an Internet business seminar organized in São Paulo in the end of June. The seminar was a starting shoot for customer acquisition and sales efforts, and thus regarded as the end of the implementation phase.

4.1.3 Adaptation Phase

According to Szulanski, the adaptation stage begins when the recipient starts using the transferred knowledge. During this stage, the recipient will be mostly concerned with identifying and resolving unexpected problems. (Szulanski 1994, 1996) The identifying and resolving of emerging problems has been typical also for the knowledge transfer process of Nedecon do Brasil during the adaptation phase.

The sales efforts of the new-established organization were started after the marketing seminar in July 1999. At the same time the transfer process of technologies and production know-how was continued and deepened. Both technical and business key personnel from the Finnish organization visited the Brazilian subsidiary altogether for four weeks during July and August 1999.

Sami Kallio, the production manager of the Finnish unit, visited the Brazilian unit for one week in the middle of July. Adaptation of production processes as well as Nedecon products not based on NAS-technology were the subjects of Mr. Kallio's visit.

Production processes have been developed and documented in detail in the Finnish organization during the last couple of years. However, the

production process implemented in Finland was not suitable for the Brazilian organization as such due to the significant differences in the existing job descriptions and the sizes of the organizations. As the production process is an integral part of Nedecon's concept, it was decided to adapt the production process to the needs of the Brazilian organization and implement the suitable parts. That was done in cooperation with Sami Kallio and the production personnel of the Brazilian unit during Mr. Kallio's visit. It was also decided which kind of project reports should be regularly sent to the Finnish headquarter.

It was raised in many interviews that the successfulness of the transfer of the production processes cannot be estimated until the receiving unit starts implementing customer cases in a greater extent. According to Mr. Kallio's opinion, the Brazilian unit has at least not yet implemented the production process as it was planned during his visit. That may result from the fact that at the time of the interview the Brazilian unit had not had that many complete customer projects on which the adjusted production processes could have been tested.

During his visit, Mr. Kallio also presented Nedecon products not based on NAS-technology (i.e. DAS, Search Server and Web Analyzer) which are used mainly in web projects. The production process and web products were first discussed with the technical personnel, and later small group training was provided also to other Nedecon do Brasil personnel.

At the time of the transfer, invoicing, salary payments, project situation follow-up, project team information and customer information, as well as profitability and effectiveness follow-up at Nedecon were based on an application software named Project Monitoring System (PMS). During the transfer, the system was under development and it was decided not to implement the old version of the software to Nedecon do Brasil. Instead, a more simple Excel-based reporting and follow-up system was developed

taking into account the characteristics of the smaller new unit. The updated version of the PMS was decided to be implemented also to the Brazilian unit as soon as it would be available.

According to Mr. Kallio, the timing of his visit was not as good as it could have been considering the implementation of the production process. That is because the Brazilian unit did not have that many projects going on at the time. The transfer could have been more effective if it would have been possible to compare the production process model to the implementation of the existing customer projects. On the other hand, taking into account that the production personnel of the Brazilian unit did not have that much to do because of the lack of projects, the timing of the visit was reasonable. The visit of Mr. Kallio gave the Brazilians something reasonable to deal with, and they had enough time to concentrate on the subjects and have discussions with Mr. Kallio.

Olli Pääkkönen, the main developer of the NAS-architecture, visited the Brazilian organization for two weeks after Mr. Kallio's visit in order to deepen the NAS-know-how of the Brazilian technical personnel. He also participated in the assessment of the feasibility of NAS-technology for some early proposals, which were in preparation at the time of his visit. Jyrki Eklund, the marketing director of the Finnish unit, spent one week in São Paulo at the same time with Mr. Pääkkönen in order to get to know better the local market and to provide sales support in negotiations with potential customers.

After July, the next significant milestone in the knowledge transfer process, not taking into account the regular interaction and problem solving that occurred between the units, was the launch of Nedecon Extranet Service for test use in the beginning of October 1999. The primary purpose of the extranet is to make the technical support more

effective. Later the extranet would be extended to support also marketing and sales as well as production management.

Customer acquisition of the new-established Brazilian unit did not start to yield results as quickly as it was expected. The owners expected that the sales leads gained from the marketing seminar would have turned into contracts in August at the latest. Actually, the first deals were not closed until in the end of October. That resulted in the prolongation of the phase without any turnover generation up to six months, which caused quite severe tension between the Brazilian managing director and the owners of the company.

In the end of October, Esa Matikainen and Ian Nordman, the manager of Nedecon Application Server, made a five-day visit to São Paulo. The purpose of Mr. Nordman's visit was to transfer knowledge of the new Nedecon product families to the Brazilian unit as well as discuss the possibilities of closer international dialogue on sales and project delivery issues.

Mr. Matikainen's visit aimed to make the slow customer acquisition more effective by discussing the marketing plan as well as formation of a more effective control system with the managing director of the Brazilian unit. As a result, the managing director committed to a set of goals regarding sales efforts and turnover development. Also regular checkpoints to review the sales situation were agreed.

In the end of October 1999, a thorough organizational change was established in the Finnish organization. According to CEO Jesse Jokinen, the most important effects of the organizational change are, firstly, the formation of the middle management, secondly, the integration of production processes, thirdly, more clearly expressed responsibilities, and fourthly, the underlining of coordination and documentation. One of the

most important consequences of the change to the international operations is the formation of a corporate management unit whose tasks include managing the financial value of the corporation as well as global competence management, i.e. enhancing competence transfer within the group. The development project of the Project Monitoring System was also concluded in connection with the organizational change, and a new system, Nedecon Project Monitor NPM, was introduced.

4.1.4 Integration Phase

The integration phase begins as the recipient achieves satisfactory results with the transferred knowledge (Szulanski 1996, 29). In the case of Nedecon do Brasil, satisfactory results are defined to be achieved when the monthly cash flow turns positive. That is estimated to occur during the first quarter or during the second quarter of year 2000 at the latest.

4.2 Transfer of Nedecon Application Server, NAS

The transfer of Nedecon Application Server, NAS, was found to be one of the most significant and most successful of the processes in the knowledge transfer of Nedecon do Brasil. The purpose of this chapter is to describe in more detail how NAS-know-how was transferred to the new-established unit. The purpose Szulanski's model of knowledge transfer phases is applied also to this description to make it as comparable as possible with the above overall case description.

Nedecon Application Server (NAS) is a framework developed by Nedecon mainly for Intranet and extranet solutions. Different parts of a solution, like structure, content, visual appearance and functionality, are separated in NAS, which enables a swift production of services as each part can be modified independently during the production phase. Normally, in tailored projects the share of the production costs is 25-30 % of the project's

turnover. NAS enables the reduction of the production costs to 10 % of the turnover at the same time when the time needed for the production phase is reduced remarkably.

From customers' point of view, NAS is a ready-to-use Intranet or extranet solution, which is easy to update and maintain even if the user has not specified education or experience regarding system maintenance. NAS consists of a core and separate functional modules, which can be integrated to the core according to a customer's needs. The modularity of NAS-architecture makes solutions based on it very integrable as new modules can be created and installed to the existing core.

4.2.1 Implementation Phase

The implementation of the transfer of NAS-technology, like the whole implementation phase, was initiated during the training period in Finland. During the training, it was possible to introduce only some principles of NAS-technology as well as present briefly some customer cases based on NAS. The detailed technical training was provided later to one of the Technical Solutions -employee of Nedecon do Brasil, who then trained the other Brazilian personnel.

Nedecon Intranet Service that is based on NAS-technology was installed to São Paulo office in April during the same visit when Teemu Linkoaho and Toni Willberg were setting up the office infrastructure. An Intranet installation manual was transferred to the technical personnel of Nedecon do Brasil and the very basics of NAS-technology were presented.

Paulo Bloedorn, one of the two Brazilian Technical Solutions -employees, visited the Espoo office for two weeks in the beginning of May. The purpose of his visit was to present him Nedecon Application Server so thoroughly that he would be able to start production based on NAS and

also train other Brazilian employees to use the technology. During the first week, Tarmo Typpi, one of the software designers of the Finnish organization, introduced Paulo the theory of NAS-programming and NAS-architecture. The main method of the training was, however, to use the technology in practice. It was raised, that practicing is the most effective, maybe even the only possible method of learning such a complex technology as NAS.

"This kind of tight training and practicing period is really essential, at least considering NAS." (Finnish employee)

At the time of the training, the development of the NAS-technology was still uncompleted. On one hand, that impeded the training as quite a lot time had to be spent on solving different problems. NAS-environment's unability to support different language versions was one of the biggest problems, which was not solved at the time of the transfer. That caused also the Brazilians a great deal of extra work as the contents of Nedecon Intranet had to be translated several times. On the other hand, it was quite useful to Paulo Bloedorn to follow the problem solving and also participate in it as a part of his training. According to Tarmo Typpi, Mr. Bloedorn learned quickly and was even able to locate some problems or weaknesses in the technology during his training period.

After the two-week training period, Tarmo Typpi and Paulo Bloedorn continued to communicate intensively, now via email, when Mr. Typpi provided the essential support to the Brazilians during their first customer Intranet installation.

The transfer of the NAS-technology suffered from the lack of sound documentation of the architecture. There was only very basic documentation, like installation instructions etc., available at the time of the transfer. In addition, the scarce documentation was available only in Finnish.

4.2.2 Adaptation Phase

Olli Pääkkönen, the main developer of the NAS-architecture, visited the Brazilian unit for two weeks in the end of July. The purpose of his visit was to complement and deepen the NAS-know-how of the Brazilian technical employees. He also supported the sales efforts by providing his expertise to assess the feasibility of NAS-technology in some potential customer cases. According to Mr. Pääkkönen, he and the Brazilians, mainly the Technical Solutions –employees and the managing director, had many interesting discussions not only considering the possibilities of NAS-technology but also regarding the characteristics of the Brazilian Internet market and the operationalization of the strategy of the new unit. During the interview, Mr. Pääkkönen described his relations with the Brazilians very friendly.

After his visit, Mr. Pääkkönen quite naturally took the main responsibility of the communication considering NAS-technology between the Finnish and the Brazilian units. Mr. Pääkkönen became the main technical contact person in Finland and the main supporter of the Brazilians' efforts in tailoring NAS-functionalities. The intensive communication between Mr. Pääkkönen and Mr. Bloedorn soon developed into kind of application development via email. According to Mr. Pääkkönen, it was not unusual between him and Mr. Bloedorn to send and receive over 20 email messages during one day.

The role of the NAS support person occupied Mr. Pääkkönen much more than the transfer occupied many other Finnish key persons. During the implementation of NAS and also during the big customer negotiations Mr. Pääkkönen had to spend even several hours in assisting the Brazilians. That gradually started to impede Mr. Pääkkönen's possibilities to allocate time to his actual duties. The Brazilian unit also suffered from the Finnish

organization's inability to effectively support the new unit. Significant delays in answering times impeded the Brazilian organization's ability to operate effectively and provide proper customer service. In addition, the difference in time between Finland and Brazil almost always causes an extra delay to the answering times.

The initial idea of starting to develop Nedecon Extranet Service came from Mr. Pääkkönen, who was quite overloaded because of the continuing need of support from the Brazilian unit. Problem solving via email was realized to be very ineffective, as solutions stayed mutual between the support receiver and the support provider and thus, the organization-wide accumulation of NAS-knowledge did not occur. In addition, the problem solving via email also burdened certain persons too much, as it was not very easy to delegate the support requests to other, also loaded, technical personnel. There had developed a clear demand for a more standardized supporting system.

Thus, at the first stage, the purpose of the extranet was to make the technical support more effective. The idea was to create a dynamic system for searching documented solutions from knowledge bases, raising new questions and providing solutions to the raised problems in a certain timeframe. Mr. Pääkkönen planned the structure of Nedecon Extranet Service, which is based on different user groups, different problem classifications, and different support levels. There are certain time margins during which it is quaranteed that an answer or solution to a raised problem is provided. When the structure of the new system was planned, attention was also paid to the documentation and filing of the solutions.

Nedecon Extranet Service was launched for testing in the beginning of October. User rights were first given to the Finnish extranet development team, the Brazilian Technical Solutions –employees and a couple of Finnish NAS-customers. Consequently, the aim of Nedecon Extranet

Service is also to support the NAS-customers, not only to provide internal assistance to corporate units. After the extranet was launched, the communication between the units concerning NAS was determinedly shifted to the extranet by Mr. Pääkkönen, who simply did not react anymore to the requests received via email.

The purpose of the Extranet is also to provide support for the sales and marketing activities as well as for project management, but so far only the technical support system is functioning. The development of the business contents for the Extranet is gradually starting, and access to the service has been given also to sales personnel of the Brazilian and the Finnish units.

In general, the Brazilian organization adopted and absorbed the NAS-technology fast. They found the technology to suit very well the services and solutions on which they decided to concentrate. Until the end of the present study's timeframe, the end of year 1999, NAS-architecture was the only production technique implemented in Brazil. For example, Nedecon's production techniques for web services, which were introduced to the Brazilian unit in July, have not been used that much in the new unit. Other product concepts, like Wireless Solutions' WAP concept and E-commerce concepts SET and POS, were introduced to the unit by Ian Nordman in the end of October. It was decided to allocate some resources in the both units to accelerate the implementation of those concepts.

According to the Finnish NAS experts, the Brazilians have also independently developed the NAS-technology resulting in some new features available also for the Finnish market. Thus, the cooperation between the units is gradually beginning to benefit also the Finnish organization.

"NAS has been absorbed really well in Brazil. It shows for example so that they have developed certain aspects of the technology which we here in Finland haven't had need or time for." (Finnish employee)

Although NAS could be regarded as the best product of Nedecon Plc at the moment, the management of the Finnish organization does not, however, regard the NAS-enthusiasm of the Brazilian unit as an exclusively positive thing. They emphasized several times during the interviews that Nedecon's services have to be always based on customer needs, not on any kind of specific product characteristics. They wanted to underline that the objective has to be always to find a best solution to the needs of the customer. Then again, they also clearly understood that the emphasis of NAS in the Brazilian unit is partly due to the fact that NAS is basically the only product that the Brazilians can concentrate on at the moment.

4.3 Transfer of Sales Concepts and Marketing Knowledge

The transfer process of sales concepts and marketing knowledge was one of the most significant and most demanding of the processes in the knowledge transfer of Nedecon do Brasil. The purpose of this chapter is to describe the implementation of the marketing strategy of Nedecon do Brasil including transfer of sales concepts and sales know-how. The aim is also to describe the difficulties faced with the customer acquisition and the possible reasons for the difficulties.

