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**Corporate versus Contractual Knowledge Transfer
The Case of Mobile Communication Services**

by

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Abstract

In the paper a combined governance-capability model for knowledge transfer is developed with the purpose of critically examining the prophecy of consolidation of the mobile network industry. According to this prophecy, almost all local mobile operators should now have been acquired and integrated into a few giant multinational firms. Since this did not happen, and since economies of scale and scope from intra-firm knowledge transfer is one of the main reasons for the creation of the multinational firm, the advantage of intra-firm over inter-firm knowledge transfers cannot be that dramatic. In the model we examine the comparative advantage of corporate knowledge transfer causing consolidation of the industry, as being determined by two sets of discriminating alignments, linking knowledge attributes on the one hand with governance and transfer capabilities on the other. The core message of the model is that converting tacit, specific and diffused pieces of knowledge into explicit, fungible and compact bundles of knowledge facilitate not only intra-firm knowledge transfer, but also inter-firm knowledge transfer and leakage to third parties. In mature markets, this may result not only in the corporate mode being outcompeted by the contractual and hybrid mode. It may also result in integrated multinational enterprises being outcompeted by a diverse collection of upstream firms, alliances and industry associations providing intermediate products and knowledge services to downstream local network operators. Fragmentation, not consolidation, of the downstream market may result.

INTRODUCTION

It is now widely believed that increasing scale and scope economies are the primary reasons for the rise of the large diversified enterprise in general, and for the large multinational in particular (Chandler, 1962, 1977, 1990; Bartlett and Ghoshal, 1989, 2000; Gupta and Govindarajan, 2000). Despite this general belief, and despite the much-cited article by David Teece on the economies of scope and the scope of the enterprise (1980), its ramifications are still not fully understood by many academics, nor by many business managers and their investment bankers. Consequently there is a somewhat exaggerated belief in large-scale global consolidation of “scale and scope” industries such as the telecommunication services industry. Impressive attempts at global consolidation were first made in fixed communication, then in mobile communications. Whereas these attempts generally failed in international fixed communication (Ulset, 2003), they are still pending in international mobile communication. My best guess would be that large-scale consolidation would also fail in mobile communication, basically for the same reason as they failed in fixed communication despite the existence of such giant mobile operators as today’s Vodafone. The reason is exactly the one implicated by Teece (1982), that scale and scope assets are sometimes more efficiently developed and utilized across international markets than inside multinational enterprises. In particular, as the services rendered by the respective scale and scope assets become increasingly tradable, vertical market contracting will replace vertical integration. Although this may still lead to global consolidation of the upstream market, fragmentation of the downstream network operation and service provision market may result.

Among potential scale and scope assets, knowledge asset is often assumed to be the most important, particularly for the so-called transnational firms (Bartlett and Ghoshal, 1989, 2000). By implication, in industries where knowledge is the key competitive asset that generates scale and scope economies, we may expect corporate (as opposed to contractual) knowledge transfer and utilization to emerge as the main mechanisms causing global *consolidation*.¹ Knowledge may be transferred either in its original form through copying, teaching, training or expatriation of personnel, or in its derived form by transferring only the practical solutions developed by such knowledge.

One industry where knowledge assets may play such a strategic role is the mobile communication services industry. Here multinational mobile operators are developing from

¹ Consolidation means here turning a large number of local mobile operators into subsidiaries of a few large global or transnational firms through mergers and acquisitions.

the international and multi-domestic types towards the global and transnational ones, here represented by Vodafone and Telenor Mobile respectively. Whereas, per definition, multidomestic firms combine high level of local responsiveness with low level of global integration, global firms combine low level of local responsiveness with high level of global integration. Transnational firms combine high levels of both (Bartlett and Ghoshal, 1989, 2000). Local responsiveness means being responsive to local tastes, traditions, culture, customs, etc. Global integration means leveraging knowledge and other important scale and scope assets across all relevant local subsidiaries. Sometimes this means transferring the knowledge itself. Other times it means transferring only the practical solutions developed by expertise located elsewhere.

In the mobile communication industry bilateral contracts between national operators already connect national networks into global networks. Additional corporate organizations must therefore serve additional coordination needs such as exclusive distribution of best practice and leading technology or privileged access to other services rendered by other unique corporate assets including the purchasing power of particularly large global operators. Accordingly, we set out to develop a combined governance-capability model for knowledge transfer (Williamson, 1999a) with the purpose of examining the advantage of corporate knowledge transfer, causing consolidation, over contractual knowledge transfer, causing fragmentation. In particular, we will be analyzing how successful knowledge transfer to foreign subsidiaries can be achieved by assigning governance mechanisms and transfer capabilities to critical knowledge attributes, conditioned by the local context. Of course, also other scale and scope assets than knowledge assets may contribute to consolidation, but these will not be explicitly treated in the theory section, only the subsequent industry case discussion.

