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**KNOWLEDGE TRANSFER BETWEEN
PARENT AND DEVELOPING
COUNTRY SUBSIDIARIES
A Conceptual Framework.**

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THE ECONOMICS OF TELECOMMUNICATIONS

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Chapter 1 INTRODUCTION

1.1. Background

Norwegian Telenor-Mobile Communication (TMC) has as its ambition to be a transnational wireless telecommunications company. This ambition is rooted in a belief in the relative value of its cumulative experience dating back to the early 1980s coupled to the innovative advantage of having as its base a sophisticated and demanding home market.

Telenor's international ambitions in regard to mobile telephony date back to 1994 when it purchased minority positions in Pannon GSM of Hungary and North-West GSM in Russia. Since then it has extended its operations within both eastern and western Europe and established a presence in South East Asia where it is the largest European investor.

Table 1.1 provides an overview of TMC's international investments. Four points should be noted in particular. First, with the exception of Sonofon in Denmark, TMC is a minority shareholder in all of its affiliates. Second, at the end of 1999, profits were only being made in Greece and Hungary. Third, penetration levels, with the exception of West Europe and Hungary are low indicating growth potential, but also a lack of local expertise. Fourth, the majority of its investments are in developing countries.

Table 1.1: An overview of TMC's international investments: September 30th 2000.

i) Bracketed figures immediately to the right of the date of TMC's initial investment represent TMC's share of ownership.

ii) Since January 2001 Telenor has disposed of its interests in both Esta Digifone and Viag Interkom.

Company	Market	Established	Date of TMC's initial investment	Density of penetration of mobile telephony 30.09.00	TMC's total investment in million NOK	TMC's share of the result 31.12.99
West Europe						
Sonofon	Denmark	July 1992	2000 (53.5%)	62.9%	14.801	-
Esat Digifone	Ireland	March 1997	1995 (49.5%)	56.8%	958	(93.5)
Viag Interkom	Germany	October 1998	1997 (10.0%)	49.5%	11.011	(540.6)
Connect	Austria	October 1998	1997 (17.5%)	70.7%	1.208	(254.8)
Central and Eastern Europe						
Cosmote	Greece	April 1998	1997 (18.0%)	51.5%	417	38.8
Pannon	GSM Hungary	March 1994	1994 (25.8%)	24.7%	673	109.9
ProMonte	Montenegro	July 1996	1997 (40.1%)	13.6%	62	(24.7)
Russia/Ukraine						
Vimpelcom	Moscow	June 1994	1999 (30.4%)	10.1%	1.678	(88.7)
Kyivstar	Ukraine	October 1997	1998 (35.0%)	1.0%	475	(25.1)
Extel GSM	Kalingrad	April 1998	1997 (49.0%)	1.3%	97	(17.5)
Stavtelesot	Stavropol	December 1997	1997 (49.0%)	1.1%	129	(34.9)
North-West GSM	St.Petersburg	December 1994	1994 (12.7%)	4.2%	15	n.a.
South East Asia						
TAC/UCOM	Thailand	September 1991	2000 (39.8%)	5.2%	6..370	-
DiGi.com	Malaysia	May 1995	1999 (32.9%)	21.5%	2.268	n.a.
Grameen Phone	Bangladesh	March 1997	1997 (46.4%)	0.2%	254	(49.1)

Although TMC's long-term ambition is to increase its stakes in its affiliates to over 50%, it wants to be perceived as a participation-oriented partner, rather a domineering partner. One of its Vice-presidents, Haakon Bruaset Kjøl, commented in early December 2000:

“We will never forget that we’re operating in foreign countries and we shall always be more than willing to adapt. We’re going to acquire a reputation as a company that enhances others by being adaptive, fast moving and skilled. We’re fast moving because we are small and we are skilled because the Norwegian market demands and responds to constant innovation.”

In particular it is envisaged that TMC’s facilitator role could be realised by effective and rapid knowledge sharing, that is by transferring and bringing to bear standardised solutions in each of TMC’s affiliates. While accepting that local management knows the local markets best, the aim is to offer to provide affiliates with access to TMC’s collective experiences, test results, best practices, marketing know-how, industry partners and technology

The aim of this working-paper is to summarise the literature on knowledge transfer with particular focus on transfer to low-knowledge subsidiaries in developing country settings. We do this without reference to TMC or to the telecommunications industry. This reflects the lack of knowledge transfer research within the industry. Nevertheless it is reasonable to assume that lessons from other industries can be fruitfully applied to the mobile telecommunications industry. As a means of facilitating this we will generate a conceptual framework that will form the basis for our future research effort aimed at TMC.

1.2. Related themes

The success of a multinational corporation (MNC) is ultimately dependent on its ability to replicate its domestic advantage in foreign locations. This domestic advantage may be due to a number of factors and such as market dominance or reputation, but in this paper our primary focus is that of knowledge assets and its transference. One aspect to this is the circumstances under which a firm prefers to effectuate this transference through internal

mechanisms – a subsidiary or an affiliate – rather than through market mechanisms such as licensing. Although this is not an issue in the main body of this paper let us briefly examine the issue because it has implications for the manner in which we treat knowledge transference.