4.3.1 Initiation Phase

During the initiation phase, the marketing strategy of Nedecon do Brasil was formulated. The mission of Nedecon do Brasil was defined to be to design and carry out holistic and innovative Internet services that provide added business value. The main objective set to the Brazilian subsidiary

during the strategy formulation was that the unit would achieve a leading position in the Brazilian Internet market by the end of the year 2000. The objective was planned to be achieved by concentrating, on one hand, on active selling to establish a credible customer base. On the other hand, it was decided to focus on building the organization.

4.3.2 Implementation Phase

The transfer process of sales concepts and marketing knowledge started with the training period in Finland, during which marketing and sales issues were introduced in some detail. The training period is described in detail in the general case description.

After the training period, at the same time when the office was set up in April, Esa Matikainen spent two weeks in Brazil. During that visit, marketing and management concepts as well as the operationalization of the strategy were widely discussed by Esa Matikainen and the managing director of the Brazilian unit. Prospect lists of potential Brazilian companies were also examined to identify more accurately the key customer group. The purpose of the discussions was primarily to adapt the Finnish sales concepts for the Brazilian market and organization.

The next milestone in the transfer of marketing and sales knowledge was the press conference organized in São Paulo in 10th of May 1999. Mr. Matikainen attended the conference, and during the one-week visit he also participated in some press interviews with the Brazilian managing director.

Lince, the Brazilian owner of Nedecon do Brasil, had acquired already before the establishment of the joint venture a small Internet company, StepWeb, providing mainly web page services, which was located in Santa Catarina, Blumenau in Southern Brazil. In connection with the establishment of Nedecon do Brasil, StepWeb's Internet business was

incorporated into the operations of the new company. Initially, two StepWeb employees were hired to Nedecon do Brasil. Later, in June, three more former StepWeb employees joined Nedecon do Brasil, two of them located in Blumenau.

StepWeb had also a couple of interesting customers, which gradually became customers of Nedecon do Brasil. The most important customer received from StepWeb was Petrobras, one of the largest companies in the Brazilian market. During May, Nedecon do Brasil implemented their first NAS-technology based Intranet for Petrobras. Since, the cooperation between the two companies has continued in the form of other projects also.

Internet Business Seminar in São Paulo in the end of June was the starting shoot for sales efforts and customer acquiring. The business seminar concept of Nedecon was transferred to the new unit, and the Brazilian sales personnel initiated their sales efforts by organizing the seminar. 80-100 persons from interesting companies participated in the seminar whose purpose was to inform the markets about a new service provider, introduce and promote Nedecon's services and first of all, gain sales leads. Esa Matikainen attended the seminar with Jesse Jokinen, the CEO, who also gave a presentation in the seminar. After the seminar, customer acquisition was started by contacting the sales leads acquired in the seminar as well as by contacting interesting companies by making so called cold calls.

4.3.3 Adaptation Phase

Mr. Jyrki Eklund, the director of marketing, visited the Brazilian unit for the first time in the end of July. The purpose of his visit was both to facilitate the beginning of sales efforts and customer acquiring and also transfer marketing and sales know-how to the new unit. The visit aimed also to get

know better the market characteristics the new unit is facing. During his one-week visit Mr. Eklund participated in over 10 negotiations with potential customers providing sales support in the form of his broad outlook on the Internet industry and deep experience of Internet solutions' possibilities to create added value. The fact that Finland is regarded worldwide as a forerunner in Internet-technologies is well known in the Brazilian market. Consequently a connection to a listed Finnish Internet company provides Nedecon do Brasil with a more credible image than it could achieve by itself. Thus, one aim of Mr. Eklund's visit was to strengthen the status of Nedecon do Brasil in negotiations with large companies as a representative of the Finnish top management.

Because of difficulties in fixing the timetables of the both parties, the Brazilian organization was not visited after the visit of Mr. Eklund for almost three months. Mr. Matikainen planned to visit the unit in September, but on account of pressure of business, the Brazilians wished to adjourn the visit for a couple of weeks. It was not possible to settle down a new point of time before the end of October, since Mr. Matikainen left for a round trip in Asia and Central Europe to negotiate the possibilities of further operation expansions. Thus, for Mr. Matikainen, the interval of his visits to the Brazilian unit was prolonged to almost four months. According to him, that long break in meeting the people of the remote unit and discussing the business situation face-to-face cannot be recommendable in any situation from now on.

4.3.3.1 Difficulties in Customer Acquisition and Turnover Development

Customer acquisition of the new-established Brazilian unit did not start to yield results as quickly as it was expected. The owners expected that the sales leads gained from the marketing seminar would have turned into contracts in August at the latest. Actually, the first deals were not closed until during October which meant that instead of the expected three

months, the period without turnover turned out to last over six months. That resulted for example in a new investment round, the third in succession, for which the owners had, to be sure, prepared in advance. In November it seemed that also the fourth, even if quite a small capital investment round would be needed before the unit's monthly cash flow would turn positive. The estimated turnover of FIM 3-4 millions was not reached during the year 1999. However, when comparing the turnover development of the Brazilian unit with the stated goals, it has to be taken into account that during year 1999 the Brazilian real has devaluated remarkably against the Finnish markka. The devaluation naturally impacts the amount of turnover of the Brazilian unit expressed in the Finnish currency.

The slow start of the customer acquisition also resulted in quite a severe exacerbation of relations between the managing director and the owners of the company, especially the Brazilian partner, Lince. Even the dismissal of the managing director was discussed.

During the interviews, a few issues were brought up to explain why the expectations concerning the turnover development and customer acquisition were not fulfilled. The reasons mentioned most often by the Finnish key personnel concerning the slow customer acquisition are presented below.

Demand for Internet –technologies in the Brazilian Market

First, there are differences between the market characteristics in Brazil and in Finland that may not have been taken into account as widely as it would have been necessary when setting the goals for the new unit. Because the Brazilian market is somewhat behind regarding the use of Internet-technologies compared for example with Finland, in many cases the selling process has to begin with the creation of demand for Internet

solutions by providing guidance and introduction of possible services. That can sometimes prolong the selling process remarkably.

Selling Process

Secondly, the selling process in the Brazilian market – an issue raised by many Finnish interviewees – was found to be somewhat different from the Finnish one. A typical Brazilian selling process begins with a preliminary visit to the premises of the potential customer. The only purpose of the visit is to get a permission to settle down a meeting with the potential customer in the seller's office. If the second meeting at the seller's office during which the seller has an opportunity to present his services is successful, the third round of negotiations may begin. During the third meeting, the technical and commercial details of the offer are negotiated. After the above described three meetings, the potential customer gives or refuses to give the seller a permission to make the proposal. Before the proposal is accepted, it may be specified and adjusted. After the offer is accepted, the project can be started right away at the same time when the actual legal contracts are drawn up.

Thus, the Brazilian selling process could be described to be more time-consuming and require more preliminary work than the Finnish selling process. That is mainly because the offering practice is different. The greatest difference in the Brazilian offering practice compared to the Finnish one is that the seller needs permission from the potential buyer to make a proposal. Getting the permission requires more preliminary work than it requires to make an offer in Finland, where the proposal is regarded more as a starting point to the more specified negotiations. In Brazil, instead, most of the work is already done when the proposal is tendered to the potential customer, and the importance of the permission to tender is regarded almost as significant as the actual contract is in Finland. On one hand, that means that when the permission to tender is

received, it is highly probable that the deal is made. On the other hand, there is also a high risk of using resources to something that never leads to incomes. One of the Finnish managers summarized the difference between the Finnish and Brazilian proposal system:

"The amount of outstanding proposals seems smaller in Brazil than here in Finland, but on the other hand the hit rate is significantly higher there than it is in Finland." (Finnish manager)

Selling Approach of the Brazilian Managing Director

The effect of the new unit's managing director's selling approach on the speed of the customer acquisition is also an issue brought up by a few Finnish interviewees, especially on the managerial level. The selling approach of the managing director was described to be very profound and thorough, even perfectionistic.

"Sometimes it seemed that they needed to build an empire around them before having courage to contact the customers..." (Finnish manager)

The above described typical Brazilian selling process, which emphasizes the work load before the tendering, was brought up especially by the managing director to explain the quite slow start of the customer acquisition. For example, the representatives of the joint venture's Brazilian partner, Lince, did not totally agree on the managing director's opinion of the amount and completeness of work, which has to be done before tendering when operating in the Brazilian market. According to interviewees that have been in contact with Lince's representatives, at Lince it was thought that the customer acquisition should and could have started more effectively in spite of the characteristics of the tendering process.

Key Customer Group and Project Profile

The fourth issue that has been perceived to influence the customer acquisition, is the definition of the key customer group and the tactics used to reach that group. In the strategy of Nedecon do Brasil it was stated that the key customer group of Nedecon do Brasil would be large corporate clients in the Brazilian market.

The competition in the Brazilian Internet market is quite fierce. On one hand, large global companies providing complex information system integrations are active in the market. For example, the Finnish personnel were told that IBM has adopted quite an aggressive strategy not to lose any deal, no matter what the cost will be. On the other hand, there are many small, local firms providing mainly simple web services. The main competitive ability of those web firms is a fierce price competition. For example, a customer whose web page project Nedecon do Brasil implemented, had received competing offers from local web firms with prices over five times smaller than the price of Nedecon do Brasil.

"We don't really see that the small competitors are threatening us; they will get the certain customers, the ones which probably would not be that interesting in the long run. IBM, though, is surprisingly often competing over the same customers with us." (Finnish manager)

According to some Finnish interviewees, the actions of the Brazilian managing director were based on an idea, that in a competition situation where the market has been that clearly divided into two quite separate competitor groups one offering more complex system integrations and the other providing mainly simple web services, a new player has to choose its strategy very carefully. Given the key customer group, large Brazilian companies, and the limited resources of the new-established unit, the managing director made a decision to approach the target customer group by concentrating on offering more complex Intranet and extranet solutions

based on NAS-technology. It was decided, at least implicitly, not to start to compete at all in the web service side of the market.

The new unit's choice to concentrate on providing broader information systems had some consequences that may have influenced the speed of the customer acquisition. Both the selling process and the production process of broad information system solutions require remarkably more resources, both time and personnel involved, than providing traditional web services. That impacts directly the speed of the turnover development as selling and production of one single project consumes significant amount of resources leading to a situation where less orders can be prepared and less projects can be going on at the same time. Especially in the tendering phase, the risk of consuming valuable resources and still ending up with no incomes, is relatively high in those kind of situations.

"...the initial sales approach in Brazil is quite different from the one in Finland. They are preparing even for a couple of weeks before contacting a potential customer ... There is a huge risk in that kind of approach: with such a limited sales personnel and with no continuous cash flow you may end up spending enormous amounts of money and other resources without getting a one single customer..." (Finnish manager)

On the other hand, value of a single deal when providing more complex solutions is remarkably greater than in producing web services. Information system solutions provide also a better opportunity to develop strategic partnership with a customer than when dealing with web services.

According to the Finnish interviewees that had discussed these issues with the Brazilian personnel, the Brazilian companies may be lagging experience in Internet-technologies at the moment. However, when they make the decision to start exploiting Internet-technologies, it is characteristic for them to pass many technical stages and implement directly the most developed solution available. According to the managing

director of the Brazilian unit, that makes it difficult to a new company without a sound reputation and references to first approach the large potential customers offering them quick web page services, and next try to provide them for example with strategic integrated supplier extranet solution. In doing so, a new company would risk to be positioned to a group it would not want to be classified in.

The initial idea of the Finnish management considering the ideal customer and project type profile of the new unit was also to aim the sales efforts to large customers and provide big web, Intranet and extranet solutions. But when expected results were not reached it was taken into consideration, if it would be necessary to implement also quick and simpler web page projects. The idea was to generate the necessary incomes by producing quickly web projects to some clients and with others start developing deeper partnership.

"They started right away to seek for strategic partnerships instead of both implementing quicker web projects that provide cash flow and developing deeper customer relationships only with some customers." (Finnish manager)

The managing director of the Brazilian unit was not willing to reallocate resources to sell and produce also web projects. Despite of the alarming slow generation of turnover, he stood out for his initial opinion that it is wiser to concentrate on large projects with highly interesting customers than to rush implementing solutions Nedecon do Brasil will not be interested in providing in the future also. The above described disagreement of the right way to continue the operations between the managing director and the owners resulted in a situation, where dismissal of the managing director was brought up for discussion.

Inability of the Finnish Organization to Provide Assistance to the Brazilian unit

The Finnish interviewees mentioned many times, that they underestimated the amount of support that the new unit would need. The amount of time and other resources required to provide the needed support were also underestimated. Underestimation of the necessary resources for providing the needed assistance applies to the whole knowledge transfer process, resulting in the overall delay in the start of the operations and prolongation of the time needed to achieve the stated goals.

During the interviews, it was also raised that the sales concepts of the Finnish organization are not as robust as they could be. It was mentioned that the sales concepts developed to support the Finnish sales efforts were more effective in acquiring customers interested in traditional web services than when the focus is in selling and marketing broader information systems.

4.3.3.2 Owners' Reactions to the Difficulties

The first large deals of Nedecon do Brasil were signed in the end of October. In addition, there were six tenders going through the specification phase of the selling process. Inspite of that, the owners – the Brazilian one in particular – were not satisfied with the managing director's actions. However, the quality of the solutions under implementation was excellent and the customers seemed content. Thus, considering the provided state-of-the-art solutions and the obvious enthusiasm and content of the customers, the owners were satisfied with the activities of the Brazilian unit. The problem that had to be solved was that there were not enough similar projects to develop the needed cash flow.

As a result to the many discussions that emerged from the disagreement on the activities that should be taken considering the difficulties in customer acquisition, it was decided, on one hand, to continue according to the managing director's standpoint. Nedecon do Brasil would continue to concentrate on providing large solutions for highly interesting customers. On the other hand, it was decided to very actively strive to make the sales activities more effective.

In the end of October Esa Matikainen traveled to Brazil for five days in order to discuss with the managing director how the sales activities would be made more effective. More precise operationalization of the existing marketing plan as well as adjustment of the sales activities to be more effective were needed to accelerate the turnover generation. As a result, it was decided to support concretely the Brazilian unit with its sales efforts by allocating more resources for new marketing activities, especially for organizing another marketing seminar in February 2000.

On the other hand, it was decided to tighten up the control of the Brazilian unit's marketing and sales efforts. A new set of measures for assessing the effectiveness of the unit's sales activities was formulated. Regular checkpoints for assessing the fulfillment of the stated goals as well as for reviewing the marketing strategy and its operationalization were agreed on in cooperation with Mr. Matikainen and the managing director.

According to Mr. Matikainen, refining of the marketing plan should have been done already in September, when he was supposed to visit the Brazilian unit. The unfortunate delay of the visit may have aggravated the situation and partly impeded the Brazilian unit from fulfilling the goals set to their operations.

Ian Nordman, the manager of Nedecon Application Server (NAS), accompanied Mr. Matikainen during the visit to São Paulo. The first

objective of Mr. Nordman's visit was to transfer knowledge and material about the new product families of Nedecon. Examples of marketing material like product packages, CD-ROM's, and brochures regarding the product families were delivered. All material was also provided in soft copy format.