Transaction cost economics and the capability approach both hold that the more difficult it is to transfer leading domestic knowledge to foreign locations, the more likely the transfer will be conducted through wholly owned subsidiaries rather than through partly-owned subsidiaries, technology licenses or similar inter-firm contracts (Teece, 1977, 1983; Williamson, 1981; Kogut and Zander, 1993). Basically, such non-transferability derives from the fact that individual and social knowledge is often tacit and therefore “sticky” to the person, team or larger firm possessing the knowledge. The two approaches disagree, however, on the fundamental role corporation and market play in facilitating such transfers. Whereas the capability approach regards the corporation as a social community that specializes in the creation and internal transfer of knowledge, transaction cost economics regards the

corporation as a governance form that supervises the process and safeguards the development and transfer of products and services (knowledge) against opportunistic behavior that otherwise may delay, disrupt and even destroy the process.

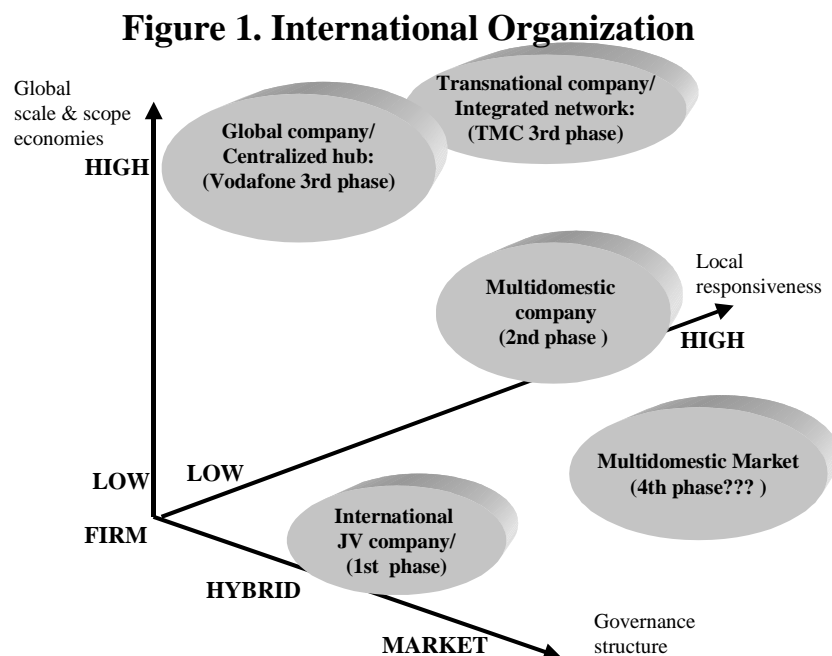
The key transfer question, however, is not whether the basic knowledge is sticky or technologically non-separable from the firm, but whether the practical use of such knowledge is contractually non-separable from the firm possessing it (Teece, 1982). Although the knowledge as such may be highly embedded in routines and social relations, and therefore technologically non-separable from the firm, its use in terms of applications and practical solutions can still be separable and sold under ordinary supply contracts (as in consulting). Whereas in service provision the practical use of productive knowledge must take place at the same time and in the same local market as consumption, the underlying basic knowledge that enables the development of such applications and solutions may still be accumulated and stored at some distant place. When, in this way, not only technological, but also contractual separation is possible, what is transferred is the output of knowledge (solutions), more than the knowledge itself. In particular, providing the derived knowledge service rather than transferring the basic knowledge may also turn out to be the most value-creating and cost-efficient way of using such knowledge unless the transaction costs of separation exceed the governance costs associated with knowledge transfer and subsequent implementation.

Taken together, both stronger *safeguards* and stronger *communities* may be needed when knowledge is difficult to transfer than when it is easy to transfer. In the firm-specific systemic case, individual knowledge pieces may become almost non-distinguishable from remaining complementary pieces and associated support capabilities. Interfaces will essentially be non-standard and closed and knowledge pieces and support capabilities will be interwoven into some kind of a firm-specific social community. In the early post-acquisition phase (our Telenor Mobile case below), for example, a fully integrated corporate social community still remains to be built between domestic and foreign firms, and the more remains to be built the more tacit, diffused, systemic and embedded the knowledge and the larger the original “social community” differences between domestic and newly acquired foreign firms.