From a Transaction Cost Economics (TCE) perspective the decision not to transfer knowledge to foreign markets through market mechanisms is based on the costs (stemming from incomplete contracts due to bounded rationality and opportunistic behaviour) of this relative to doing so within the firm by establishing subsidiaries. In other words a decision to internalise knowledge transfer through hierarchy is a consequence of transaction costs being more efficiently mitigated by hierarchy than by some alternative governance forms such as a licensing contract. Contrasting with this is the capabilities approach, which ignores the emphasis of transaction costs and the assumption that organizations exist because of their combined ability to economize on bounded rationality and curb opportunistic behaviour through the hierarchical governance mechanisms (less incentive intensity, stronger administrative controls, less legalistic conflict resolution as compared with inter-firm collaboration and market contracting). Instead it predicates the concept of “organizational capabilities”. Like TCE the capabilities approach hypothesizes that if knowledge is easily codifiable and teachable then licensing will be preferred but that when it is tacit there will be a pronounced tendency to transfer it within the firm through subsidiaries. However, from a capabilities approach the decision to develop and use subsidiaries is not dependent on notions of opportunism and governance but on the nature of the firm as a potential social community, consisting of higher-level organizing principles and social relations that facilitate the development and transfer of firm-specific social knowledge. That is “Firms exist to create and transfer knowledge that is difficult to encode for the purpose of external dissemination” (Kogut and Zander, 1993:631).

It is argued that this inherent “firm efficiency” stems from regular interaction between individuals and groups rendered possible by a firm setting. In turn this interaction leads to a common understanding and a shared purpose that constitute an efficient mechanism for the transfer of tacit knowledge and its application in new markets. Unlike TCE the capabilities approach actually regards governance mechanisms as detrimental. This is because they undermine the trust required for social community formation. What determines what a firm does is thus not the transaction costs and the ability of control mechanisms to attenuate opportunism, but the firm’s efficiency in the process of knowledge development and transfer. This efficiency varies among firms. Some firms have greater out-transferor capabilities than others and they have the ability to develop subsidiaries with greater in-transferor capabilities than other potential recipients.

The critical difference between TCE and the capabilities approach is the plausibility of social communities replacing control, in the sense of monitoring and incentives, as efficient preconditions for tacit knowledge transfer. Our view is first that control is rarely absent and is, provided it is not taken to an extreme, actually a precondition for social communities. Second we are sceptical that strong social communities are a necessary prerequisite for the efficient transfer of tacit knowledge. Third there is little evidence that strong social communities in the sense of clans are widespread.

Another critical shortcoming of the capabilities approach is its failure to acknowledge that communities of practice are not necessarily restricted to individual firms. It is entirely feasible for inter-firm communities of practice to be established: that is a community of practice might not only be established between a firm and a foreign subsidiary but a foreign licensee as well. Given that sufficient in-transfer capacity is present, the decision to not invest in the creation of an inter-firm community of practice, but to internalise knowledge transfer through the establishment of a foreign subsidiary is therefore in the first instance a TCE decision. That is

it depends on an analysis of whether contracts with licensees can be established that secure the long-term interests of the knowledge transferor as well as an assessment of the costs of establishing internal governance mechanisms in a subsidiary. Local conditions in the foreign setting – including the technological infrastructure, the legal framework and cultural distance – can be usefully distinguished as impacting at every level of this decision making process. Not only do they impact the decision to establish a subsidiary rather than a licensing agreement, but after the decision has been made to establish a subsidiary they also impact the subsidiary's future knowledge position within the larger multinational enterprise. Local conditions may also be assumed to influence the strategy for knowledge transfer in that they will condition both the attributes of the knowledge to be transferred and the design of the respective governance mechanisms for knowledge transfer. Finally they will impact on the organizational capabilities for knowledge transfer, here divided into in- and out-transfer capacities. The efficacy of these capabilities/capacities will be an important determinant of the transfer performance of the affiliate.

Figure 1.1 summarizes this process. The focus of this paper will mainly be on the relationships between tacit/explicit knowledge and organizational learning and transfer capabilities (the double-arrowed learning and transfer relations indicating reciprocal learning over time) and between governance mechanisms for knowledge transfer (exchange mechanisms) and learning and transfer capabilities. In a subsequent paper the whole model will be elaborated and testable hypothesis derived.