The second objective of Mr. Nordman's visit was to initialize an international dialogue on a concrete level with emphasis on sales and project delivery issues. The role of Nedecon Extranet Service was emphasized in providing also business-oriented information (about e.g., products, proposals, projects). The principles of documenting customer cases and forming databases of business knowledge were discussed.

One aim of his visit was to get information about the present project situation in Brazil. During his visit, Mr. Nordman also brought up to discussion the product concepts of Nedecon, such as Wireless Solutions concept and E-commerce concept, which had not been actively marketed in the Brazilian market. Mr. Nordman and the Brazilians assessed together the opportunities to start sales efforts concerning these product concepts.

In the beginning of December, when the first check point regarding the sales activities of the Brazilian unit was approaching, it seemed quite clear that the set goals would not be achieved. The representatives of Lince reacted to that information by expressing once again their severe dissatisfaction with the contribution of the managing director of Nedecon do Brasil. Finally, the discussions between the Finnish and Brazilian owners resulted in the decision to immediately dismiss the managing director.

The main reasons for the dismissal were, firstly, the far too slow customer acquisition and turnover generation. Secondly, the managing director's inability and unwillingness to adapt his working approach to better meet

the expectations of the owners made the cooperation between him and the owners very arduous. One of the Finnish managers estimated that after the reviewing of the marketing plan and the formation of the new goals and measures in October, the managing director's behavior towards the personnel and even the customers of the unit changed remarkably. According to the Finnish manager's estimation, the reason for the change may have been the managing director's inability to work effectively under pressure.

In connection with the decision to make the managing director redundant, it was decided that a member of Lince's board would temporarily take the responsibility for the operations of Nedecon do Brasil. Right after the dismissal, Esa Matikainen visited the Brazilian unit in order to discuss the situation with the new leader as well as with the other personnel of the unit. One of the most important purposes of the visit was to calm down the situation and create an atmosphere of continuity. During his visit, Mr. Matikainen also met some candidates for the post of managing director, but it was decided to put off the selection of the new managing director for a while. The representative of Lince would continue as a temporary manager of Nedecon do Brasil, until a new managing director would be nominated.

5 CLASSIFICATION OF KNOWLEDGE TRANSFER FACTORS

The purpose of this section is to classify the empirical data of the present study into three categories of factors, which reflect the origins of possible knowledge transfer barriers. The classification is based on Gabriel Szulanski's model, which was modified to meet the requirements of the examined case. The modification of Szulanski's model is presented in the second section of the report.

5.1 Characteristics of the Transferred Knowledge

Table 3. Characteristics of the Transferred Knowledge

	NAS	SALES CONCEPTS
Knowledge documentation	— —	—
Knowledge robustness	—	— —
Knowledge complexity	no effect	— —
Market-orientation of the activity	+	—

5.1.1 Knowledge Documentation

According to Winter, the failure to articulate what is articulable may be a more severe barrier to the transfer of knowledge than tacitness itself (Winter 1987, 172). In addition, Nonaka and Takeuchi state that documentation of knowledge benefits the both knowledge transfer partners. On one hand, documentation helps individuals internalize what they have experienced, thus enriching their tacit knowledge. On the other

hand, documents and manuals facilitate the transfer of explicit knowledge to other people thereby helping them experience the experiences of others indirectly. (Nonaka and Takeuchi 1995, 69)

The insufficient documentation of knowledge was brought up several times during the interviews of the Finnish personnel as one of the main reasons for the difficulties faced in the knowledge transfer process.

"Lack of documentation has clearly been a problem, and considering the future it is one of the most critical issues which should be taken care of. There has been quite a lot discussion about documentation after the knowledge transfer to Brazil, but I am not so sure how much has actually happened. One positive thing at least is that extranet has been launched for test use." (Finnish manager)

Also the Brazilians mentioned the lack of documentation as an important impediment to the effectiveness of the knowledge transfer. Especially the Technical Solutions –employees emphasized the insufficient documentation as one of the two major impediments they were faced with during the knowledge transfer of Nedecon do Brasil.

"Due to the technical nature of my area, [one of the greatest problems is] *the lack of deep and full documentation about all products and technologies." (Brazilian employee)*

*"The missing detailed documentation is also a problem, making people work in a guess based routine." (*Brazilian employee*)*

The lack of sufficient documentation impeded especially the transfer of NAS-technology. Although NAS-knowledge – due to its technical nature – could be explicitly articulated to a great extent, at the time of the transfer NAS-technology was not documented almost at all, not taking into account some very basic installation instructions. There are quite many reasons for that. First, at the time of the transfer, NAS-environment was still under development, and the scarce resources were needed for the actual development of the technology.

"We have been living in a very strong development stage, when the most critical goal is to create solutions that generate money as quickly as possible. In such a situation, documentation is easily left as a matter of minor importance." (Finnish employee)

Second, there has not been an urgent need for detailed documentation in the Finnish organization as the size of the company has been relatively small and the amount of personnel working within the same field has been very limited. That has enabled knowledge sharing and transfer by face-to-face discussions and by other informal ways. Third, before the organizational change in October 1999, there has not been any explicitly expressed standard procedure for documentation of information and knowledge at Nedecon.

"So far documentation has been depending on everyone's own interest." (Finnish employee)

"The traditional working style of programming and more or less of the whole organization could be described with words "ad hoc", it has not been very controlled. But now this new approach aims to assure that standard operation procedures are followed, there is middle management whose responsibility is to take care for example of documentation related to software development and programming in general... So the operations will become much more professional which will be good also regarding the international operations." (Finnish manager)

In addition to the lack of sound documentation, the scarce explicitly articulated information concerning NAS was documented mostly in Finnish, which was raised as a problem by both the transfer partners.

"Most documentation, even if scarce was originally written in Finnish." (Brazilian employee)

"It was quite embarrassing to go through our material, because not more than ¼ of all our material is in English. That is an issue that has to be taken care of in the near future." (Finnish employee)

"The language should be English and all the documentation should be in English, even if that would stiffen out activities here in Finland at least for a while." (Finnish employee)

Concerning the transfer of NAS, the lack of sufficient documentation resulted in that the recipient was totally dependent on the very few NAS-experts of the Finnish organization, who were able to solve the recipient's problems even from the distance. That led to the excessive burdening of those highly skilled people also with that kind of problems which the recipient could have been able to solve independently, if they would have been provided with sufficient documentation.

"Long distance support has been done at the beginning basically only via email. It worked but was not a reliable and fast channel and the main problem I think is that it consumed highly skilled people resources from Nedecon Finland." (Brazilian employee)

"Normally, we have to rely on some documentation we have, and to try and fail methods…." (Brazilian employee)

Concerning the sales concepts, the lack of proper documentation was not perceived as such a direct impediment to their transfer as regarding the NAS-technology. However, the lack of documentation concerning implemented customer cases as well as customer reference lists were raised by the Brazilians.

"It could have been created a "database knowledge", "customers reference list" and other tools to share the experience and knowledge." (Brazilian employee)

5.1.2 Knowledge Robustness

The Finnish interviewees admitted that the problem in transferring sales concepts may not have been the insufficient documentation but the overall underdevelopment of the sales concepts. The lack of robustness of knowledge can naturally be regarded as an even more severe impediment

to successful transfer than insufficient documentation of otherwise sound knowledge.

Considering the transfer of sales concepts and marketing knowledge, it was raised in some interviews that the Finnish sales concepts are not as robust as they could be especially regarding the marketing and sales of more complex information system solutions.

"We may not have had good enough concepts for customer acquisition. We haven't been providing enough analysis of what should be done and what shouldn't – the focus has been too much on how to use telephone efficiently. That is, however, changing now along with the organizational change…" (Finnish manager)

That may partly result from the traditional focus of the Finnish organization's sales style that has emphasized more effective telephone selling than in-depth consultation.

"Marketing and sales approach is different in Brazil from the one we have here, they don't do so called "telephone selling" we have been doing here from time to time…" (Finnish manager)

At the moment, the focus is changing which was explicitly expressed in connection with the organizational change in October: One of the reasons for the change was to support the shift from a sales organization to an expertise orientation.

"Our organization has been changed so that we would better be able to produce big solutions to big customers, not just selling web pages to some small workshops." (Finnish manager)

"We have established for example Market Intelligence Service –unit whose task is to provide knowledge for supporting customer projects and sales." (Finnish manager)

Thus, the overall underdevelopment of robust sales concepts impeded the Finnish organization's ability to support the Brazilian unit in its sales efforts.

Concerning NAS, knowledge robustness was not found to be such a great barrier to its successful transfer. Although the fact that development of NAS was not completed at the time of transfer may have somehow complicated the transfer during the implementation phase, the researcher assumes that the situation also provided the transfer partners with a good learning environment. Joint efforts to develop the technology as well as dialogue on problem solving are regarded as an effective way to transfer tacit knowledge (O'Dell and Grayson 1998, 157). During the intensive training period in May, the Brazilian key technical person had an opportunity to follow the development of NAS-architecture, and consequently gain valuable experience concerning problem solving in the NAS-environment.

The clear concentration of the profound NAS-knowledge only to a couple of experts in the Finnish organization can also be regarded as a problem concerning knowledge robustness.

"Well, we have quite a severe lack of NAS-experts, and consequently lack of trainers too... We have basically only one guy who is independently able to take care of NAS-projects – we "older" guys are trying to concentrate on developing the basic technology on which the customer cases are tailored." (Finnish employee)

The problem manifested itself through the excessive burdening of the high skilled person(s), as it was not possible to delegate the task of support providing. In addition to the overloading of the Finnish experts, the situation also prolonged the adaptation phase of the recipient unit.

One of the most significant aspects concerning the robustness of NAS-knowledge that was raised during the interviews was the lack of sound product support systems.

"Product support is one of the issues that we must be working on... But the fact is that we can't provide the Brazilian unit with better services than we have here in Finland, and the truth is that we have quite much to do also here at home." (Finnish manager)

5.1.3 Knowledge Complexity

Simonin's concept of knowledge complexity refers to "the number of interdependent technologies, routines, individuals, and resources linked to a particular knowledge or asset." (Simonin 1999, 600) Simonin also notes that complexity is expected to affect the comprehension of the totality of an asset and to impair its transferability as the full information spectrum of a particular competence may be diffused across the organization (Simonin 1999, 600-601).

Since sales knowledge can be regarded as an asset that consists of many different aspects diffused across the organization, knowledge complexity is one of the most important factors effecting the transfer of sales concepts. The absorption of a sales process requires quite a comprehensive understanding of both the products (i.e., characteristics, applicability etc.) and the production processes and technologies (i.e., feasible delivery times, possibilities to tailor solutions etc.) Also familiarity with previous customer projects (what kinds of solutions have been implemented to what kinds of customers) facilitates the sales efforts and makes them more effective.

It was perceived also in the case of Nedecon do Brasil that the kind of sales knowledge described above can be quite difficult to transfer and implement.

"In my opinion, the biggest problem [considering the transfer of sales and marketing knowledge] *is to be able to transfer general know-how: product knowledge and all the concepts related to marketing and sales…" (Finnish manager)*

"When you begin to work with the specific products and solutions, you need to know the new technologies with detail and understand how to apply them in your native country." (Brazilian employee)

5.1.4 Market-orientation of the Activity

The results of Schoenberg's study indicate that there can be seen inter-functional variance with regard to an activity's market-orientation and the successfulness of its transfer (Schoenberg 1999, 9). The effect of market-orientation can be clearly perceived also in the knowledge transfer process of Nedecon do Brasil.

The transfer of sales knowledge faced challenges with regard to the differences between the two markets.

"We have found out that markets don't work similarly everywhere. I mean that in Brazil, for example, you can't just 'sell' but you have to have sound reasons for everything you are suggesting right from the beginning. Maybe there happened some kind of mistake – maybe we thought that you get customers just by being active and using telephone. Maybe there is also some kind of cultural difference between the two markets." (Finnish manager)

"In the commercial area, we have some cultural differences between the two markets, and the focus is a little bit different." (Brazilian employee)

The implementation of NAS-technology, on the other hand, was not perceived to suffer from dependency on market characteristics. That is consistent with the findings of Schoenberg's study: transfer of so called non-market orientated activities such as R&D, production and administrative activities are found to be more successful than transfer of more market-oriented activities like marketing, sales and distribution.

One interesting point raised by a couple of Finnish interviewees was that the transfer and implementation of NAS-technology in fact benefited from the characteristics of the Brazilian market.

"Product based solutions have turned out to be very successful in developing markets... Customers like clear packages, and they don't require that much tailoring etc. You know, a product is easy to sell and buy – you know what you are offering and getting. Maybe that is one reason why NAS seems to be relatively successful in the Brazilian market." (Finnish manager)

"NAS provides them with a competitive advantage in the Brazilian market, they have something that everybody else don't have yet. In my opinion, without a good product it would be quite hard to gain market share in that market." (Finnish employee)

To facilitate the transfer of market-orientated knowledge, Schoenberg suggests that more attention should be paid on detailed implementation planning. He emphasizes especially the importance of commercial due diligence providing in-depth analyses of the receiving unit's national, market and customer characteristics and highlighting any contextual differences from the source's domestic environment. (Schoenberg 1999, 11)

In the case of Nedecon do Brasil, the fact that neither of the partners was too familiar with the characteristics of the Brazilian Internet-market, was raised especially by the Brazilians.

"...Also, it appears to me that neither one of the sides have really studied the Brazilian market with its variations, prices, and cultural differences." (Brazilian employee)

"In my opinion, when you make some kind of joint venture it is very important to analyze the market, competitors, prices in running, culture, and others points. In this specific case, both sides didn't have experience in "International Partnership in Internet Solutions". Here in Brazil as well in Finland we have many competitors, big companies, strategic

partnership, then when you decide to open an company in big city like São Paulo, your difficulties are proportional." (Brazilian employee)

5.2 Characteristics of the Knowledge Transfer Partners

Table 4. Characteristics of the Knowledge Transfer Partners

	NAS	SALES CONCEPTS
Collaborative know-how of the knowledge transfer partners	— —	— —
Absorptive capacity of the recipient	+	—
Motivation and cooperativeness of the partners	+ +	no effect

5.2.1 Collaborative Know-how of the Knowledge Transfer Partners

Simonin (1999, 603) notes in his study that understanding of collaborative mechanisms and transfer processes gained from past experience of similar activities facilitates the knowledge transfer process by eliminating many of the unnecessary tasks and disruptive noise of cooperation. As Nedecon had no prior experience in establishing foreign operations or in transferring knowledge to another market area, it can be assumed that the lack of collaborative know-how affected the effectiveness of the transfer. At the time of the transfer, Nedecon had, however, gained experience in managing a large merger with another Finnish Internet company, which may have facilitated the identification of different aspects that have to be taken into account in international knowledge transfer.