In the opposite case, when knowledge elements are technically and socially separable both from each other and from the respective transfer capabilities, open interface standards will be said to regulate the respective relations. In practice, the separability and tradability of knowledge elements will change, and so will the organization of the subsequent development and utilization of these elements. By accepting standard open interfaces, lower-layer network operations may become separated from higher-layer application services, and upstream

production from downstream distribution and marketing. As technical separation increases contractual organization may gradually replace corporate organization for the respective functions and underlying knowledge.²

The following three-dimensional figure illustrates the above discussion, with Telenor Mobile and Vodafone exemplifying the different company structure as the industry evolves towards more advanced and mature stages. In the first phase, Vodafone and Telenor Mobile are the minority owners of local operators, playing the role of international “exporter” of financial capital and industry knowledge. As they gradually acquire majority and full ownership of their local affiliates in the second and third phase respectively, local mobile operators are gradually incorporated either into the global structure of Vodafone or into the transnational structure of Telenor Mobile. In the fourth and fully standardized phase, an increasing number of local operators are again spun-off into franchises or independent firms with a multidomestic market as final result. In this way, local responsiveness and global scale and scope economies can be achieved not only through fully vertically integrated corporations, but also through hybrid forms and market contracting.



² A similar, but less developed argument is proposed by Winter (1991: 192): “Evolutionary economics suggests that the concept of human assets specificity is central to understanding the functioning of the firm as a repository of knowledge. For understanding to progress, however, the idea of “specificity” must be refined and linked to the broader context in which quasi-rent to various sort of productive knowledge are determined.” In the telecom industry, the development of interface standards plays a decisive role in defining such quasi-rents.

Despite of the triviality of the above knowledge transaction logic, and despite the fact that it may just as well apply to repositories of knowledge (firms) as to individual pieces of knowledge (experts), it has pretty much been neglected by the capability approach whose very invention it was to describe the firm as a repository of knowledge.³ Whereas integrating the two perspectives is strongly rejected by convicted capability writers (Morgan and Ghoshal, 1996), more moderate writers recommend integration (Teece, 1982; Williamson, 1999a; Foss, 1999). In this paper we follow the latter advice and pursue the integration strategy.

After this introductory section, a combined governance-capability model will be developed in section 2 with a particular focus on the problems associated with knowledge transfer to partly owned subsidiaries in emerging markets. In section 3 this model is used to examine prospective consolidation of international mobile communication industry and the experiences made by one of its the international players, Telenor Mobile. Summary and discussion of the two perspectives end the paper in section 4.

³ In fact, knowledge considerations are often presented as different from transaction cost considerations in instances where similarities actually are more striking than differences, for example in Demsetz (1991: 173): “A single firm works a product into new, simple-to-use (on the basis of directions) products until the diversity of uses further downstream is so great as to require this firm, if it is to continue developing product lines, to bear greater costs of information acquisitions and maintenance than are avoided by potential users when there is additional simplification of each product line.” Whether greater costs are borne by the upstream than the by the downstream “repository” firm depend on whether simple-to-use solutions are offered as standard solutions to all potential downstream users or rather as customized solution to each individual user. Only in the latter customer-specific case would it be less transaction costly for the downstream firm to provide such solutions himself rather than relying on the upstream firm.

A COMBINED GOVERNANCE-CAPABILITY APPROACH

Industry background

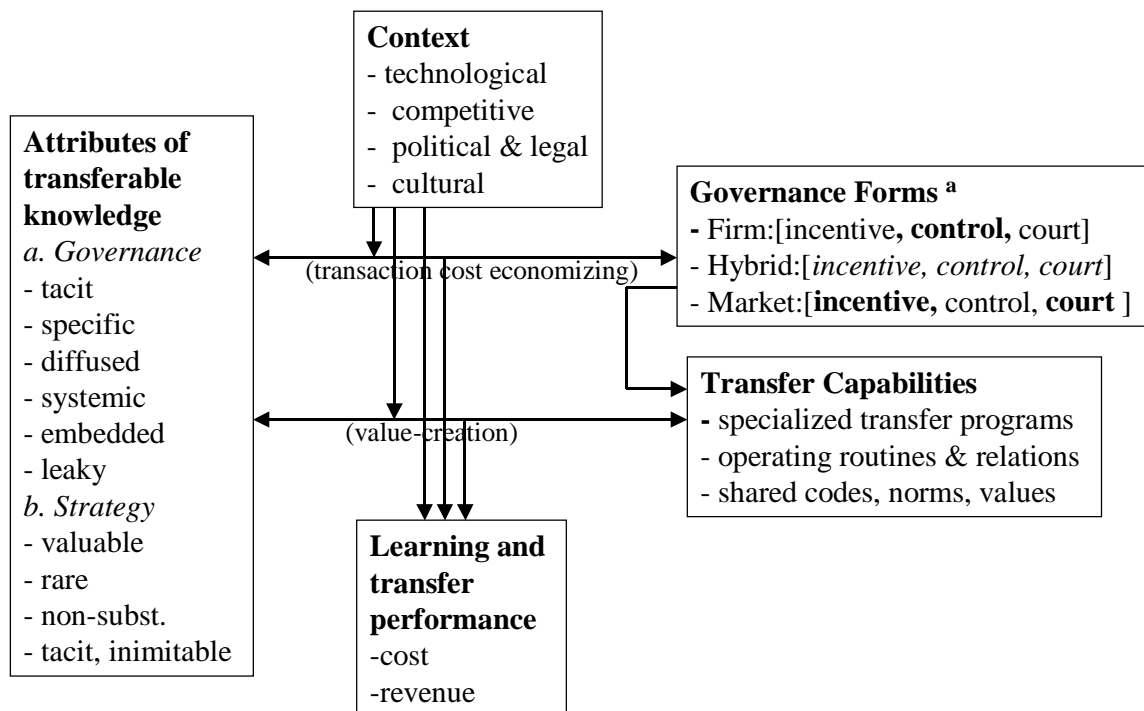
Towards the end of the 90s, leading European cellular operators considered expansion into foreign markets as their most favored business strategy. Having poured billions of euros into foreign portfolio companies holding attractive licenses, the next big challenge was to roll out high-quality cellular networks and upgrade local management and operating capabilities as quickly and efficiently as possible. This was essentially done by transmitting to foreign operations whatever leading best practice the mother company already possessed in various fields such as general management, business development, network operation, information technology, branding, marketing, and customer support. In particular, by transferring best domestic practice to mobile operations in foreign markets additional revenue could be attained at lowest possible incremental cost given that best domestic practice is also best foreign practice and that foreign operations possess the necessary capacity and organizational capabilities (skills, routines) to finalize the transfer and utilize the knowledge.