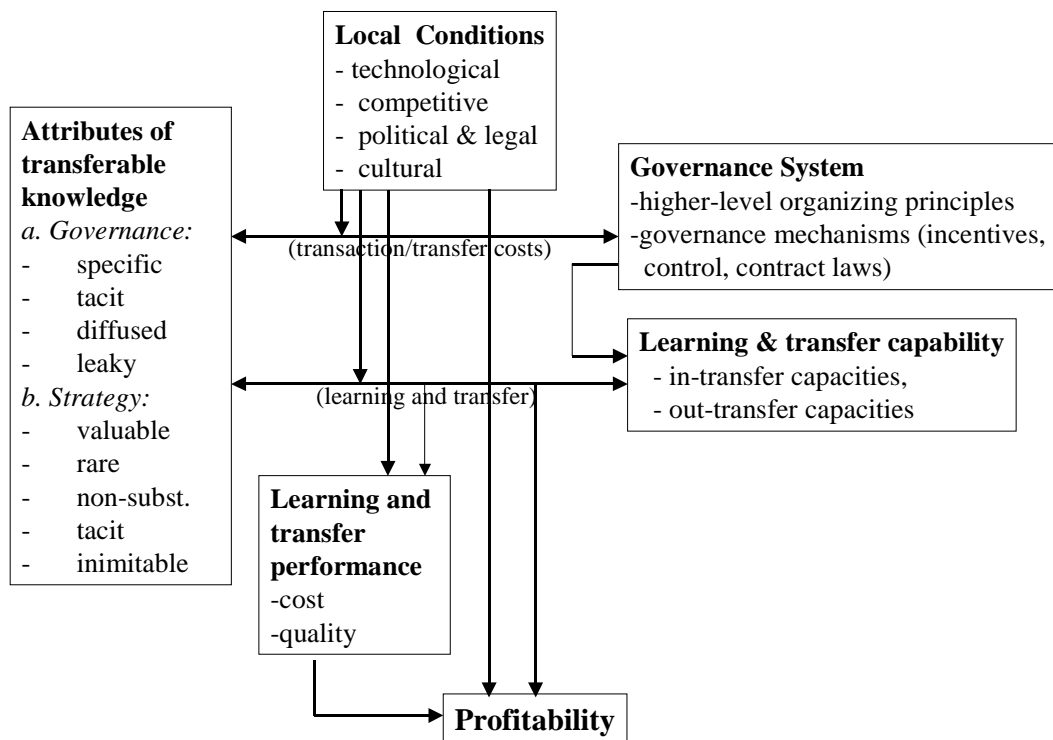


Figure 1.1 An integrated knowledge transfer model

In focusing on the means for knowledge transfer we distinguish four levels of knowledge in-transfer capability or capacity. A level I subsidiary is only capable of absorbing explicit knowledge of an elementary type. However, a level IV subsidiary is not only capable of absorbing tacit knowledge, but is also capable of independently generating knowledge which may be transferred to the parent or other parts of the firm. Using extant research various knowledge transfer mechanisms are identified in the move from level I to IV. These vary in terms of the social interaction they are intended to generate which in turn is contingent on the degree of tacitness to the knowledge that is to be transferred.

Chapter 2 The Knowledge Transfer Capabilities

2.1. Introduction

Traditionally the scope of knowledge transfer between multinational parent and developing country subsidiary has been limited. Beyond gaining access to raw materials or markets, foreign direct investment has been confined to utilising low cost unskilled or semi-skilled labour on the basis of established technologies involving limited training. However, rising educational standards and government-led aspirations increasingly make at least some technology and knowledge transfer mandatory.

The transfer process is affected by the out-transfer capacity of the transferor, the in-transfer capacity of the recipient as well as factors such as the cultural distance and the local environment of the recipient (Leonard-Barton, 1995; Martin and Salomon, 1999).

Additionally the degree of tacitness involved in the knowledge to be transferred is a significant factor. Tacit knowledge involves “causal ambiguity” (Lippman and Rumelt, 1982; Reed and Defillippi, 1990), that is there is a basic difficulty in comprehending the precise nature of the causal connections between actions and results that is critical when one is attempting to replicate a capability in a new setting.

For Nonaka (1994) tacit knowledge is deeply embedded in action within idiosyncratic contexts. It involves knowledge that is complex, difficult to codify and therefore “sticky” (von Hippel, 1994; Szulanski, 1996). Thus while explicit knowledge consists of easily codifiable information that can be transmitted “without loss of integrity once the syntactical rules required for deciphering it are known” (Kogut and Zander, 1992, p.386), tacit knowledge comprises recipes many of which are difficult to articulate in precise terms because they involve experiential insights which may only be transferable by the exchange of employees

(Bresman and Birkinshaw, 1999). Thus whereas explicit knowledge can be extracted from the person who developed it, made independent of that person, and reused for other purposes, tacit knowledge can generally only be transferred through some form of social interaction (Nonaka and Takeuchi, 1995). In general the greater the tacitness of the knowledge the more expensive it is to transfer across national borders (Teece, 1981). Moreover, trying to turn inherently tacit knowledge into explicit knowledge can lead to serious problems if inappropriate transfer mechanisms are used (Hansen, Nohria and Tierney, 1999).

Clearly, attention should be paid to developing and selecting the most appropriate mechanisms for knowledge transfer. In this chapter our aim is to provide a theoretical conceptual framework that distinguishes between the challenges involved in transferring explicit “know what” knowledge and those involved in the transference of tacit, “know-how” knowledge (Polanyi, 1962; Kogut and Zander, 1992). This issue is addressed with a particular focus on knowledge transfer between high knowledge parents and low knowledge subsidiaries in developing countries. Our starting point is a distinction between the out-transfer capacity of the transferor and in-the transfer capacity of the subsidiary.

2.2. Out-Transfer Capacity

Out-transfer capacity can be sub-divided into the transferor’s ability to transfer explicit knowledge and its ability to transfer idiosyncratic, tacit, knowledge. The former involves the ability to codify and disseminate necessary information through operating manuals, routines, procedures and physical systems that enable the user to know what to do. Just as some manufacturers of consumer products are more able than others to design clearly articulated operating manuals and user-friendly end products, so some firms are more efficient than others at communicating explicit knowledge to their subsidiaries.