"The reason for these problems [in transferring and implementing the business concept] *was mainly the lack of experience on both sides on how to implement an international joint venture." (Brazilian employee)*

"Nedecon has experience of merging with another Finnish Internet company, which may have facilitated us to understand in some extent the requirements related to an international transfer process." (Finnish manager)

5.2.2 Absorptive Capacity of the Recipient

Recipient's lack of absorptive capacity (Cohen & Levinthal 1990) refers to the ability of the recipient to recognize the value of new external information, assimilate it, and apply it. According to Cohen and Levinthal (1990), the level of absorptive capacity depends largely on the level of prior knowledge. The findings of Szulanski's research (1996) state that absorptive capacity of the recipient is one of the most significant barriers to intrafirm transfer of best practices. Regarding the knowledge transfer of Nedecon do Brasil both positive and negative effects of absorptive capacity can be perceived.

Considering the transfer of NAS-technology, the Finnish interviewees estimated that the absorptive capacity of the Brazilian technical key employees was very good. It was also raised that especially the role of Mr. Bloedorn was quite essential in the transfer and implementation of NAS.

"Some Brazilians had been working as a team already before the establishment of Nedecon do Brasil, and they had a couple of years experience of web projects. In my opinion, that really helped them to absorb things." (Finnish employee)

"There were people who were really enthusiastic, for example Paulo. He absorbed the idea [of NAS] *first and explained it to the managing director. After that, it seemed that they concentrated on NAS quite comprehensively…" (Finnish employee)*

The Brazilians, however, emphasized the difficulties they faced in absorbing the technology. They also brought up the insufficiency of the technical training provided to them.

"The additional ten days training in Finland surely gave me not only the needed technical expertise but also a good and deep view in the way projects and customers are conducted at Nedecon in Finland. The training time however should be extended, as 10 days is not enough to absorb such amount of knowledge." (Brazilian employee)

"For me, the initiation in Finland was very good and complete, but the training was not. I faced many problems in doing the real projects, and it took me several months to learn everything that it was needed to work on the real cases, because the programming of Nedecon Application Server is very specific and requires special training." (Brazilian employee)

"When Olli was here, to help us with the Intranet projects, I was still in a stage where I couldn´t learn that much with him. I only had the basic training in Finland, and that doesn´t really gave me the skills I would need to face the real projects here in the beginning. I couldn´t follow him properly, because I didn´t have the knowledge for that in that moment." (Brazilian employee)

"I think that in this moment I would learn much more if I have contact with the technical people again." (Brazilian employee)

Despite of the difficulties reported by the Brazilians, the absorptive capacity of the recipient's key personnel had a positive effect on the transfer of NAS. NAS-technology can be regarded as one of the best absorbed Nedecon-concepts in the Brazilian unit. The independent development of the technology conducted by the Brazilians can be regarded as a clear indication of the thorough absorption of the technology.

"NAS has been absorbed really well in Brazil. It shows for example so that they have developed certain aspects of the technology which we here in Finland haven't had need or time for." (Finnish employee)

Compared with the transfer of NAS, absorptive capacity of the recipient constrained more the transfer of sales concepts. The Brazilians working with sales raised that the one-week training period in March was not enough for them to absorb the knowledge needed to start the sales efforts in Brazil.

"The main point was that the time was not enough. When you … begin to work with the specific products and solutions, you need to know the new technologies and understand them in detail to [be able to] *apply in your native country." (Brazilian employee)*

"First of all, the training in Finland was not enough to understand the product and how to market it." (Brazilian employee)

"…The bad part [in the training] *was that it was not long enough and we did not learn what we should have, and the learning had to be done by distance, which makes it more difficult." (Brazilian employee)*

The insufficiency regarding the training of the sales people was perceived also in Finland.

"We had that training here in Finland, but maybe the training period should be more specified and a little bit longer, at least when it comes to the absorption of technical issues." (Finnish manager)

A Finnish manager also brought up that the decision to transfer sales and marketing knowledge mainly through the managing director impeded quite remarkably the Brazilian consultants' possibilities to absorb the knowledge.

"Managing director's ability to absorb new knowledge did not meet our expectations. Consultants, on the other hand, would have been eager to learn, but they did not receive enough knowledge, because almost everything went through the managing director. That must have affected the effectiveness of sales efforts." (Finnish manager)

5.2.3 Motivation and Cooperativeness of the Partners

According to Szulanski, motivation of the recipient manifests itself through the recipient's willingness to accept, implement and use new knowledge. The motivation of the source manifests itself through the source's willingness to share knowledge and devote time and resources to support the transfer. (Szulanski 1996, 31)

According to the Finnish interviewees, motivation and cooperativeness of the Brazilian personnel was excellent.

"People who came here, were really motivated." (Finnish manager)

"Personnel of the new unit are obviously good and motivated. It has been always really nice and easy to work with them." (Finnish manager)

"There are people who are really enthusiastic…" (Finnish employee)

The Brazilians expressed also their content with the Finnish personnel's motivation and cooperativeness especially during the visits to the remote unit.

"The people that was here was very good and cooperative, no problems about that." (Brazilian employee)

It became apparent during the interviews that there had developed a particularly friendly relationship between the Finnish and the Brazilian technical key employees, which must have facilitated the transfer of NAS-technology remarkably.

"[The cooperativeness and motivation of the Finnish personnel] *was excellent. The technical staff at Finland surpassed our expectations." (Brazilian employee)*

According to the understanding of the researcher, the close relationship emerged mainly from motivational factors. The Finnish NAS-expert seemed naturally eager to support the transfer of a technology developed initially by him. The Brazilian key technical person, on the other hand, absorbed the technology very quickly and also seemed eager to participate in the further development of the technology. Due to these reasons, the Finnish expert may have found it less burdening to assist the Brazilians, at least in the beginning before the situation got too far. Thus, it seems that there had emerged a fertile dialogue between the two persons that facilitated the implementation and absorption of the technology.

Considering the transfer of sales concepts, the most significant factor related to the issue was the Brazilian managing director's slight inability to absorb new knowledge as well as his unwillingness to fully cooperate with the owners.

"Managing director was maybe a little stubborn, and, especially at the end, he wasn't willing to discuss things or cooperate in general." (Finnish manager)

The disagreement between the managing director and the owners of the company was delicately raised also by the Brazilian personnel.

"...the cultural differences on how to do business between Brazil and Finland forced us to adapt solutions and created some tensions between us and our Finnish partners." (Brazilian employee)

5.3 Actions Taken by the Knowledge Source

Table 5. Actions Taken by the Knowledge Source

	NAS	SALES CONCEPTS
Resource deployment	— —	— —
Flow of people between the units	+	— —
Communication of the strategy and its operationalization	no effect	— —
Continuous support providing and communication	—	—
Extranet launch	+	no effect

5.3.1 Resource Deployment

Szulanski (1996, 37) highlights in his study the importance of devoting scarce resources as well as managerial attention to the transfer of best practices within an organization. He also warns of relying only on incentive systems to mitigate the effect of different knowledge transfer barriers. Also Simonin (1999, 603) emphasizes the importance of proper resource allocation in improving the firm's learning capacity.

Considering the knowledge transfer process of Nedecon do Brasil it became apparent that quite significant underestimations were made at the managerial level regarding the necessary resource deployment.

"We promised more support to the Brazilians than we were able to provide. That was mainly because we were really busy here in Finland. We made a mistake in estimating the importance of the support given from here as well as in estimating the amount of support which should be provided..." (Finnish manager)

"Time and resources needed for support providing were badly underestimated." (Finnish manager)

Members of the Finnish management team raised the problem of insufficient resource deployment more often than the other interviewees. That may result from the fact that the responsibility of the transfer was mainly divided inside the top management team in order to gain experience of managing international operations. Consequently, as responsibility was not delegated in great extent outside the top management, it is quite natural that the other members of the organization did not report of problems in resource deployment.

"This far, we have been consciously working even a little bit ineffectively: there have been two or three members of the top management team participating in the internationalization activities – we have wanted to expand the level know-how related to international operations in the top management team." (Finnish manager)

The director of strategy had, in addition to his other duties, the explicit responsibility of Nedecon do Brasil, and the other members of the management team supported him when needed. It was brought up during the interviews that in the future the persons in charge should be able to concentrate remarkably more time on the international issues.

"This far, the person responsible for Brazilian operations has had dozens of other things on his shoulders, too. Consequently, he has been able to allocate only 10-15% of his time for Nedecon do Brasil. It seems that in the future the persons in charge should allocate 1/3 or even more of their time for taking care of the particular country." (Finnish manager)

"A person who is responsible for a country should be able to spend at least one week in every second month in that country - truth is that we weren't able to do that considering Brazil. Otherwise there are no possibilities for keeping up with the local situation." (Finnish manager)

"There are important issues like implementation control, which may have been neglected due to the lack of time. (Finnish manager)

It became clear during the interviews that in the future it would be necessary to delegate the responsibility also outside the top management team.

"We are going to expand our foreign operations in such a pace, that the resources of the present top management team will not be enough, and responsibility has to be delegated also outside of the top management." (Finnish manager)

"It has been typical for our organization that everybody takes lots of responsibilities. As the size of the company grows, the importance of every responsibility grows as well and at some point you can't handle all the things anymore. Then it is time to delegate." (Finnish manager)

It seemed that the Finnish employees are willing to participate more in the planning and implementation of international knowledge transfer and sharing. What was emphasized, was the necessity of explicitly expressed and clear responsibilities.

"Things should be thought in a more organized way, we could gather together and think about these issues, also outside of the top management." (Finnish employee)

"I would like to participate also at the planning phase, together we could think about what can be promised and what can be also provided." (Finnish employee)

"In my opinion, when we think about communication and cooperation between different units, the role of our department could be quite integral as a kind of support and service unit of the international Nedecon." (Finnish employee)

"We never agreed on how much each of us would put effort on assisting the Brazilian unit. In practice, when somebody asked if you would take care of something, you couldn't know if it meant that you would take care of that issue for the next two years or if it meant that you would just answer to that one email. It is quite essential to define responsibilities

and goals, because it is impossible to just 'take care of international issues' in addition to your own duties." (Finnish employee)

5.3.2 Flow of People between the Units

People, knowledge, and physical resources flow between the source and the recipient especially during the implementation phase of knowledge transfer (Szulanski 1994, 9). Regarding the success of the transfer, flow of people has an especially important role for two reasons. Firstly, the adaptation and modification of the transferred knowledge according to the needs of the recipient occurs mainly through dialogue between the partners. Secondly and maybe even more importantly, the essential communication link between the source and the recipient is created most effectively by personal contacts.

Considering the transfer process of Nedecon do Brasil in general it was estimated that there should have been more visits to the Brazilian unit. The problem was, however, that the persons who were the best to transfer knowledge were also the ones that were most occupied by the activities of the Finnish organization.

"There are always certain problems, when someone moves from one place to another; he or she is totally unable to perform his or her own duties. That's the problem we have been faced with – only the best and most skillful people can transfer knowledge and train others, and they are the ones we need here. Surely it would have been good if we could have sent more people from Finland to Brazil..." (Finnish manager)

The flow of technical people, in terms of both quantity and quality, seemed to be more effective than the flow of more business-orientated people. In addition to the one-week general training in March, one of the Brazilian technical employees spent two weeks in Finland in order to familiarize with NAS-environment. Most of the Finnish personnel that visited the Brazilian unit were specialists of technical issues. When the Brazilians were asked if

they had found the visits of the Finnish personnel an effective way to transfer knowledge, their answers reflected the difference between the transfer of technical aspects compared with the transfer of sales concepts.

"In technical area yes. *In sales, it is more an exchange than a transfer, but it is very useful also." (Brazilian employee)*

"Definitively yes. Not only in technical but also in cultural aspects." (Brazilian employee)

"Basically only technical people came here, unfortunately the sales people didn't come." (Brazilian employee)

"Yes, specially for the technical people. In the commercial issues, I don´t think this is exactly the best way, because the markets are different." (Brazilian employee)

A Finnish key person who visited the Brazilian unit in order to transfer knowledge about production processes and products of Nedecon, perceived a clear need for more business-orientated dialogue between the units.

"When I was there introducing production process, the Brazilians had questions mainly concerning sales and marketing. It seemed that their needs were totally on that side of the business concept. Well, I have been doing also those things so I was able to answer in some extent to their questions, even if I wasn't the right person." (Finnish employee)

Also the Brazilians brought up the same issue, and it seemed that the Brazilians would have needed more direct contacts with the Finnish personnel working with sales and customer projects.

"It could be useful for us for to share the experience in the success cases of Finland´s customers." (Brazilian employee)

"...it would be very important to have some visits to or from Finland to know the customers profile, new products and applications, as well to compare similar projects in Brazil and Finland. I am sure that both sides could grow with this experience." (Brazilian employee)

"We also need people that know about the projects that have been made, to provide us a global vision of all the things we could offer here." (Brazilian employee)

5.3.3 Communication of the Strategy and Its Operationalization

In their responses, the Brazilians raised the different approaches of the Brazilian managing director and the Finnish management considering the project profile and the key customer group of the unit as a reason for difficulties in implementation sales concepts.

"In the commercial area, we have some cultural differences between the two markets, and the focus is a little bit different. We need to weight exactly the type of customers we are dealing with, to have the proper approach." (Brazilian employee)

"If both companies would had done a strategic plan, with more details and more depth, maybe we could have been able to change this beginning of the enterprise." (Brazilian employee)

As the ambiguity of sales and marketing knowledge in the form of complexity and market-orientation is usually quite high, it could be stated that maybe the communication of the strategy and its operationalization was not sufficient in the case of Nedecon do Brasil. It would have been maybe necessary to more explicitly express and articulate the goals of the both partners as well as define more accurately the exact activities, which should be taken to achieve the goals. Simonin (1999, 603) emphasizes in his study, that at least in strategic alliances partners may have "various, sometimes hidden, and often assymmetric if not conflicting objectives". It seems quite important to take Simonin's notion into account and aim to make the objectives of the partners – maybe unconscious in nature – as transparent as possible.

5.3.4 Continuous Support Providing and Communication

Continuous support providing and communication between the units become prerequisites for the success of a transfer in the adaptation phase. According to Szulanski, quick and effective resolution of the unexpected problems is essential for successful adaptation, but the recipient may not have the required knowledge and experience to solve the emerging problems. Thus, the role of the knowledge source is essential in identifying and solving existing problems and in anticipating and forestalling incipient or potential ones. (Szulanski 1994, 12)

"In my opinion, the "central point" when exist an International Operation (Joint Venture) is the cooperativeness, e.g., the remote office requires some support from the "HQ" very much in the first months." (Brazilian employee)

The inability of the Finnish organization to provide continuous support to the Brazilian unit came up quite clearly in the interviews of the Finnish personnel and in the responses of the Brazilians.