A Knowledge Transfer Model

Let us start on a more general level by assuming that multinational companies (MNCs) want to capture a larger share of potential profit from knowledge transfer to foreign affiliates and to minimize the associated transaction costs. Both governance mechanisms and organizational capabilities may contribute to this. To show how, a theoretical model is outlined below, combining transaction cost economics with the organizational capability perspective (Williamson, 1999a). Whereas value-creation potential (strategy part) can be expressed as a function of knowledge being superior, non-substitutable and inimitable to various degree (Barney, 1991), the transaction costs associated with knowledge transfer (governance part) can be expressed as a function of knowledge being specific, tacit, systemic, embedded and leaky (Williamson, 1981; Teece, 1980, 1982).

The model's core message is that certain knowledge attributes and local conditions will cause transfer problems that governance mechanisms and organizational capabilities may help to solve. The same mechanisms and capabilities may subsequently contribute to consolidation of industries where knowledge is the key source of competitive advantage that also generates

huge scale and scope economies. The model explains knowledge transfer and learning performance as the result of aligning transferable knowledge which vary in appropriable value and transfer cost on the one hand with organizational structure with vary in their capabilities and governance mechanisms on the other in a comparative transaction cost economizing and value creating way (see Figure 1.). Whereas value-creation is the primary function of the capability-knowledge alignment, transaction cost economizing is the primary function of the governance-knowledge alignment. Both alignments/approaches state that compatibility in capability and in governance respects will affect transfer and learning, and resultant profitability, but they differ in the relative weights they put on capability versus governance (incentives and controls), and in the way they conceptualize and define organizational mechanisms. Furthermore, both alignments are conditioned by the local context, including the technological level of the host country, the degree of local competition, and the political, legal and cultural environment.

Figure 2. A Combined Governance-Capability Model

^a bold/italics/normal=strong/semi-strong/weak when comparing firm, hybrid and market across incentive intensity, administrative control and court ordering respectively (Williamson, 1991)

Unit of analysis

The model's unit of analysis is the knowledge transaction by which we mean the package of knowledge transferred from the owner/supplier to the buyer/user who start applying it after having learnt how to do so. The knowledge may contain a mixture of information and know how, transmitted partly in written and symbolic form, partly through some kind of interactive learning process (apprenticeship, teaching, on-the-job training, simulation, etc.). Knowledge may also be transmitted in its derived form as customized solutions or user-friendly technology. In the simplest of cases, all relevant knowledge is contained in user-friendly technology, and users benefit from knowledge by buying the technology products without any additional learning or information transfer.

In its extended form, the transfer process would include both the initial selection/sourcing phase where possible knowledge suppliers are recognized and potential value of knowledge is revealed, and the subsequent transfer/utilization phase where selected knowledge is transferred and finally utilized for which a special consulting team may be needed when knowledge cannot be articulated. Our focus, however, will be on the subsequent transfer/utilization phase and the ex post transaction costs involved herein. The number of

people engaged in the transfer and subsequent utilization may vary from one or two in the early transfer phase to almost everybody in the later utilization phase, depending on how widely applicable the knowledge is.