In regard to tacit knowledge there are a number of factors that make out-transfer of it relatively problematic. One factor is that the generation of tacit knowledge is the product of organisational routines (Nelson and Winter, 1982). These routines have evolved as a consequence of individuals interacting with one another, face-to-face, over an extensive period of time. As a result there will be a strong sense of collective identity. Strong-tied, multilateral social relationships are not readily duplicable. Pathways between the out-transferor and the recipient have to be deliberately created to facilitate the social ties that make tacit knowledge flows possible (Dyer and Nobeoka, 2000). One increasingly common type of pathway consists of intranet systems that enable employees to pinpoint relevant experts within the firm together with e-mails, the phone and video-conferencing systems. However, many multinational companies such as Ericsson consider over-reliance on Web-based systems for competence networking as risking the loss of continuity and responsiveness in knowledge building and competence sharing (Hellström, Kemlin and Malmquist, 2000). While not abandoning Web-based tools Ericsson like Bain, Boston Consulting Group and McKinsey also make extensive use of face-to-face dialogue not only on a one-on-one basis but also by transferring people between offices for brain- storming sessions.

A further constraint on the out-transfer of tacit knowledge is that individuals or groups of individuals have to be motivated to share their valuable knowledge despite the fact that their income and status within the firm are invariably linked to their know-how. This problem is particularly acute when there is no prospect of receiving an immediate payback in equally valuable knowledge, or when there is a fear that proprietary knowledge may be leaked to competitors (Porter, 1985). For intra-firm knowledge transfer to take place a motivation system must be designed that provides the source sufficient incentive to engage in transfer (Porter, 1985).

Last, but by no means least, is the issue of the initial strategic aim of the out-transferor. As we have previously noted, multinationals are often initially motivated to establish foreign subsidiaries in order to benefit from inexpensive labour, avoid excessive transportation costs, or achieve market access. Once established, continuous transfer of private technology and best practice may be needed to maintain the subsidiary as a profitable operation. Still the same, parent company has a restricted view on what knowledge is to be transferred. The aim is often limited to the transference of technical know-what information, rather than the transference of tacit know-how knowledge.

2.3. In-Transfer Capacity

Going beyond a knowledge dependency relationship is a theme that Leonard-Barton (1995) has focused on in the context of the in-transfer capacity of subsidiaries located in developing countries. Research by Szulanski (1996) on intra-firm knowledge transfer identified this factor, which he refers to as absorptive capacity (Cohen and Levinthal, 1990) as a particularly salient factor. Likewise Lyles and Salk (1996) have also demonstrated the importance of absorptive capacity as a determinant of knowledge acquisition from foreign parents within the context of international joint ventures.

Leonard-Barton (1995) distinguishes four levels of in-transfer capacity at the subsidiary level:

- The capacity to operate assembly or turnkey equipment (level I)
- The capacity to adapt and localize components (level II)
- The capacity to redesign products (level III)
- The capacity to independently design products (level IV).

While moving from the one level to the next is dependent on the transferor's out-transfer-capacity, it is also heavily influenced by the subsidiary's ability to develop its in-transfer-capacity. In developing countries, because of levels of education and relevant experience, most subsidiaries will only possess a *level I* in-transfer capacity. Level I operations are characterized by the construction of a complete working plant (a turnkey factory) or an assembly plant. Usually the equipment involves older technology that has been tried, tested and successfully debugged so that it is "fool-proof". Beyond the advantage of ease of use, older equipment means that proprietary knowledge is not revealed.

At level I there is little or no capacity for the receipt of tacit knowledge. Knowledge transfer is limited to explicit knowledge that either is embodied in the equipment, software or other physical systems, is recorded in manuals or is communicable through instructions and demonstrations. The only skill required by the recipients is the ability to use the equipment and to perform routine maintenance.

However, even formal transfer of explicit knowledge may be subject to severe constraints. One major constraint involves finding a match between the functioning of the equipment and the existing infrastructure in developing countries. For example:

Firms wanting to set up in Nigeria are faced with a problem known locally as "BYOI" (Bring Your Own Infrastructure). Cadbury Nigeria, for instance, in the absence of reliable power or water supplies, generates eight megawatts of its own electricity and drills 2,500 feet down to obtain the 70,000 gallons of water an hour it needs for its Lagos food-processing plant. Since the water spurts out at 80°C, it has to be cooled before it can be used. According to Bunmi Oni, the firm's managing director, BYOI adds at least 25% to operating costs. (*Economist*, 2000)

Another challenge in a level I transfer is to ensure that there is a clear understanding among employees as to what is required of them not only in terms of level of output but also in quality.

Moving from level I to *level II* means that the recipient has developed the ability to adapt the product to local tastes and is able to produce it using a substantial portion of local components. For the recipient to be able to fine-tune the technology and make use of opportunities for the procurement of locally produced components the explicit knowledge transferred must be upgraded to include the basic engineering principles underlying the successful operation of the transferred technology. In turn this is dependent on the efficacy of the explicit knowledge transfer mechanisms between parent and in-transferor.

A basic problem for a move to level II is to obtain local managers of a sufficient quality:

More than half the firms questioned in a recent survey of multinational companies in China by the Economist Intelligence Unit (a sister company of The Economist) admitted they were disappointed by their performance in China. Many complained about difficulties with their joint-venture partners, but nearly all said the most pressing problem was obtaining good local managers. As a result, many factories are still heavily dependent on expensive expatriate managers. This hurts them...