"Daily communication is really not necessary, but sometimes information come very fast, other times they don't come at all. (Brazilian employee)

"There should be an active communication link between the people doing same kind of things. At the moment it doesn't work as well as it should work…" (Finnish manager)

The Finnish organization's inexperience in international operations as well as unclear or undefined responsibilities were brought up as the reasons for the problems in support providing.

"[Communication] *hasn't worked as well as it should. One reason for that is that things haven't been defined in great detail. Then again, in my opinion, it wouldn't have been wise to start defining things that precisely at that moment, it would be better if people just knew who to ask and the communication would kind of work spontaneously..." (Finnish manager)*

"About the support because there was no need at Nedecon Finland (before the installation of Nedecon do Brasil) for such long distance support channel." (Brazilian employee)

The slowness of distant communication, which resulted according to the Brazilians from the problems to prioritize between the needs of the Finnish and the Brazilian unit, was raised many times by the Brazilians.

"The people that was here was very good and cooperative, no problems about that. The problem we really face is to receive information being here in Brazil, from Finland." (Brazilian employee)

"Something that could be improved concerning this matter is that the Finnish employees in general could give more priority to the Brazilian requests by answering promptly to the e-mails." (Brazilian employee)

"...There must be a good study of priorities between the two countries." (Brazilian employee)

Also some Finnish interviewees reported of same kind of problems in the effectiveness of distant communication between the units.

"The Brazilians may think that no one here really tries to answer their questions... Already the time difference often causes a delay of at least 24 hours." (Finnish employee)

"Questions that the Brazilians have are often quite urgent ones, which they wish to be answered right away. That kind of requests can easily mess up timetables in both units." (Finnish employee)

"If there is a customer on the phone and the guys sitting next to you need your help, it is quite easy to imagine which things you prioritize... Especially if you don't have clear responsibilities and goals considering communication and supporting." (Finnish employee)

The inefficiency of providing support impeded surely both the transfer of NAS-technology and the transfer of sales knowledge. The different nature

of the two concepts has to be, however, taken into account when assessing the amount of provided support as well as the effects of insufficiency in support providing. The implementation of NAS-technology requires much more reliable and rapid supporting system than the implementation of sales concepts. If the Brazilians have problems with the NAS-environment, the activities will lay idle until the problem is solved. The effects of insufficient support in sales will not manifest themselves so clearly and the consequences are subtler: turnover generation stumbles, sales efforts are ineffective, customer satisfaction is low etc.

Considering the support providing related the NAS-technology, it can be stated that before the extranet was launched there was not any standard support providing system that could have been used.

"[Problem was] *also the lack of a reliable and fast support channel." (Brazilian employee)*

In addition, even the basic documentation was not available at the time of the transfer.

"The Brazilians didn't have any kind of documentation, actually only thing they had was a list of names... In addition, they always had to be able to define the problem quite precisely before it could have been answered." (Finnish employee)

Due to the nature of the concept discussed above, it was essential, however, to somehow try to provide the needed support to the Brazilian unit. In practice, there was no other possibility for doing that than to rely excessively on the know-how of the few Finnish NAS-experts.

Thus, the email-based daily communication and support providing between the source and the recipient made it in the first place possible to transfer and implement the NAS-technology. The friendly personal relationships between the Finnish and the Brazilian technical personnel as well as other motivational factors discussed already earlier facilitated or

even made possible in the first place the formation of such a heavy support providing system.

"I basically communicate with technical people via email and my experience has been excellent. Once the Extranet is running properly the communication should be even better and require less time of the parts involved." (Brazilian employee)

"Not rare they [the technical staff at Finland] *invested their time to help us to make things happen in the right way and on the schedule." (Brazilian employee)*

The one-to-one email-based support system did not, despite of the effort the partners placed on it, meet the requirements of the partners. The Brazilians reported of problems related both to the reliability and the rapidity of support providing, which remarkably impeded their ability to work effectively. The overloading of the Finnish NAS-experts was raised by the experts themselves as well as by their co-workers.

"From the technical point of view, we normally find important lags in the response time, when we have some technical problem to solve. The result can be a great waste of time." (Brazilian employee)

"Long distance support has been done at the beginning basically only via email. It worked but was not a reliable and fast channel and the main problem I think is that it consumed highly skilled people resources from Nedecon Finland." (Brazilian employee)

"[Communication between the units] *is sometimes fast, and sometimes very slow. What is missing is a standard way of doing this. Being that way, we could know exactly how much time will take to exchange information." (Brazilian employee)*

"One problem has been that the questions tend to accumulate too much to one person, just like has happened with Olli…" (Finnish manager)

Regarding the sales concepts and the support needed by the sales personnel of the Brazilian unit, it was emphasized that such a continuous and tight communication, which is a prerequisite for the operation of NAS, is not really needed. What is needed, however, is more prompt and

reliable cooperation especially when it comes to the needs of the Brazilian customers.

"Daily communication is really not necessary, but sometimes the informations come very fast, other times they don't come at all." (Brazilian employee)

"In my opinion, today is not necessary to have a daily communication. But some requests are necessaries to have answers very fast, would be better if the answers were in short time. We had here many experiences with this situation, and the answer time was not enough for the our expectations." (Brazilian employee)

"Usually, when we needed of information from Finland our support or assistance was very slow and may times we had not." (Brazilian employee)

"In most cases we can live without some information. The big problems arise when the customers want to know something, and if we don´t know in the exact moment, the customer expects to receive the answer on next morning, usually. Is here that we face the worst problems." (Brazilian employee)

The manager of NAS, who was the first business-orientated person outside of the top management team visiting the Brazilian unit, reported a clear need for support from the Finnish unit also regarding sales and project deliveries.

"According to my experience, the Brazilians would need much more support from Finland. Especially when they are contacting Finnish companies established in Brazil." (Finnish employee)

"I was surprised by the fact that our reference lists haven't really been discussed with the consultants. The list had been delivered there, probably via email, but no one had discussed it with them." (Finnish employee)

During his visit, he also perceived good opportunities for tighter cooperation between the units.

"The project profile of the Brazilian unit isn't that known in Finland, and one of the purposes of my visit was to create concrete contacts with them considering sales and project delivery issues." (Finnish employee)

"There are actual possibilities to make good use of the knowledge between the Brazilian and Finnish units. Considering the projects they have in Brazil, there seems to be already clear compatibility that could be explored with the projects we have here." (Finnish employee)

5.3.5 Extranet Launch

The formation of Nedecon Extranet Service was mainly a reaction to the workload of the NAS-experts of the Finnish organization. At the same time it was also a starting shoot for developing a comprehensive standard support providing system, which would make the international operations more effective regarding both technical, marketing and administrative aspects. In long run, Nedecon Extranet Service is an excellent media for creating an organizational memory of different knowledge and databases for sharing both information and experiences. O'Dell and Grayson (1998, 157), for example, maintain that the role of such a corporate memory is essential in organizations where the lack of contact, relationships and common perspectives among people not working side by side may impede the organization's ability to work effectively.

The launch of the extranet had a positive effect to the support providing regarding NAS. At least there was created a possibility for the overloaded NAS-experts to more easily delegate the task of support providing also to others. A major improvement was also that the accumulation of reached solutions to different databases was initiated. The launch and testing of the extranet was, however, only the first step in making the support system more effective.

"...We have very good hi-tech solutions, like the extranet to exchange information with Finland, but the responses are still very slow." (Brazilian employee)

"Nowadays, an Extranet has been implemented but it is needed to allocate more people and resources in order to make the Extranet really work properly, not only for the technical people but also for the consultants." (Brazilian employee)

"Technically speaking extra is working without problems, now it is all about getting people to change their behavior." (Finnish employee)

Within the timeframe of the present study, the extranet launch did not have any significant effect on the work of sales personnel. Dialogue regarding the development of business contents to the extranet was, however, initiated between the units.

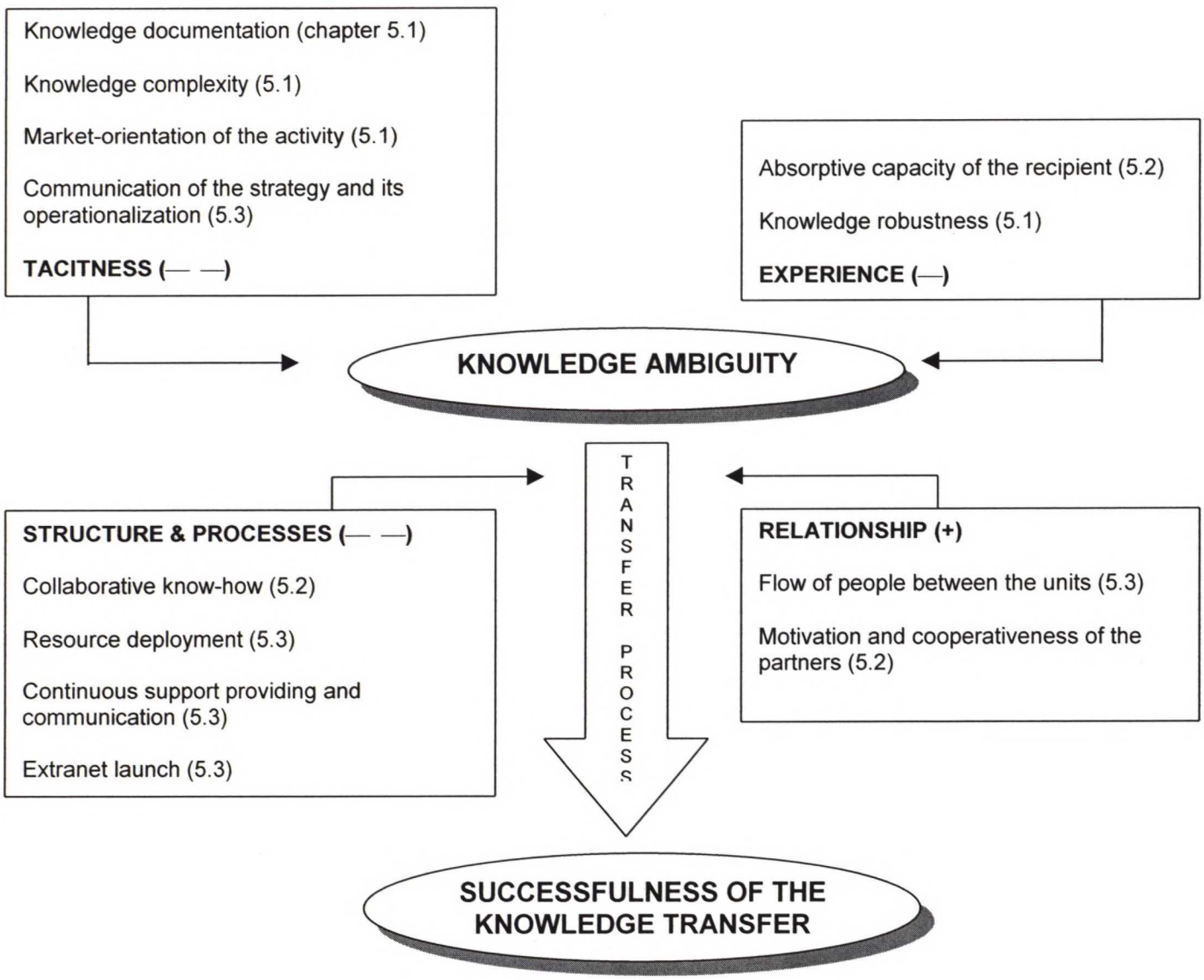
6 INTERDEPENDENCIES BETWEEN THE KNOWLEDGE TRANSFER FACTORS

In the previous section, empirical data related to the knowledge transfer of Nedecon do Brasil was classified into three groups according to Szulanski's modified model: characteristics of the transferred knowledge, characteristics of the knowledge transfer partners, and actions taken by the knowledge source. To be able to highlight the joint effects and interdependencies between the different factors that affect the successfulness of the transfer, it was decided to apply to Simonin's conceptual model, which is more dynamic in nature than the model of Szulanski. Thus, the sixth section aims to present the most crucial interdependencies concerning the transfers of both NAS-technology and sales concepts. Also implications related to the interdependencies are presented.

The formation of the present framework, which is illustrated in Figure 6, is presented in detail in the second section of the report (see chapter 2.4.3). The basic idea is to group the characteristics of the transferred knowledge,

the characteristics of the transfer partners as well as the actions taken by the knowledge source in a way, which enables the examination of dynamics between these factors.

Figure 6. Dynamic Framework for Analyzing Interdependencies between Knowledge Transfer Factors (modified from Simonin 1999)



Factors grouped into the categories of tacitness and experience are related to the level of knowledge ambiguity. Factors grouped into the categories of relationship and structures & processes are related to the actual transfer process. The effect of each category of the dynamic framework is expressed with the same kind of scale (- - / - / no effect / + / ++) that is used also in the previous section. The effect of each category is based on the joint effects of the knowledge transfer factors included into that particular category. The effects of the different factors introduced in the fifth section are reviewed in Table 6. The table presents also the joint effects, which form the total effect of each category.

Table 6. Joint Effects of the Knowledge Transfer Factors

TACITNESS	NAS	Sales concepts	Joint effect
Knowledge documentation	— —	—	— —
Knowledge complexity	no effect	— —	— —
Market-orientation of the activity	+	—	no effect
Communication of the strategy and its operationalization	no effect	— —	— —
			— —

EXPERIENCE	NAS	Sales concepts	Joint effect
Absorptive capacity of the recipient	+	—	no effect
Knowledge robustness	—	— —	— —
			—

STRUCTURE AND PROCESSES	NAS	Sales concepts	Joint effect
Collaborative know-how	— —	— —	— —
Resource deployment	— —	— —	— —
Continuous support providing and communication	—	—	—
Extranet launch	+	no effect	+
			— —

RELATIONSHIP	NAS	Sales concepts	Joint effect
Flow of people between the units	+	— —	—
Motivation and cooperativeness	+ +	no effect	+ +
			+

Thus, it can be perceived that the joint effect of the knowledge transfer factors incorporated into the category of tacitness as well as into the category of structure & processes have had the most significant negative effect on the successfulness of the knowledge transfer of Nedecon do Brasil. Also the factors included in the category of experience have had a slight negative effect on the knowledge transfer process. The joint effect of the knowledge transfer factors included in the category of relationship, on the other hand, has been slightly positive regarding the overall successfulness of the transfer.