Transfer performance

Transfer performance concerns both (i) the value created when knowledge is successfully transferred which may imply a minimum of learning effort by the user, and (ii) the transaction costs involved.⁴ Value is created when knowledge possessed by the suppliers is transferred and successfully applied by the customer, meaning that the customer's value from applying the knowledge at least exceeds the price paid for the knowledge including transaction costs. As there are serious ex ante and ex post transaction hazards involved in knowledge transfer that may cause unpleasant surprises and serious delays, particular safeguards are needed to accomplish the transfer in a timely fashion so that knowledge can be successfully applied as soon as possible. Transaction costs involve both the ex ante costs of drafting, negotiating and safeguarding an agreement and, more specifically, the ex post costs of maladaptation and adjustment that arise when contract execution is misaligned as a result of gaps, errors, omissions, and unanticipated disturbances (Williamson, 1996: 379). In particular, additional transfer capacity would be needed in terms of extra consulting support, management capacity and contractual safeguards when knowledge is not only tacit, but also widely diffused, specific to the supplier firm, highly interdependent, deeply embedded in operating routines and social relations, and potentially leaky so that both customers and competitors may receive additional knowledge without paying (as further outlined below).

Knowledge attributes

Superior (valuable and rare) knowledge may be considered proprietary and a potential source of added value to the degree it can be protected from being copied or imitated by other firms. Such protection may be said to exist to the degree respective knowledge is *specific* to the participating actors and rather useless to others (non-convertible), or to the degree it is *difficult* or *illegal* by patent law to transfer such knowledge to other users, despite otherwise being compatible and valuable to potential users.

⁴ Knowledge transfer varies with the amount of learning implied in searching for suitable solutions and turning these into productive use. Continuous learning on the supplier's side is a precondition for repeat transfers, whereas required learning effort among users is a function of how comprehensible the knowledge is in relation

Knowledge is difficult to transfer to the degree it is *tacit* in the sense of being difficult to articulate and codify (Polanyi, 1962; Kogut and Zander, 1992), *embedded* in idiosyncratic social contexts and *diffused* over a larger number of highly *systemic* (interdependent) team members (Nonaka, 1994). By serving as a protection against leakage, transfer difficulties will also improve the return on knowledge investment.⁵ On the other hand, knowledge attributes that serve as a protection against non-intentional transfer (leakage), will also serve as a protection against intentional transfer (utilization) and subsequent economies of scale and scope. Increasing transaction (transfer) costs will therefore be associated with such transfers.

Governance and Capabilities

The benchmark case on which we will be building our model is the classical outsourcing or consulting case where the client acquires a solution to his problem without buying the underlying basic knowledge from the firm possessing it (Ulset, 1996). When users benefit from superior knowledge by buying only the solution that solves the problem, transferring the more general knowledge would be needless unless such trading relations tend to undergo a fundamental transformation whereby the supplier accumulates superior knowledge and gradually develops a unilateral monopoly position towards his client (Williamson, 1985). To protect himself against possible power abuses from such monopoly suppliers or from leakage of knowledge to competing firms sharing the same supplier, the customer may want to buy exclusive user right to whatever knowledge that is developed by the supplier as part of the work outsourced to him.⁶ Since the duration and efficiency of such exclusivity clauses are

to the user's ability to comprehend. Without continuous learning on both sides, there will be no need for building permanent knowledge transfer mechanisms such as mHorizon.

⁵ Tacit knowledge (know how) is the opposite of explicit knowledge (know what) or information, defined as easily codified explicit knowledge that can be transmitted "without loss of integrity once the syntactical rules required for deciphering it are known. Information includes facts, axiomatic propositions, and symbols" (Kogut and Zander, 1992, p.386). Explicit knowledge can be extracted from the person who developed it, made independent of that person and reused for other purposes. Tacit knowledge involves know-how that is difficult to articulate and codify (Polanyi, 1962) and therefore "sticky" to the person and his team and their idiosyncratic context (von Hippel, 1994; Nonaka, 1994; Szulanski, 1996). On the organizational level, tacit knowledge consists of all the behavioral routines that link individuals together and facilitates communication, cooperation and therefore learning (Nelson and Winter, 1982). Transfer of tacit knowledge can only take place through some kind of social interaction (Nonaka and Takeuchi, 1995) or by transferring the knowledgeable people (Bresman and Birkinshaw, 1999).

⁶ The fact that knowledge supported by firm-specific capabilities will lose productive value if transferred to companies lacking such capabilities, does not mean that transaction cost economics with its assumption of opportunistic behavior become over-determined (Madhok, 1996). What matters is not the knowledge itself, neither the transfer of it, but rather the productive use of it, and if the user will suffer great losses when turning to another supplier lacking such support capabilities, users may be exploited by opportunistic monopoly suppliers controlling the right knowledge and the most relevant support capabilities.

usually limited, buying the knowledge will be difficult without also acquiring the supplier or transferring the personnel that developed it.

When controlling the innovative solutions is impossible without also transferring and employing the people that developed it, such transfer and employment may still have negative side effects. Whereas transferring only some of the people may split the creative team that produced the innovative solutions, buying the whole firm and turning the innovators into exclusive suppliers of their former customer may seriously weaken both their career opportunities and their incentives for developing subsequent innovations.