(Economist, 1997).

One particular shortcoming of local Chinese managers is that few have any experience in working with suppliers outside their own vertical chain. Thus one critical in-put of explicit knowledge involves the training of local managers in logistics and in working with a network of suppliers.

Adapting the product to take into account local conditions depends on being able to go beyond the mechanistic order taking approach at level I. It means developing a work force that is capable of assuming responsibility, co-operating with other employees and contributing to the development of local knowledge building. The discipline and the quality consciousness involved in this move may preclude substantial numbers of employees who lack the necessary potential to be able to contribute to a move to level II. Indeed their presence may be a hindrance for such a move. However, large-scale dismissals may be politically unacceptable thereby blocking a move from level I. Institutional factors of this kind are as much a part of the local infrastructure as the reliability of the local power supply.

Finally, it should be noted that these explicit-knowledge transfer mechanisms must not only embrace the subsidiary but also the entire network of local suppliers. A common experience in China has been that local sourcing of components has been problematic because of the amount of training suppliers have needed in order to meet necessary quality standards. This has acted as yet another constraint on a move from level I to level II.

At *level III* the in-transfer capacity embraces the ability to redesign the whole product in order to arrive at a superior product. As such the recipient is able to do more than adapt components. This capability comprises both a strong theoretical grounding and a great deal of practical experience. Building on the more advanced Japanese infrastructure it took Fuji Xerox less than ten years to reach this level (Leonard-Barton, 1995), whereas Hewlett-Packard's Singapore facility took twenty years (Thill and Leonard-Barton, 1993). Although recipients at this level are still dependent on the transferor for the scientific knowledge underlying the product there is a move from know-what to know-how, or from the transference of explicit to tacit knowledge.

One factor determining the move from level II to III is the degree of initiative at all levels in the recipient. This may have to be developed in a purposive manner by implementing

mechanisms that permit informal social interaction and thereby the communication of values and norms. At Hewlett-Packard the successful transference of tacit knowledge was contingent on the development substantial opportunities for interaction, involving actual physical co-location, between recipient engineers and managers and their transferor counterparts.

Leonard-Barton (1995, p.241) records that:

When Larry Brown, a manager in the Hewlett-Packard peripherals division with over ten years' experience in research and manufacturing, first took on the task of setting up research in the Singapore facility, he had to learn how to formulate questions so as to leave his authority-conscious engineers options on how to respond: "If I suggested answers to my engineers, to them this became the only possible solution".

To some extent this innate unwillingness to disagree openly with a figure of authority is a facet of a particular national culture, but it also a facet of any subsidiary that has developed a dependency relationship with its parent company. Ultimately though the move from level II to level III will be a product of the type of interaction between parent and subsidiary over and above the mechanical transference of technical know-how. Nonaka and Takeuchi (1995) use the notions of socialization and internalisation for such interaction. The former refers to the acquisition of culturally embedded knowledge through exposure to the foreign parent, while the latter refers to the conversion of explicit knowledge into routines as a product of experience.

Iveco, the truck-making subsidiary of Fiat, was particularly focused on parent-sub subsidiary interaction mechanisms when it introduced its management-training program to its Chinese subsidiary. In the late 1980s it selected nearly 400 Chinese engineers and workers,

trained them in Italian and transferred them to Italian factories. Mr Donati the chief representative in China of Iveco explains:

“The Chinese wanted the technology. I said ‘No’”, he says. “We will give you know-how.” In 1986 Mr Donati arranged for 32 Italians to come to Nanjang to teach 370 local mechanics and other staff basic Italian.

Then they were all transferred to Iveco’s various factories in Italy to gain on-site technical expertise in how the trucks and vans were assembled, as well as a sense of the corporate and national culture. For Iveco, more than most international automotive groups, such a substantial language programme was a necessity. “At that time we had a problem in how to communicate,” explains Mr Donati. “The Chinese didn’t speak English and, in fact, the Italians too didn’t speak such English either.”

There were loftier reasons for doing more than merely handing over the technical specifications on paper. “If you wanted to plant a tree in China, then you had to create the ground for it that we had in Italy,” he explains. (*Financial Times*, 1999)

What characterizes a level IV in-transfer capacity is that the original recipient is able to absorb the knowledge that enables it to design products independently of the original out-sourcer. A move from level III to level IV is dependent on a substantial bi-directional knowledge flow that in turn implies an acceptance of the recipient as a potential equal. Roles and relationships have to be redefined if synergies are to be created. Pathways for knowledge exchange have to be established coupled to incentives that encourage the sharing of knowledge. In the case of Fuji Xerox it took about eight years to develop an in-transfer capacity that enabled it to produce its first copier based on its own design concept (Leonard-Barton, 1995).

Possessing level IV subsidiaries, either through subsidiary development or acquisition, means that the MNC's potential sources of innovation are geographically dispersed. The hierarchical relationship between headquarters and the subsidiary is replaced by a network of equals, in which the foreign subsidiary is one of several interacting, and sometimes even competing knowledge generating sub-units. Bartlett and Ghoshal (1983) have labelled this organizational form the transnational, whereas Hedlund (1994) refers to it as the heterarchy. Leading subsidiaries may then be given the corporate responsibility of managing the research and development activities within their own specialized fields on a global basis. Because of this, "The challenge is not to divide a given task in a way ensuring maximally efficient performance. Rather, it is to position the company so that *new* tasks can be initiated, often on the basis of a combination of separate knowledge pieces from different organizational units" (Hedlund, 1994, p.87). Some studies have suggested that while this dispersion undoubtedly poses challenges, it may come to facilitate the technological development of the firm, "since the MNC can tap into alternative streams of innovation in different centers, and establish favorable cross-border interactions between them" (Cantwell and Piscitello, 1997, p.166).