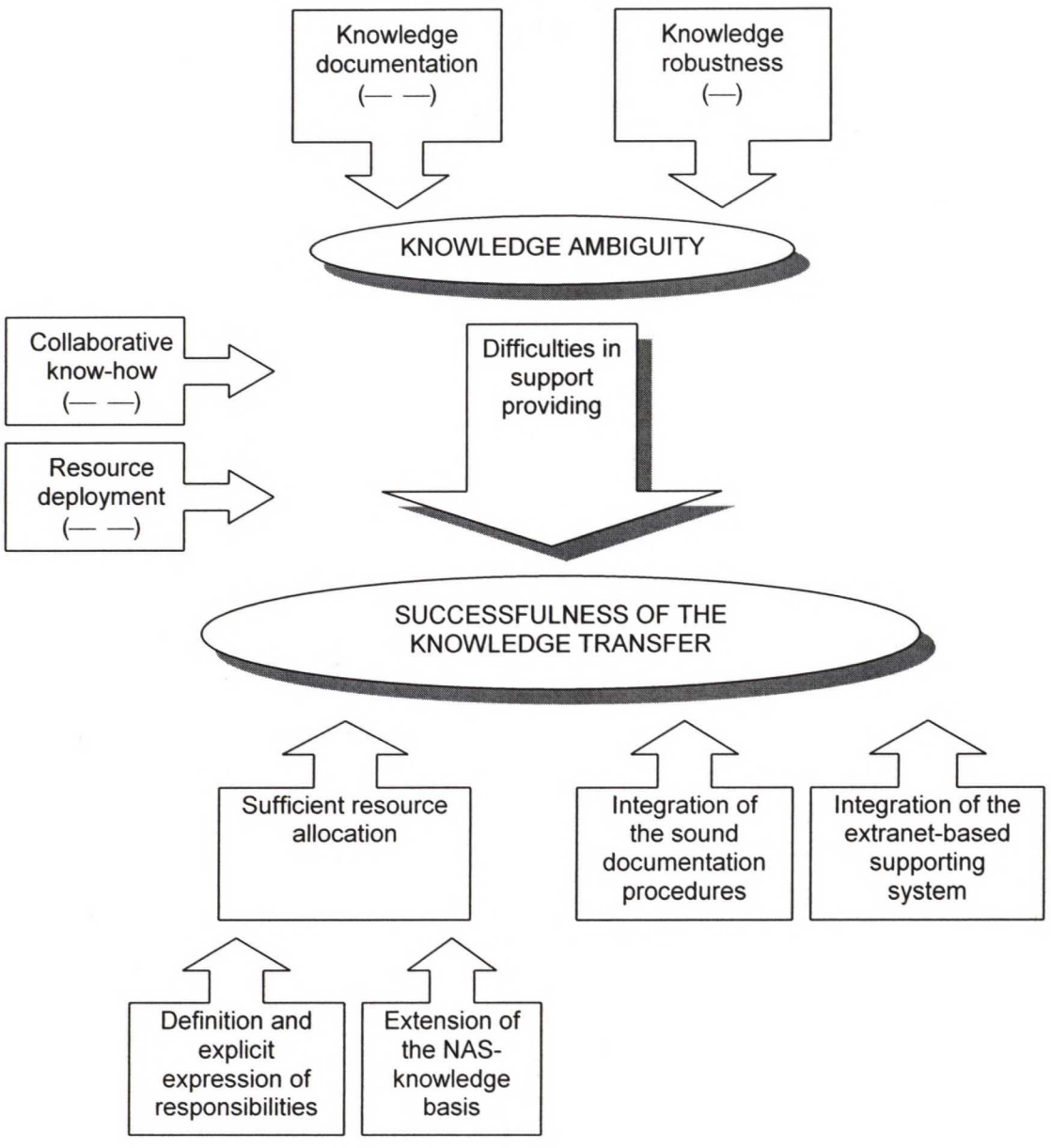
These joint effects of the knowledge transfer factors provide already some kind of understanding of the dynamics affecting the overall successfulness of the case knowledge transfer. However, there are still some interesting interdependencies related to the successfulness of the two subprocesses, NAS and sales concepts, which the researcher would like to highlight. The rest of this section deals with these interdependencies related to the transfer of NAS and transfer of sales concepts.

6.1 Interdependencies Related to the Transfer of NAS-Technology

6.1.1 Difficulties in Support Providing

The most significant interdependencies and interactions between different factors that affected the transfer of NAS-technology were related to difficulties in providing continuous support to the Brazilian unit. Figure 7 summarizes the causal and correlational relationships, which are related to problems in support providing. The figure includes also the implications suggested by the researcher in order to improve the situation.

Figure 7. Interdependencies Related to Difficulties in Support Providing / Transfer of NAS-technology



Insufficient knowledge robustness combined to insufficient documentation of knowledge raised the knowledge ambiguity associated to NAS-technology for two reasons. Firstly, not even the knowledge source had a sound and widely diffused knowledge basis regarding NAS: NAS-know-how of the Finnish organization was clearly concentrated on only few experts, which can be regarded to have a negative effect on knowledge robustness. Secondly, unsufficient documentation of the existing knowledge impeded remarkably the source's possibilities to communicate its knowledge. At the same time, unsufficient documentation hindered the recipient from identifying the whole of the knowledge asset.

Thus, NAS-technology was quite ambiguous in nature, which, by definition, makes its transfer difficult. The transfer process was further impeded by two factors, namely insufficient collaborative know-how of the knowledge source and inadequate resource deployment. Since the knowledge source had not before been involved in international intrafirm knowledge transfer and there had not been a need to develop processes in order to assure effective long distant support, it was quite obvious that the lack of collaborative know-how would impede the transfer process. Insufficient collaborative know-how manifested itself mainly through the lack of robust processes and procedures, whose development had to be started during the transfer. Inadequate resource deployment can be regarded as an independent factor hindering the transfer process, or it can be seen as a consequence of the inexpertness of the knowledge source. Either way, the underestimation of resources needed to transfer and implement NAS resulted in overloading of the few Finnish experts as well as in ineffectiveness of activities in the Brazilian unit.

Moreover, the lack of comprehensive documentation increased the amount of resources needed for providing the receiving unit with sufficient support. The amount of needed resources was increased also by lack of sound supporting systems and processes, which in turn resulted from lack

of prior experience as well as lack of prior need to develop those systems. Thus, there can be perceived also interdependencies between the different factors affecting the source's ability to provide support to the receiving unit, which may have further aggravated the initial situation.

The researcher has several suggestions to improve the situation described above. Firstly, more attention should be paid on sufficient resource allocation, which requires definition and explicit expression of responsibilities as well as extension of the NAS-know-how basis. The responsibilities to participate in international operations and to provide support to distant units have to be defined and included in job descriptions. As the international operations expand further, extension of the NAS-know-how basis of the Finnish organization will become inevitable: more skillfull personnel will be needed to participate in continuous support providing.

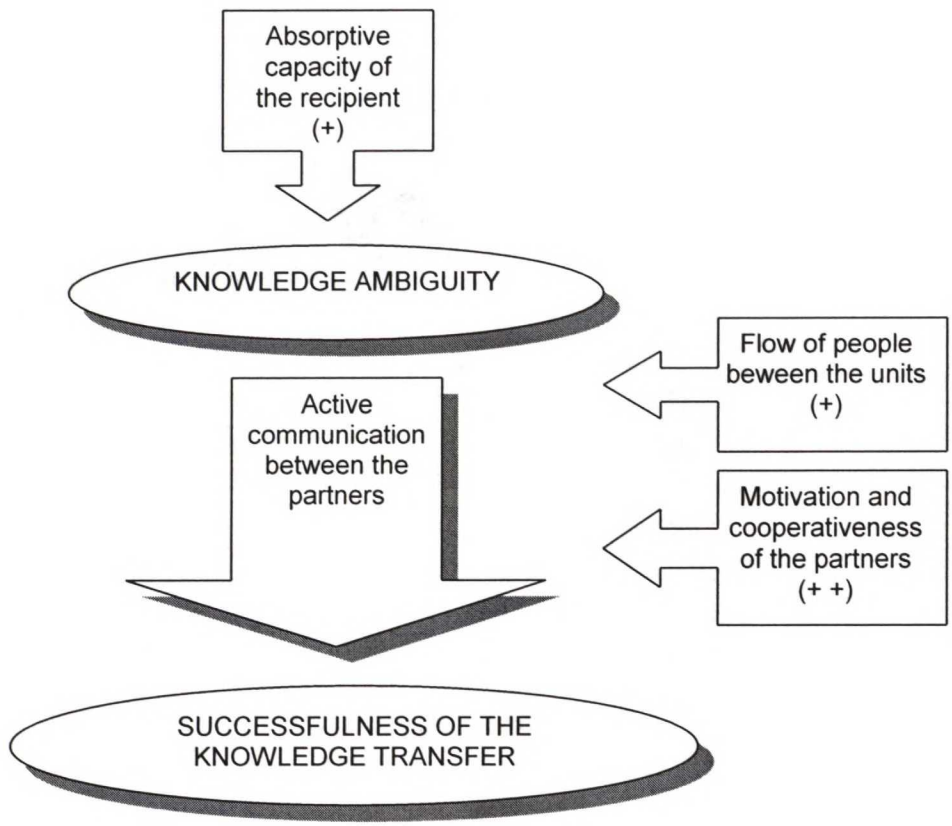
Secondly, as the above suggestions aimed to make the actual transfer process more effective, there are also some suggestions whose purpose is to decrease the level of ambiguity associated with NAS. The sound documentation procedures, which were introduced within the organizational change in October, should be fully integrated to a standard way of operation first at the Finnish headquarters and later also in other units. That would increase remarkably the robustness of NAS-knowledge. The extranet-based support providing system, which was launched to test use in October, should also be integrated to be a standard way of providing continuous support within the corporation. The structure and contents of the extranet should also be actively developed to meet the evolving requirements of the growing corporate. However, it is worth noticing Marschan's statement, that information and telecommunications technologies should not be viewed as an easy substitute for face-to-face interaction. Rather, the right balance between face-to-face and

electronically mediated interaction should be found and maintained (1996, 176)

6.1.2 Formation of an Active Communication Link between the Partners

There can be also perceived that some factors of the transfer related to NAS-technology had a positive impact on the overall successfulness of the transfer. Figure 8 illustrates those factors.

Figure 8. Interdependencies Related to Formation of Active Communication Link between the Partners / Transfer of NAS-technology



Firstly, good absorptive capacity of the recipient mitigated at least somehow the effects of insufficient knowledge robustness and documentation on knowledge ambiguity. Secondly, adequate flow of technical personnel between the units – in the terms of both quantity and

quality – made it possible to develop close relationships between the key persons, which in turn facilitated the formation of active communication links between the partners. Without such an active communication link between the partners – the other characteristics being equal – the transfer of NAS may have turned out to be much more complicated.

Thirdly, active flow of people between the units affected also the motivation and cooperativeness of the partners through development of personal relationships, which in turn made the communication and support providing more effective. This causality was raised by both the Finnish and Brazilian respondents.

"I think the motivation and cooperativeness is a factor of personal contact between people. The more often people from both countries interact in person, the better this process will happen." (Brazilian employee)

"You see the whole thing totally differently, if you have been able to visit the distant unit… Compared with a situation, where someone who has never been there and has never met the people or even heard of them, is asked to answer questions and assist the distant unit… In my opinion, it is crucial that key personnel can visit the unit." (Finnish manager)

Finally, high absorptive capacity of the recipient as well as the obvious enthusiasm of the Brazilian key technical persons towards NAS may have also increased the motivation and cooperativeness of the Finnish key technical persons to allocate time for supporting the operations of the new unit.

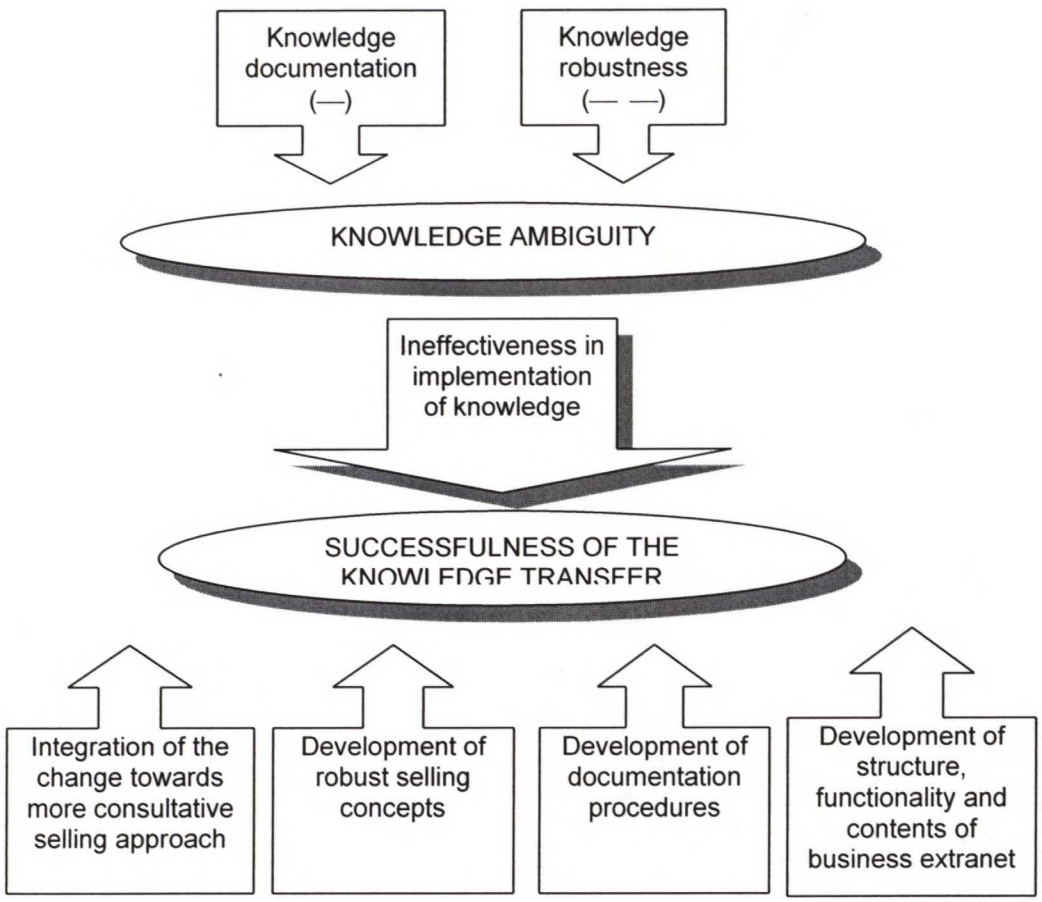
6.2 Interdependencies Related to the Transfer of Sales Concepts

As transfer of sales concepts can be regarded as a more difficult process than transfer of NAS, it is quite natural that there can be also perceived more complex causal and correlational relationships between and among the different factors related to that transfer process. The

interdependencies related to transfer of sales concepts are summarized in three figures. The first figure (9) summarizes the different factors that impeded the effective implementation of sales knowledge. The second figure (10) highlights the interdependencies associated with problems in adapting the transferred knowledge. The third figure (11) brings up the reasons for the ineffectiveness in communication between the Finnish and Brazilian sales personnel.