In general, when solutions can be separated from the knowledge, and the knowledge from the developers, specific solutions as well as general knowledge can be transferred, and vertically separated markets thus created, without damaging effects on productive relations and innovation incentives. As technology stabilizes and industry matures, tacit knowledge will gradually change into explicit, private knowledge into public knowledge and firm-specific routines and relations into standard interfaces. Consequently, the benefit of firm-like governance compared with contractual governance will also decline, and the former may gradually be replaced with the latter.

Local context

The possibility still exists, however, that the net benefit from transferring knowledge and best practice to a larger number of foreign markets turns negative due to extra transaction costs. Among the factors causing transaction costs our model includes the following: attributes of knowledge that make knowledge less transferable, insufficient organizational capabilities to carry out efficient knowledge transfer, restriction on the choice of governance form appropriate for knowledge transfer, and finally all the difficulties that derive from transferring knowledge to companies that operate under foreign conditions vastly different from the familiar domestic ones.

Organizational capabilities appropriate for knowledge transfer

Because it assumes negligent opportunism, the capability approach ignores transaction costs and focuses on production cost and the organizational mechanisms and capabilities that economize on bounded rationality in production respect (including knowledge transfer). Since knowledge is assumed to be the major production assets such economizing will be dealing with mechanisms and capabilities that promote learning and transfer of superior technology

and best practice so that knowledge explored is fully exploited and potentials for economies of scale and scope fully realized. Furthermore, by ignoring incentive problems and transaction costs only, those aspects of organizational mechanisms and capabilities that promote anti-opportunism (i.e.; trust) remain to be explored.⁷ These are mainly relational social assets that help interacting individuals to communicate, cooperate and learn in general and to facilitate knowledge transfer in particular.⁸ Gradually, as more specialized and complex transfer mechanisms are created and more tacit, specific, systemic and embedded knowledge transferred, a social community of shared values and beliefs may be created across subsidiaries (Kogut and Zander, 1992).⁹ In principle, any organizational mechanism that promotes knowledge transfer will also motivate investment in supportive social assets (transfer capabilities) that are common or shared among its interacting individuals. As indicated in the model, these include not only specialized transfer program, but also coordinative routines and personal social relations, besides common language, information codes, behavior norms and cultural values (see figure 1). Most of these transfer capabilities are relational social assets that evolve as a consequence of individuals interacting with one another, face-to-face, over an extensive period of time. In the early post-acquisition phase, social transfer capabilities will still be weak and sufficient only for easily transferable knowledge.¹⁰

For the sake of simplicity, transfer capabilities will be named strong when relational social assets are many and strong, and weak when they are few and weak. In particular, building strong corporate transfer capabilities will require multiple level social interactions between parent and subsidiary over and above the mechanical transference of technical know-how. Nonaka and Takeuchi (1995) use the notions of socialization and internalization 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. Under favorable corporate conditions, social assets

⁷ Note that because of the assumption of incentive compatibility and negligent opportunism, the problem of leakage of superior knowledge transferred to foreign subsidiaries is also assumed away.

⁸ Among specialized transfer capabilities we may count both knowledge support specialists that help users learn and implement best practice, and more general expatriate, seconding, training and personnel rotation programs (e.g.; sending out general managers and expertise to foreign operations; assigning subsidiary managers to corporate headquarters; participating in headquarters-based training programs; offering parent company mentors to foreign subsidiary managers).

⁹ Gupta and Govindarajan (2000:479) refer to this community as “interpersonal familiarity, personal affinity, and convergence in cognitive map between the interacting parties”

¹⁰ 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

may even develop into a stronger sense of collective identity that further facilitates transfer of tacit knowledge. When, for example, several subsidiaries carry out their own product development, and sources of innovation are correspondingly dispersed, the hierarchical relationship between headquarters and the subsidiary tend to be supplemented by a network of interacting and interdependent knowledge generating entities that operate according to a shared set of corporate norms and values, developed and maintained by top managers acting more as visionary leaders and community builders than as financial officers (Bartlett and Ghoshal, 1993).¹¹

The following proposition summarizes the reasoning above:

Proposition 1: *When knowledge is difficult to transfer due to being specific, tacit, diffused, systemic and embedded, transfer performance will be higher when transfer capabilities are strong than when they are weak.*¹²

Governance mechanisms appropriate for knowledge transfer

By assuming both bounded rationality and opportunistic behavior, the governance approach is prepared to consider any governance mechanism that may economize on bounded rationality and curb opportunism. In the model above these considerations are expressed as a transaction cost discriminating alignments between knowledge attributes and governance mechanisms. In the standard interface case, when relationship-specific knowledge is mostly lacking, additional corporate support capability and governance mechanisms are less needed. The respective knowledge-based services are transferred or sold without transferring the enabling knowledge. In a way the capability concept is included also here, not as part of governance, but as part of underlying productive assets and favorable trading atmosphere (Williamson, 1975).

developing mechanisms that facilitate social interaction that subsequently will facilitate business transactions and knowledge transfer.