The question we now seek to address explicitly is the role and development of knowledge exchange mechanisms involved in the upgrading of the in-transfer capacity of subsidiaries from level II, through level III to level IV.

2.4. Beyond Formal Vertical Mechanisms

Challenging as knowledge transfer is at levels I and II, while taking the local infrastructure into account, to a large extent headquarters can exert unilateral control over the process. This means that although the absence of proximity makes it difficult to supervise directly the behaviour of foreign subsidiary managers, it can nevertheless monitor them through formalized information and reporting systems as well as through more informal feedback from

expatriates (O'Donnell, 2000). In other words it can largely determine and supervise the flow of knowledge from headquarters to subsidiary as well as its application through various formal and informal transfer mechanisms. A decision to move beyond level II entails a substantial increase in subsidiary autonomy. To some extent at level III, but much more so at level IV, the intention is that through a synergistic transfer of tacit knowledge subsidiaries should have knowledge assets equivalent but different to that of headquarters such that it can take on global responsibility for a set of value activities. In order to achieve this move formal monitoring and supervision should be moderated and supplemented with programmes for the build-up of in-transfer capabilities suitable for the co-operative behaviour and trust needed for bi-directional knowledge transfer (O'Donnell, 2000). A perceived lack of trust may lead to opportunistic behaviour on the part of the subsidiary in the sense that knowledge is surreptitiously withheld from other parts of the network (De Meyer, 1995; Ghoshal and Moran, 1996).

In order to create the conditions for tacit knowledge exchange that enables a move from level I/II to level III knowledge transfer mechanisms of an increasingly interpersonal type are necessary (e.g., personnel rotation, training, mentoring).

Vertical interpersonal mechanisms

Both Reger's (1997) research and De Meyer's (1995) interviews with fourteen large multinational companies with international R&D operations indicate that the majority expend a considerable amount of effort in developing mechanisms that facilitate social interaction. The function of these mechanisms is thus to create what Kogut and Zander (1992) have termed a "social community", that is a set of shared values and beliefs across subsidiaries. Gupta and Govindarajan (2000:479) refer to this as "interpersonal familiarity, personal affinity, and convergence in cognitive maps between the interacting parties." O'Donnell

(2000) lists a variety of vertical interpersonal mechanisms that are used to facilitate the interaction needed to increase subsidiaries' identification with the organisation as a whole. Among these are the assignment of subsidiary managers to corporate headquarters and headquarters-based training programs both of which the Iveco example above featured. In addition is the use of parent company personnel as mentors for managers of foreign subsidiaries.

As subsidiaries move from level III to IV the reality is that the firm is moving away from operating on the basis of hierarchy to that of "heterarchy", that is the balance of power, at least in knowledge terms, within the corporation is undergoing radical change. To facilitate this evolution knowledge exchange mechanisms that permit and enable either partner to initiate knowledge exchange are required. Although many of these lateral mechanisms are formal, their aim is to facilitate informal corporate socialisation processes by extending opportunities for more open and richer communication.

Lateral interpersonal mechanisms

Strategic committees generally consisting of the head of central research and heads of development from the subsidiaries are widely used formal lateral mechanisms, as are planning departments which have the purpose of developing and co-ordinating R&D and technology portfolios (Reger, 1997). Both of these mechanisms represent efforts at providing relatively durable structures for lateral knowledge exchange. Frequently lateral mechanisms are temporary in character. They include temporary inter-unit committees that are set up to allow managers from different international locations to engage in joint decision-making on a project by project basis. They also span temporary task forces for the co-ordination and facilitation of international collaboration between subsidiaries on a specific project, expatriate

assignments between subsidiaries, and training programs that involve participants from multiple international locations.

Another lateral mechanism is executive development programs that bring together participants from both headquarters and subsidiaries. In some cases these develop into being corporate universities. For example in 1999 ABB founded its own academy not because it was disappointed with the output of the world's business schools but because an arena for lateral as well as vertical interaction was deemed necessary. As Arne Olsson, head of management resources, explained, ABB initiated its academy because it was felt that

... (business schools) cannot deliver information on where we are going, what the issues, problems and challenges are. People told us they want to get straight messages directly from the top, to build networks with peers, to get a better understanding of ABB's culture and values, and to get specific tools, ideas, and project management techniques to help them manage better. This is a large and very decentralised company. It may sound like a paradox but the more decentralised you are, the more you need some kind of mechanism to build that organisational glue. To manage a company of this size cannot only be done by instructions and memos. You have to have that glue of people contact and trust. (*Financial Times*, 2000)

Yet another lateral mechanism in evidence is the use of central staff members as liaison personnel. De Meyer's (1995) interviews indicate widespread use. Their specific job is to co-ordinate the efforts of international functional areas. Frequently they have to travel around constantly to follow up on the evolution of the technology. Part of their mandate is to actively trigger the contacts between different individuals and groups across the company. A second task is to get involved in coaching, guiding and monitoring the research and

development activities. A third task is to bring to the attention of the corporate head office potentially significant developments within the network. De Meyer (1995) records that the success of such a person is dependent on, at a minimum, a combination of technological credibility, social and integrating skills. Another factor is, knowing the decision-makers at corporate headquarters.