6.2.1 Ineffectiveness in Implementation of Knowledge

Figure 9. Interdependencies Related to Ineffectiveness in Knowledge Implementation / Transfer of Sales Concepts



Insufficient robustness of knowledge related to sales concepts can be regarded as one of the most important factors that increased the ambiguity associated with sales knowledge. It became apparent during the research that the sales concepts of the Finnish organization were quite underdeveloped, and the focus of the whole sales function was more on efficient telephone selling than on consultative selling. Moreover, at the time of the transfer, documentation concerning existing sales knowledge was quite scarce. The lack of documentation impeded the transfer of explicit sales knowledge, whose transfer could be quite straightforward, if it was well documented. The overall underdevelopment of the sales knowledge must have impeded not only the transfer of sales knowledge but also the activities of the Finnish sales function.

In order to improve the situation it is suggested, for one thing, to fully integrate the shift in sales towards a more consultative approach, which was initiated within the organizational change in October. Secondly and closely related to the previous suggestion, attention should be paid on the development of both robust sales concepts and systematic documentation procedures of sales knowledge. Moreover, the development of business-orientated extranet is one of the most crucial tasks in order to be able to effectively transfer and share the more robust and comprehensively documented sales knowledge within the corporation.

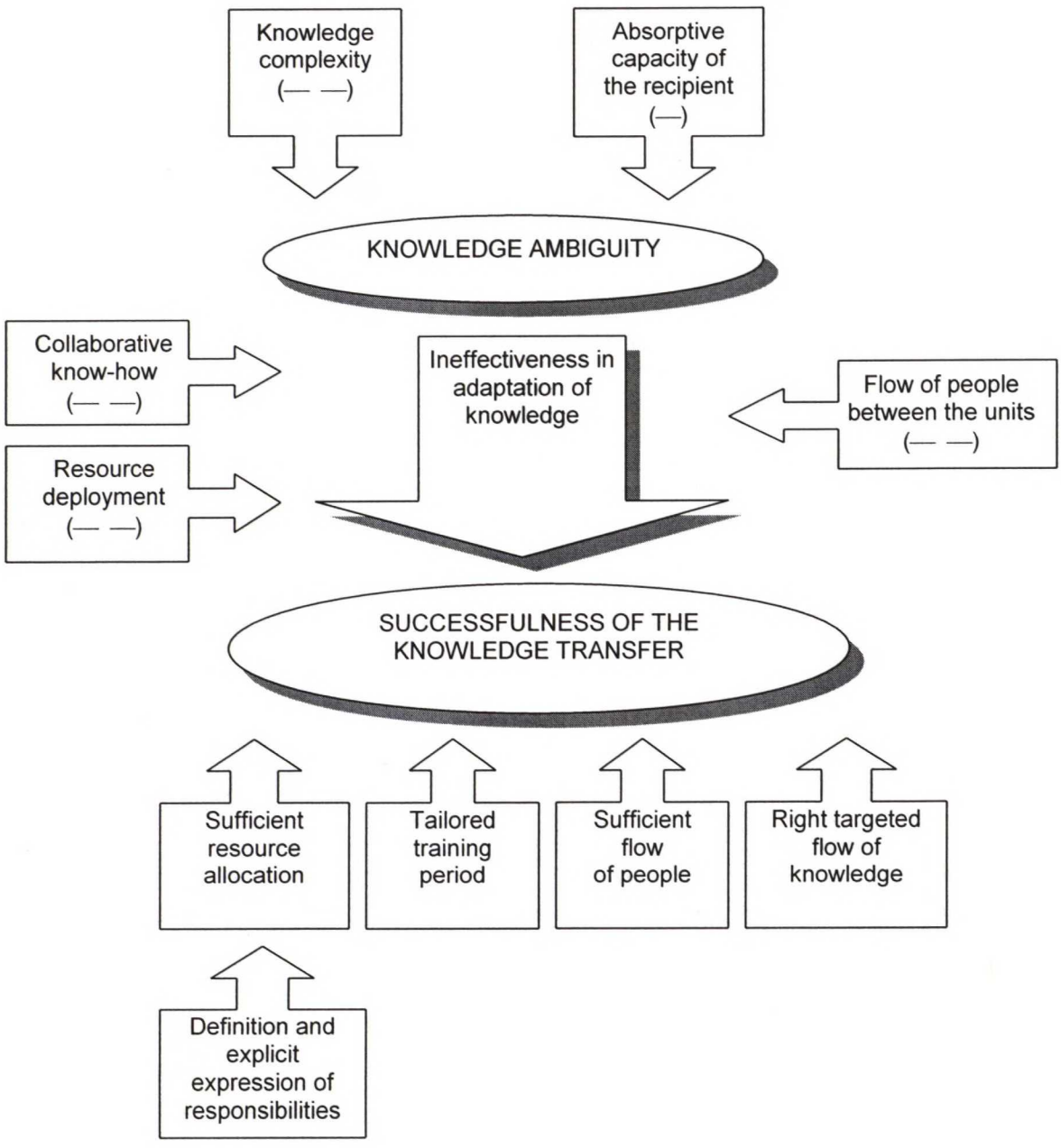
These implications are supported by Huber, who suggests two practices as possible solutions for the problem of ambiguity in knowledge transfers. The first is the institutionalized practice of sharing and explicating evolving knowledge within the organization, subjecting it to examination, critique, and revision as it takes form, which can be linked to the corporation-wide development and communication of robust sales concepts. The second practice suggested by Huber is the institutionalized practice of one organizational unit's creating and delivering to other units a "lessons learned file", which can be closely linked to the development of

documentation procedures as well as sharing the documented knowledge through corporate extranet. As a summary, Huber notices that the sense-making and articulation efforts involved in these two practices contribute greatly to converting tacit knowledge into more easily transferrable explicit knowledge, i.e. decreasing the level of knowledge ambiguity. (Huber 1999, 72-74)

6.2.2 Ineffectiveness in Adaptation of Knowledge

Thus, the transfer of sales concepts suffered first of all from the general underdevelopment of the knowledge asset. There can be perceived also causal and correlational relationships affecting the successfulness of the transfer, which are more clearly related to the actual transfer process. The next two figures deal with those interdependencies.

Figure 10. Interdependencies Related to Ineffectiveness in Adaptation of Knowledge / Transfer of Sales Concepts



Sales knowledge is a knowledge asset that can be described as quite complex in nature, complexity referring to "the number of interdependent technologies, routines, individuals, and resources linked to a particular knowledge or asset" (Simonin 1999, 600). Successful transfer of sales knowledge involves many different aspects that have to be taken into account. In other words, knowledge complexity may hinder the knowledge source from recognizing the totality of the knowledge asset that has to be transferred, and consequently make it more difficult to e.g. plan training. Thus, complexity related to sales knowledge increased the level of ambiguity associated with sales concepts, which was already high because of insufficient knowledge robustness and documentation.

Knowledge ambiguity in general and complexity in particular increase the requirements set to the absorptive capacity of the recipient. High knowledge complexity combined with moderate absorptive capacity of the recipient and insufficient flow of sales people between the units made the adaptation of the transferred sales knowledge quite ineffective in the case of Nedecon do Brasil. There are some different aspects of that ineffectiveness which will be presented below.

First of all, the Brazilian sales people were not provided with the same kind of tailored training period than the Brazilian technical key person was. Consequently, the Brazilian consultants had to start their sales efforts relying mainly on the information they received during the one-week general training in Finland, which was merely introductory in nature. Given the overall ambiguity of sales knowledge, some kind of specialized training e.g. at Nedecon's premises in Finland would have facilitated the absorption.

Secondly, not enough Finnish sales people visited the Brazilian unit. The director of marketing was actually the only person during the first six months of operations who visited the unit primarily in order to transfer sales knowledge. The director of strategy's visits included also marketing and sales issues, but he had also many other issues to take care of during his visits. Compared with the visiting weeks concerning NAS-technology during the first six months of operations (together at least five weeks were dedicated purely to transfer and implement NAS), the one week that the director of marketing spent in São Paulo seems insufficient. That fact combined to the lack of tailored training period made the actual sales knowledge flow between the units quite scarce.

Moreover, it could be stated that there were problems in targeting the knowledge flow. Most of the sales knowledge was transferred through the managing director of the Brazilian unit, whose ability to learn, absorb and share knowledge turned out to be slight. During his one-week visit in July, the director of marketing participated in the customer negotiations with the consultants, and consequently transferred his knowledge directly to the operative personnel. The director of strategy, on the other hand, discussed the marketing and sales aspects basically only with the managing director. Knowledge flow could have been targeted more clearly also towards the actual operative sales personnel, whose ability and willingness to learn seemed to be good.

Regarding NAS-technology, targeting of knowledge seemed to be more successful than compared with sales concepts. The fact that it was possible to name – at least implicitly – the Brazilian key technical person already quite early in the transfer process must have facilitated the targeting of knowledge flow. The absorptive capacity of the technical key person in the terms of prior knowledge as well as his motivation to learn were brought up by Finnish interviewees. It also seemed that the knowledge flow was targeted correctly, as the technical key person turned

out to be able to transfer the knowledge further to the other personnel of the new unit.

Huber, who has examined project team practices that facilitate learning and contributions to organizational knowledge, has also paid attention on the problem of targeting knowledge in a situation of inadequate absorptive capacity. He suggests that it is important to identify the member of the receiving unit who, as an individual, seems to have the most absorptive capacity, and use this person as a knowledge conduit and as an interpreter and disseminator within the receiving unit (Huber 1999, 74). It could be stated that considering the transfer of NAS, Huber's suggestion was more effectively fulfilled than considering the transfer of sales concepts.

The lack of cooperative know-how and the underestimation of needed resources impeded also the transfer of sales knowledge. According the estimation of the researcher, insufficient cooperative know-how of the source manifested itself most clearly through the overall lack of attention paid on the transfer of sales knowledge: there was no tailored training, the flow of people between the units was not adequate etc. Lack of proper resource deployment can also be considered as a result of insufficient collaborative know-how: In the case of sales concepts, there was not such an obvious lack of persons capable of transferring knowledge than there was considering the transfer of NAS. Thus, the reason for inadequate resource allocation may have been a kind of inability to pay enough attention to the particular transfer process.

The researcher has several suggestions for improving the situation described above. To begin with, the same kind of definition and explicit expression of responsibilities than suggested in connection with NAS is recommended also considering the transfer of sales concepts. Sufficient resource allocation follows logically the definition and expression of

responsibilities. That is supported by Simonin (1999, 612) who notes that strategic intent is not a substitute for resource commitment. Simonin's study establishes that proper resource allocation accelerates learning: it is possible to compensate for the insufficient absorptive capacity and for the complex nature of the knowledge by deploying greater resources to learn (1999, 613).

In general, much more attention should be concentrated on assuring sufficient flow of people between the units. Firstly, it would be essential to understand that the sales persons in particular need to absorb the business concept quite comprehensively to be able to operate effectively. Thus, it could be recommended to organize a tailored training period also to sales personnel, which would fully cover their specific perspectives.

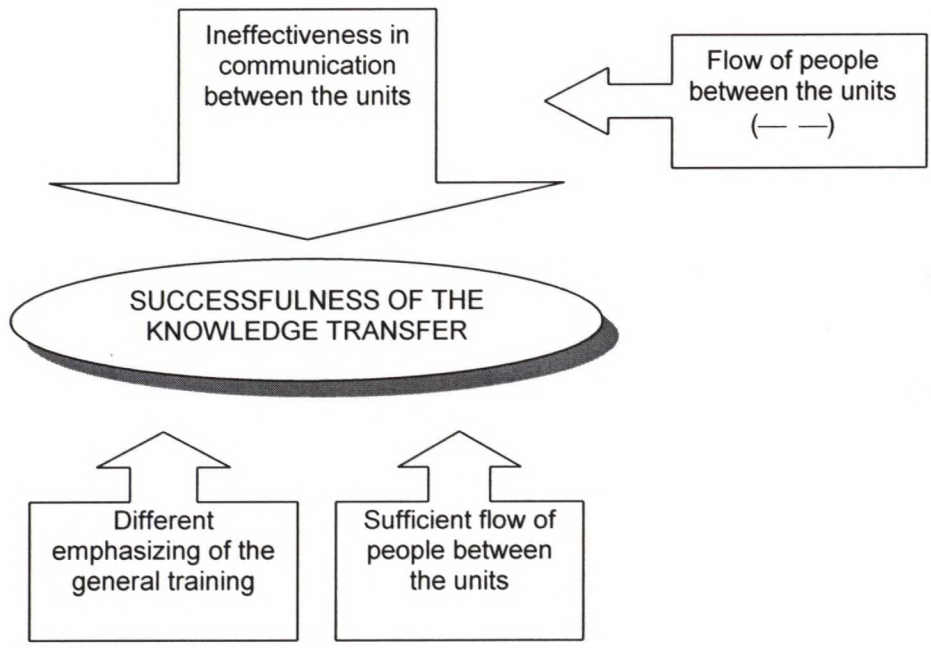
Secondly, attention should also be paid on that enough business-orientated key people would visit the new unit and consequently get familiar with the local market situation. That would increase the initial flow of knowledge as well as facilitate the adaptation of the knowledge to the local conditions.

Finally, the flow of knowledge between the partners should be targeted more carefully. However, it may not be easy to make difference between the key persons according their status and the persons with real absorptive capacity and willingness to learn and share. Thus, it may be worth considering to target most of the knowledge to at least two members of the receiving unit. Hence, the risk that one person's lack of absorptive capacity would impede the others to receive the needed knowledge would be decreased.

6.2.3 Ineffectiveness in Communication between the Units

There can be perceived still another set of factors affecting the outcomes of the transfer of sales concepts, which is illustrated in Figure 11.

Figure 11. Interdependencies Related to Ineffectiveness in Communication between the Units / Transfer of Sales Concepts



The insufficient flow of people between the units, which was raised already in connection with the ineffectiveness in knowledge adaptation (Figure 10), had remarkable effects also on the development of communication links between the partners. Due to the insufficient flow of people between the units, there was not enough possibilites to develop personal relationships between the transfer partners.

The insufficiency of the flow of people manifested itself not only quantitatively but also qualitatively. The researcher supposes that the Brazilians may have needed contacts with Finnish sales professionals

working daily with same kind of tasks than the Brazilian consultants. However, during the first six months of operations, the only business-orientated persons who visited the Brazilian units were the members of the top management. The visit of the manager of NAS in late October was the first visit made by a person who works daily with sales at operational level. It seems that the Brazilians may have needed contacts with account managers, project managers or other personnel who work daily with sales and customer cases. That kind of personnel did not, however, visit the Brazilian unit, which may have impeded the transfer of practical sales knowledge.