¹¹ Bartlett and Ghoshal (1993) have labeled this organizational form the transnational, whereas Hedlund (1994) refers to it as the heterarchy. According to Hedlund (1994: 87): “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.” 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).

According to transaction cost economics, the need for corporate organization to safeguard against transaction hazards associated with transfer of “less-transferable” knowledge arises when opportunistic and boundedly rational actors carry out such transactions, especially if surrounded by insufficient contract laws and corrupt enforcement agencies.¹³ All these aspects of “less-transferable” knowledge are in some way related to the cost of redeploying or transferring the knowledge. Tacit knowledge is sticky to the person and difficult to transfer unless transferring also the person possessing the knowledge; firm-specific knowledge is simply tailor-made to the original firm and will not work in a different firm unless converted into non-specific knowledge or retailored to fit the unique attributes of the hosting firm; diffused knowledge is difficult to collect and assemble into transferable packages; systemic knowledge is dependent on complementary knowledge pieces and will not work unless transferred as an integrated knowledge system; socially embedded knowledge resides in the routines and social relations linking individual skills and will not work unless transferred as an integrated social system.

When combined with opportunistic behavior, transferring already difficult-to-transfer knowledge may cause further escalation of transaction costs. In particular, when knowledge is difficult to articulate so that supplier’s specialists must assist the user in learning and applying the knowledge (i.e.; tacit knowledge), a series of unexpected knowledge-related problems concerning quality, relevance and application may cause unpleasant surprises and conflicts that are harder to solve under contractual relations than under corporate relations. This is even more so to the degree highly interdependent specialists are used to solve firm-specific system problems (i.e.; firm-specific systemic knowledge). In this case individual pieces of larger knowledge systems can only be transferred at a loss of productive value unless the other complementary pieces are also transmitted along with the individual experts possessing the knowledge plus all the firm-specific operating routines and social relations linking individual experts and knowledge pieces into workable systems. Due to the non-transferability of administrative routines and social relations, embedded knowledge cannot be transferred unless transferring the individuals practicing the routines and possessing the social relations,

¹² Stronger transfer capabilities are also the main explanation why intra-firm knowledge transfer will outperform inter-firm transfer in these instances.

¹³ According to transaction cost economics, firms are characterized by stronger administrative controls, weaker incentives and less legalistic conflict resolution (i.e.; less use of classical contract law) than market contracting, whereas hybrid contracting consists of all the intermediate solutions between market and firm (Williamson, 1991). The efficiency of firm governance over hybrid and market contracting depends on factors causing transaction costs such as (i) attributes of the transacting parties (e.g.; rationality, opportunism), (ii) attributes of the transaction (e.g.; complexity/uncertainty, underlying non-redeployable assets) and (iii) attributes of the institutional environment (e.g.; contract laws, legal enforcement standard).

which often require investing in extra sets of transferable key personnel (potential expatriates).

Besides, when knowledge is easy to imitate or copy so that customers buying specific solutions also learn about the underlying knowledge, customers may be tempted to apply acquired knowledge in competing businesses or resell it to third parties without compensating the supplier (leaky knowledge). Copying may be considered illegal if patent rights protect technology.¹⁴ Although it will be rather difficult to transfer to new users knowledge that is tacit, diffused, specific, systemic, embedded, and potentially leaky without suffering some of the associated transaction costs (frictions and leakage), these difficulties will normally be harder and more costly to solve when knowledge is transferred to external customers than to internal users.

Whereas simple contracting will be the least-cost solution to knowledge transfer when investment in non-redeployable assets is negligent, more hierarchical contracting is the least-cost solution when investment in non-redeployable assets is significant because of the respective control and incentive mechanisms being more suitable for correcting deviant behavior and transfer output, and for controlling opportunism and thereby preserving the transfer relation. Although firm-specific knowledge will initially be more supplier-specific than customer-specific, the knowledge being developed from repeat transfers of customized solutions may increasingly be infused with more relationship-specific content. In case of even larger investments in non-redeployable assets, or in case of large potential losses from knowledge leakage, contractual based collaboration will no longer suffice, and should consequently be replaced with a fully integrated corporation.

In short, corporate transfer should be preferred to hybrid and market transfer when knowledge is difficult to transfer due to being tacit, diffused, firm-specific, systemic, embedded and leaky because the corporate hierarchy offers higher capacity for information disclosure, conflict resolution and leakage protection than the other two. Since higher capacity for information disclosure is needed when knowledge is tacit than when it is explicit, since higher management capacity for conflict resolutions is needed when tacit knowledge is also diffused, firm-specific, systemic and embedded, and since added protection is needed when knowledge is leaky, corporate transfer is preferred to contractual or collaborate transfer in these instances.