2.5. Cultural Distance

Thus far we have not considered the impact of cultural distance on knowledge transfer. Hofstede's (1980) research suggests that even when linguistic difficulties have been reduced, by employing a common business language, cultural differences impinge on the ability of people to successfully interact and to interpret the subtleties of meaning involved in tacit knowledge transfer. For instance Nonaka (1994, p.22) detects that "Japanese firms encourage the use of judgement and knowledge formed through interaction with customers – and by personal bodily experience rather than by 'objective,' scientific conceptualisation." This represents a fundamentally different epistemological tradition to that of the West and contributes to causal ambiguity. It is reasonable to suppose that the degree of cultural distance is a particularly salient factor in the initial stages at level I and II. Beyond these initial stages, given that the appropriate knowledge transfer mechanisms are in place, it would seem that the impact of cultural distance is of less significance. Research by Simonin (1999) on the transfer of marketing know-how in international strategic alliances indicates that there is a significant mitigation of cultural distance as the degree of collaborative experience increases. This result was consistent with Meschi's (1997, p.218) findings that "all cultural differences in an international joint venture, regardless of their nature or intensity, will ultimately recede over time." It may be supposed that the same would apply to integrated MNCs. Certainly research by Bresman, Birkinshaw and Nobel (1999) on post-acquisition knowledge transfer within

Swedish MNCs indicates communication processes improving with time to a point when cultural differences have no significance. In other words, effective informal vertical and lateral mechanisms mitigate the effects of cultural distance.

2.6. Summary and Discussion

A simplified version of the integrated knowledge transfer model summarises the above discussion (Figure 2.1). For the efficient transfer of increasingly tacit and less-transferable knowledge (tacit, diffused, leaky) increasingly higher levels of out-and in-transfer capacities are needed, developed by supplementing vertical transfer mechanisms with an increasing number of lateral transfer mechanisms (i.e.; various governance mechanisms for knowledge transfer). The efficacy of the formal vertical exchange mechanisms that are established will determine the move to level II, signified by an extensive capacity for the in-transfer of explicit knowledge. Both the cultural distance and the quality of the local infrastructure may impact on the transfer efficacy of vertical and lateral exchange mechanisms. A move to level III, that is a limited capacity in the subsidiary for the in-transference of tacit knowledge, is conditioned by the ability of the parent to establish effective vertical exchange mechanisms that promote social interaction. Likewise, a move to level IV, that is a substantial capacity for the in-transference of tacit knowledge, will be determined by the implementation and efficacy of social exchange mechanisms of a more lateral type. Once a subsidiary is positioned at level IV it is no longer a subsidiary in the conventional sense, but rather a corporate technology and/or production centre that transfers technology and/or intermediate products to other production or assembly facilities.

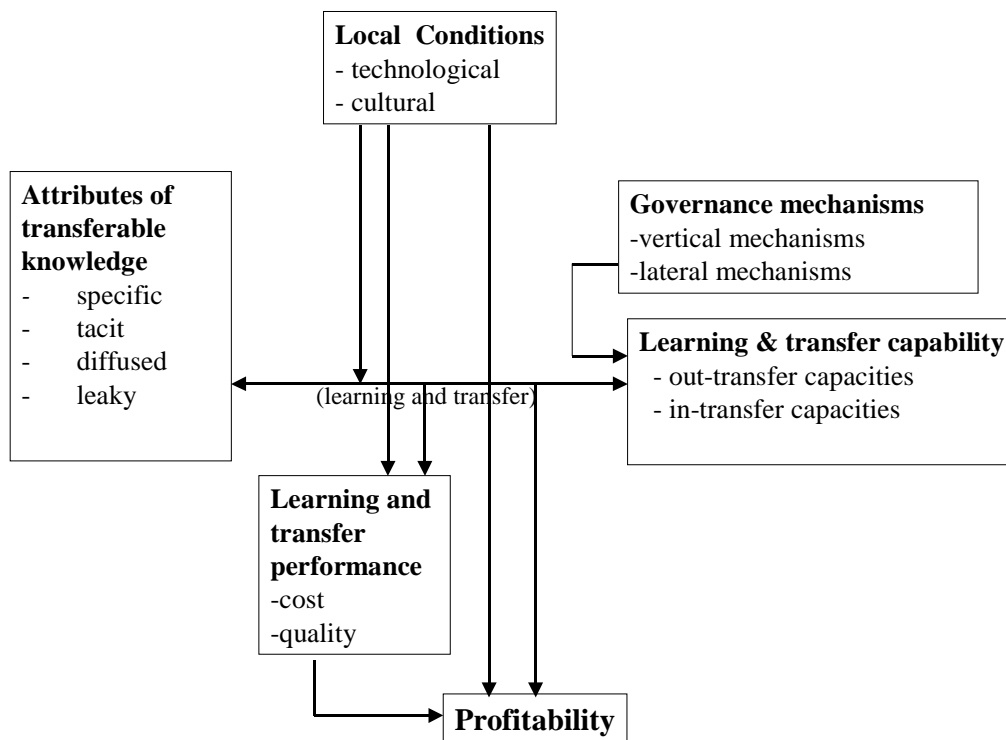


Figure 2.1 Simplified Knowledge Transfer Model

The knowledge exchange mechanisms we have listed are well documented. Further research will undoubtedly uncover further examples and may be able to rank them in regard to their knowledge transference efficacy. The tendency, however, has invariably been to present knowledge transfer mechanisms with only scant regard to the context in which they evolve. Our paper has attempted to provide this context. We have argued that it is largely determined by the interaction between the out-transfer capacity of the parent company and the subsidiary's in-transfer capacity. The development of this interaction is primarily contingent on the ability and willingness of the parent to develop appropriate knowledge exchange mechanisms.