In addition, the Brazilian sales personnel were not provided with a tailored training period in Finland, during which they could have developed personal contacts with the Finnish employees. Thus, it could be stated that the Brazilian consultants did not have that many opportunities to meet the Finnish colleagues and develop the important personal contacts that enable the ease of communication as well as effectiveness of support providing.

The importance of personal contacts in adapting the transferred knowledge as well as in providing support were brought up by the Finnish interviewees.

"Knowledge transfer will be made more effective by paying attention on documentation, that's for sure. But the adaptation of knowledge according to the local needs seems to always require a couple of good conversations, either in the office or informally after the office hours... In face-to-face meetings you can go through lots of things, and lots of things are just mentioned and left to brew... In my opinion, personal meetings are important." (Finnish employee)

"If people are really busy and they have never met the ones who are asking for help, it can be quite difficult to get people invest their time for answering the questions of the distant unit." (Finnish employee)

Compared with the transfer of NAS, where the active communication link between the partners became almost a prerequisite for the activities, it could be stated that considering sales activities, such a continuous communication and support providing is not that essential. However, active communication between the partners would make also the sales effort much more effective. The importance of continuous communication is highlighted e.g. by Szulanski (1995,10), who maintains that a transfer of knowledge is likely to be not singular event but rather an iterative process consisting of numerous individual exchanges. Nonaka (1994), in addition, emphasizes that transfer of highly tacit knowledge requires usually several personal contacts and dialogue between the partners.

The researcher has two suggestions for improving the situation. Firstly, during the general training, it would be important to create more possibilities for the persons working with same kind of tasks to meet and get familiar with each other. During the training of the Brazilians, a short period of time was dedicated to that kind of interaction, but it was brought up that the time was not enough.

"In my opinion, one of the best parts during the training period was when everybody had a chance to meet and have a word with their colleagues... It is a pity there wasn't more than an hour for doing that." (Finnish employee)

During the general training, it would be possible for also the other employees than the most critical key persons to develop personal contacts with the members of foreign units. That is supported by Marschan, whose research highlights the weaker position of middle management and personnel working at the operating levels to create and maintain personal inter-unit relationships. According to her, that is partly due to their fewer possibilities compared to top management to meet face-to-face colleagues from other units (1997; 173, 176).

Secondly, the importance of sufficient flow of people – both in the terms of quantity and quality – is stressed once more. This time the flow of people is related to the creation and maintaining personal contacts between the units. Also this suggestion is supported by Marschan, who asserts that the benefits of having personal, informal communication networks over national borders lie, for example, in accelerating decision making processes, enhancing trust and facilitating the search for advice (1997, 176).

7 CONCLUSIONS

This section briefly summarizes the present research, draws together the findings as well as managerial implications based on the findings, and offers suggestions for further research.

7.1 Brief Summary of the Research

The present study is a case study examining a recent intrafirm knowledge transfer process at Nedecon Plc. The knowledge transfer process under examination is the case company's recent joint venture in Brazil, which included the transfer of Nedecon's business concept to the local market area.

The purpose of the research is, firstly, to describe the knowledge transfer process of Nedecon do Brasil. The aim of the description is to provide the reader with a context for reflecting the empirical analysis. Milestones of the knowledge transfer process as well as in-depth descriptions of the two subprocesses, on which the empirical analysis is built, are provided in the fourth section of the report. Secondly, the purpose of the study is to classify different factors of the transfer process, which affected the successfulness of the transfer. The classification of the knowledge transfer

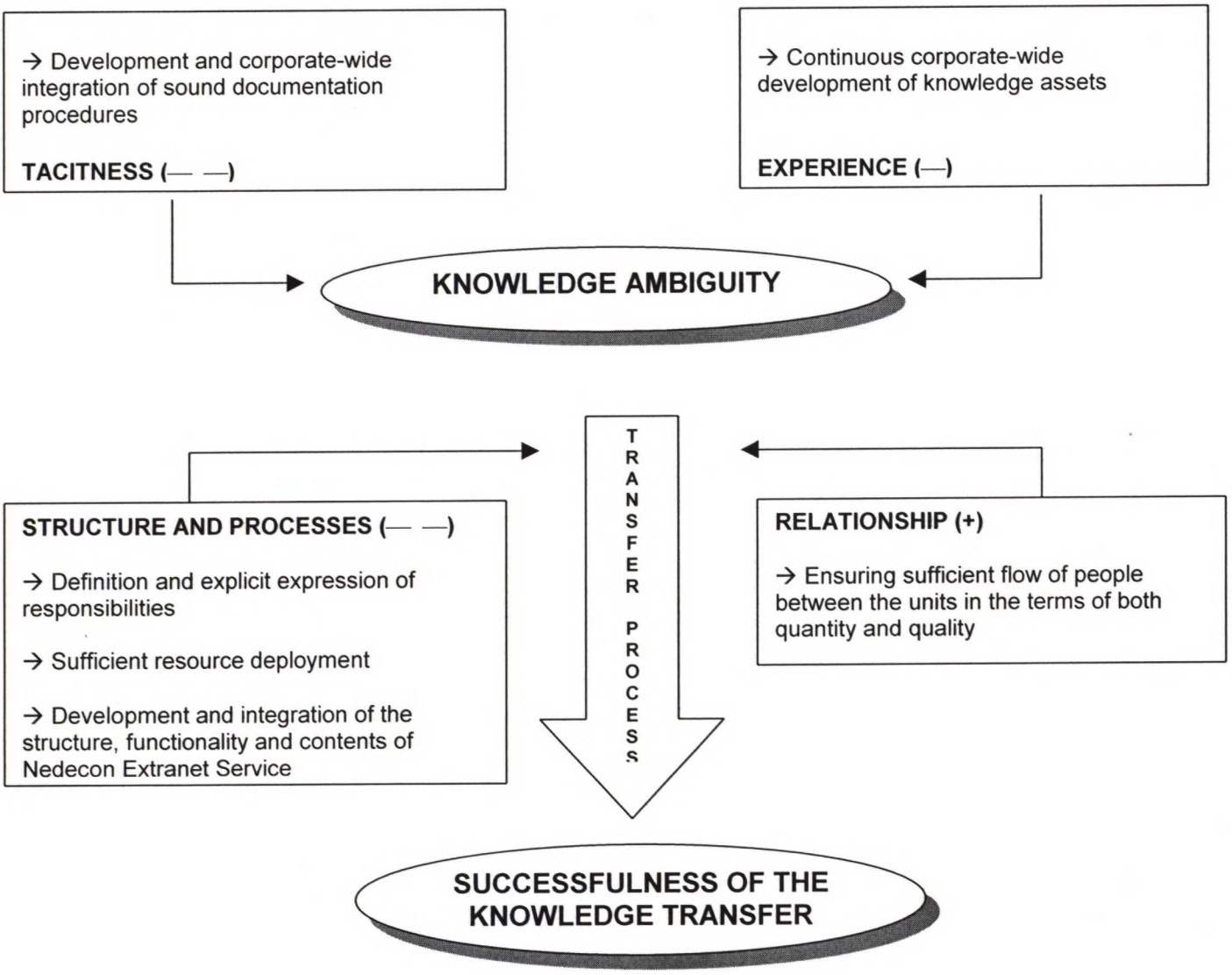
factors is based on a modified model of Gabriel Szulanski (1996), and it includes three groups: characteristics of the transferred knowledge, characteristics of the knowledge transfer partners, and actions taken by the knowledge source. The fifth section of the present study deals with that classification, forming a basis for the dynamic analysis of the sixth section. Thus, the third purpose of the research is to analyze the most significant interdependencies between the different knowledge transfer factors. The dynamic analysis is based on a framework modified from the one of Bernard Simonin (1999). Managerial implications are drawn in connection with the analysis of the interdependencies between the different knowledge transfer factors.

7.2 Major Findings

According to the dynamic framework of the present study, the successfulness of a knowledge transfer can be hindered by two reasons. Firstly, ambiguity of knowledge affects the transferability of knowledge. There are two categories of factors that affect the level of ambiguity: tacitness and experience. Secondly, the successfulness of a knowledge transfer may be hindered by ineffectiveness during the actual transfer. The ease of a transfer process is also affected by two categories of factors: relationship and structure and processes.

Major findings of the present study are summarized in the Figure 12, as well as the managerial implications based on these findings.

Figure 12. Summary of Major Findings and Managerial Implications



In the present study, it was found that tacitness as well as structure and processes were the most important categories of barriers to successful knowledge transfer. Knowledge transfer factors classified into the category of tacitness were found to affect significantly the level of ambiguity of the transferred knowledge, thus decreasing the transferability of the knowledge. Consequently, the lack of profound documentation and high

level of knowledge complexity among other factors impeded both the knowledge transfer partners to identify the totality of the transferred knowledge assets. The significance of tacitness and its effects on knowledge ambiguity found in the present study is in accordance with Schoenberg, who highlights the importance of correct recognition and codification of the exact knowledge elements that has to be transferred in order to replicate the capability (1999, 10). In addition, Simonin found in his study, that the effect of tacitness on ambiguity is consistently significant across various analyses (Simonin 1999, 611).

Knowledge transfer factors classified into category of structure & processes, on the other hand, were found to have a remarkable negative effect on the ease of the actual transfer process. Hence, lack of collaborative know-how, inadequate resource deployment, and inability to provide continuous support made the actual transfer process difficult. That is in accordance with Simonin who asserts that sufficient resource allocation and great collaborative know-how may remarkably decrease the effects of knowledge transfer barriers, e.g. tacitness, complexity, absorptive capacity of the recipient etc. (Simonin 1999, 616-617).

It was also found that knowledge transfer factors classified into the category of experience seemed to raise slightly the level of knowledge ambiguity, consequently affecting negatively to the transferability of knowledge. Thus, insufficient absorptive capacity of the recipient as well as lack of robustness of the transferred knowledge increased in some extent the level of knowledge ambiguity.

The only category with a positive impact on the successfulness of the process was the category of relationship. Knowledge transfer factors classified into that category, i.e. flow of people between the units as well as motivation and cooperativeness of the partners, were found to have a positive effect on the ease of the actual knowledge transfer process.

7.3 Managerial Implications

Managerial implications illustrated in Figure 7.1 originate from the interdependencies between different knowledge transfer factors highlighted and analyzed in the previous section. Thus, the implications based on the special features of the transfer of NAS-technology and the transfer of sales concepts are now incorporated into same framework.

In order to decrease tacitness associated with the knowledge assets of Nedecon it is suggested to pay attention to the development and integration of sound documentation procedures. Regarding NAS-technology, it is mainly about the integration of the documentation procedures and responsibilities, which were established in connection with the organizational change. Considering sales concepts, the development of more sound documentation procedures has also been initiated as Market Intelligence Service –unit was created in connection with the organizational change. Further attention should, however, be paid on the fully integration of these practices both in the Finnish organization as well as at corporate level.

In order to decrease the effect of experience on knowledge ambiguity, knowledge robustness should be improved by continuous corporate-wide development of the knowledge assets of Nedecon. That is especially relevant considering sales concepts. Knowledge robustness has to be taken into account also regarding NAS-technology as well as other products and technologies in general. For example, extension of NAS-know-how basis is an issue that deserves attention.

The researcher has three suggestions related to the category of structure and processes. Firstly, in order to be able to develop the structure and processes related to knowledge transfer and sharing, responsibilities have to be defined and expressed explicitly. Secondly and closely related to the

previous suggestion, sufficiently resources have to be allocated to knowledge transfer activities. Finally, careful attention has to be paid on the development and integration of the structure, functionality and contents of Nedecon Extranet Service. Considering technical aspects, the structure and functionality of extranet are already quite developed and the next steps include e.g. the integration of extranet-based support system. The structure, functionality and contents of other, more business-orientated parts of the extranet have to be, however, developed.

In order to maintain and increase the positive effect of the category of relationship on the transfer process, the most important issue is to assure sufficient flow of people between the units. At this stage, it has to be mentioned that the positive effect of this category originated from the exceptionally favorable development of personal relationships between the Brazilian and Finnish technical key persons, which had an essential impact on the success of the transfer of NAS. Considering the transfer sales concepts, the flow of people turned out to be quite insufficient. Thus, in order to assure adequate flow and adaptation of knowledge as well as development of personal contacts, the flow of people between the units has to be sufficient in the terms of both quality and quantity. Knowledge has to be also targeted right, according to the real absorptive capacity of the recipient.

7.4 Suggestions for Further Research

The last chapter of the concluding section presents the ideas for further research, which have emerged during the preparation of this report.

Even if the empirical data of this study includes material from both the source and the recipient of knowledge, this study clearly concentrates on examining the knowledge transfer process from the viewpoint of the

knowledge source. The standpoint of the knowledge recipient had to be left out mainly because of the time and cost limitations faced by the researcher. Thus, it would be interesting to complete the findings of the present study by incorporating comprehensively also the standpoint of the knowledge recipient.

The effect of cultural differences between the source and the recipient of knowledge was not at the focal point of the present study. Hence, it would be appealing to know more about the possible problems, strains of other effects of cultural differences between the knowledge transfer partners, whose quite distant cultural backgrounds – Brazilian and Finnish – could provide an interesting field for that kind of research. However, as Simonin (1999) found in his study that cultural distance was not significant for young alliances, that kind of study would be feasible only after some years of cooperation between the units.

As it became apparent during the present study, that different knowledge transfer factors may form quite varied causal and correlative relationships, more attention should be focused on more comprehensive analysis of interdependencies between different knowledge transfer factors. More detailed attention could also be given to interdependencies between the four categories of knowledge transfer factors – tacitness, experience, relationship and structure & processes. In the framework of the present study, interdependencies between different subprocesses of the case knowledge transfer were not examined in detail. It would also be an interesting field of research to examine the interdependencies between different knowledge transfer subprocesses.

To conclude, it could be stated that the field of empirical and process-orientated research on intrafirm knowledge transfer offers challenging research paths to be followed.

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Background interviews:

Sami Kallio, Production Manager	27.7.1999	1 h
Toni Willberg, Software Designer	28.7.1999	1 h

Interviews:

Mirva Mustonen, Office Manager	3.11.1999	1 h
Sami Kallio, Production Manager	3.11.1999	1 h
Olli Pääkkönen, Software Designer	4.11.1999	1,5 h
Teemu Linkoaho, Manager, Technical Services	4.11.1999	1 h
Jyrki Eklund, Director, Marketing	9.11.1999	1 h
Ian Nordlund, Manager, NAS	9.11.1999	1,5 h
Tarmo Typpi, Software Designer	12.11.1999	0,5 h
Jesse Jokinen, CEO	12.11.1999	1 h
Esa Matikainen, Director, Strategy	25.11.1999	2 h
	7.2.2000	2,5 h