This is particularly the case in regard to the development of lateral exchange mechanisms, not least because they depend on the parent company being prepared to redefine

its relationship with its subsidiaries. Hence, we emphasise that the role of top management in defining the self-identity of the company is critical for moving beyond the use of vertical knowledge transfer mechanisms.

Although the framing of this paper has been within the context of the development of subsidiaries with low knowledge content to high knowledge content the model we have proposed also has an applicability to high knowledge content mergers and acquisitions. Successful knowledge exchange depends on the development of a combination of informal vertical mechanisms and lateral exchange mechanisms. Without regard to these mechanisms the synergies that are so often claimed as the *raison d'être* for mergers and acquisitions will simply not materialise.

Chapter 3 Future Research

As we stated in the background to this paper the conceptual framework we have evolved is aimed at providing a platform for research into knowledge transfer in TMC. In this last section we will present a short overview of our research agenda.

In Chapter One we drew attention to the fact that with the exception of Sonofon in Denmark TMC is a minority stakeholder in all of its foreign direct investments. In other words the reality of its operations is one of a series of equity-based international joint ventures (IJVs) rather than the fully owned subsidiaries that form the basis of the knowledge-transfer literature.

IJVs are remarkably diverse in character. In the case of the IJVs TMC are involved in it may be assumed that TMC's motive in the first instance is to acquire access to the licenses in rapidly growing emerging markets that in the next instance should enable it to achieve huge profits and escalating stock value from rapidly increasing sales volume. In the case of emerging markets it is entering markets where the local licenses can only be obtained in conjunction with a local partner. Added to that it might be argued that the "local knowledge" necessary for successful operations (local business connections and government relations) is difficult to acquire by any other means than some form of local partnering. For their local partners TMC represents a source of capital as well as a means of acquiring knowledge and technology.

TMC's and their local partners' motives are not necessarily commensurate with one another. First, the achievement of scale economies does not necessitate knowledge transfer over and above level II knowledge transfer. TMC's role, as it acknowledges, is essentially that of a "tool kit man" applying tools (technologies, techniques, procedures) developed in its home market to other settings. Second, any motivation TMC might have for knowledge

transfer over and above level II will be undermined if there is a possibility that TMCs' partners might terminate the joint venture once the necessary knowledge and technology has been acquired. Contractual instability is a particular facet of emerging economies such as Russia and Thailand (Economist, 2001).

On the other hand overt resistance on the part of TMC to assisting its partners in a move from a "know what" in-transfer capacity to a "know how" capacity may cause its partners to break at an early stage with the alliance and seek an alternative partner. This is by no means a theoretical possibility. The instability rate of IJVs of this type is estimated to be about 50% (Beamish et al, 2000).

The literature suggests two radically different ways of resolving the latent instability of joint ventures but neither fully takes into account the peculiarities of IJVs involving developing countries:

- i) The transaction cost economics (TCE) approach emphasizes the use of unifying incentives as the main device for preventing serious friction from arising between transacting parties (Williamson, 1975). However, in the context of developing countries the enforceability of contracts is so problematic that TCE would cause us to assume that TMC will show no commitment to being anything other than a "tool kit man" – i.e. it will avoid developing the local partner beyond level II unless it is turned into a wholly owned subsidiary.
- ii) The capabilities approach emphasizes the importance of "enduring social relationships" (Kogut and Zander, 1992). Some sense of a "collective" of "shared (corporate) identity" can and must be developed if the stability of the IJV is to be ensured and knowledge transfer over and above level II to occur (Kogut and Zander, 1996). The question is though whether commonalities

can be developed given the cultural dissimilarities between TMC and its local partners in emerging markets. In other words TMC may find it immensely difficult, despite local partner pressure and expectations, to move beyond its “tool kit man role” even in those developing countries TMC may eventually commit itself to moving its local partners beyond level II.

Although both theses lead to a similar “tool kit man” prediction, their reasoning is essentially different. TMC predicts that going beyond the “tool kit man” role is dependent on developing contractual stability and unifying incentives. The capabilities approach emphasizes the role of “shared identity” as the key antecedent. The former is highly problematic in the case of developing countries with their weak institutional arrangements, the latter in the case of distant-culture settings.

Our future research will seek to analyse and test the implications of these two competing theses by examining TMC’s perceptions of its partners and its partners’ perceptions of TMC with special reference to the development of the means for knowledge transfer. We will do so through a qualitative analysis of knowledge transfer activities in the context of TMC’s subsidiaries in Western Europe, the former Soviet Union and South-East Asia.

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