¹⁴ Such rights have two different functions. It may protect the technology from leaking out to competitors or other companies, and it may facilitate trading by making it possible to sell or license out the user right to one or several other users on exclusive or non-exclusive terms.

Conversely, to the degree tacit knowledge can be made tradable by converting it into explicit and legally protected information or technology, the market should normally appear as a more efficient governance form than the integrated corporation. Similarly, when previously non-redeployable resources later are transformed into redeployable ones, corporation will normally constitute a too complex, costly and protective governance form and should consequently be replaced by a simpler and less protective contractual one. Should the innovation rate slow down and technology stabilize, tacit knowledge may gradually convert into explicit knowledge, tradable information and user-friendly technology. As long as product technology is not completely self-instructive and the accompanying user-guide still insufficient, additional customer service and user training will be offered with the transfer of the physical products, also to external customers. When technical interfaces connecting different components become completely explicit, open and standardized, corporate management tend to be out-competed by more efficient market contracting like in the computer, automobile, and oil & gas industry. In these industries development and production tasks are increasingly being outsourced to competing independent part and sub-system suppliers who specialize in the further development and production of these parts and systems, and in marketing and selling these to downstream final assembly or system firms. As a consequence, firms should be replaced with markets as the underlying technologies mature and develop into more stable and standardized forms.

The following propositions summarize the above discussion:

Proposition 2: *When knowledge is difficult to transfer due to being specific, tacit, diffused, systemic, embedded or leaky, transfer performance will be higher under corporate governance than under non-corporate governance.*

Proposition 3: *When knowledge is transferred as explicit solutions, transfer performance will be higher when these solutions are provided by external competing suppliers rather than by internal non-competing suppliers.*

Governance-Capability Symbiosis

It is evident from the above discussion that transfer capability is rather complex concept that needs further specifications and clarification. Transfer capabilities consist partly of (i) specialized transfer personnel and programs, partly of (ii) operating routines, relations, codes

norms and values guiding the behavior of such personnel and programs. These defining characteristics correspond to (i) transaction-specific assets and (ii) various control mechanisms in transaction cost economics respectively (Williamson, 1999a, 1999b). As such, the capability approach to knowledge transfer seems ripe for a symbiosis with the governance approach. Transfer capabilities are simply one special kind of firm-specific support for one particular kind of transaction, namely the transaction of less-tradable knowledge (i.e.; knowledge being tacit, diffused, specific, systemic, embedded, and/or leaky, as outlined in the propositions above). Transfer capabilities could then be added to the list of other durable, valuable and firm-specific assets that attain its firm-specific status though some kind of fundamental transformation, more efficiently carried out though corporate organization than through market and hybrid contracting. The firm would then simply internalize knowledge transactions for which firm-specific transfer capabilities would be highly productive, and for which firm provides a more efficient and productive governance structure than market or hybrid contracting. In addition, unfavorable external trading conditions (e.g.; foreign subsidiaries in emerging markets) will increase the value of firm governance and firm-specific transfer capabilities over similar, but simpler market and hybrid arrangements, as pointed out in more general terms by Williamson (1991).¹⁵

Given that a suitable knowledge transfer program is established, final transfer results will depend on how governance structures are aligned with knowledge attributes. A promise by headquarters to reward knowledge-sharing subsidiaries with a larger share of profit and to intervene only when mutual gain is to be expected, may easily be reneged and is therefore less trustworthy. In fact, a decision to intervene with specific adoption and sharing requirements can be exercised both for good cause (to support expected net gains) and for bad cause (to support the subgoal of the intervenor) (Williamson, 1996: 150-151). Refraining from full ownership and full decision-making power constitutes in these instances a sort of credible commitment to intervene only for good cause (Williamson, 1983). That is, a promise by principal to intervene only when mutual gains are in prospect will be regarded as more credible when principal is part owner than when he is full owner because the part owner must rely more on persuasive arguments and less on formal decision-making power than the full owner.

¹⁵ In our conceptualization, hierarchical and relational governance are partly substitutes, partly complements (Poppo and Zenger, 2002). They are substitutes in the sense that one alternative is more efficient than the other under given conditions, and complements in the sense that corporate structure are the framework under which relational governance develop.

Consequently, a policy prescribing high-powered incentives and full delegation of responsibility to stimulate local innovation and growth tends to be more frequently compromised and more severely mitigated under corporate governance of wholly owned subsidiaries than under hybrid governance of partly owned subsidiaries. The negative innovation effect of this incentive weakening depends on the localization of the associated knowledge sources. To the degree these are not centralized, but spread among local operations in different countries, the incentive effects are likely to become negative. Although the immediate effect of organizing streams of dispersed local innovations through a larger transnational enterprise are positive, the long-term effects may still become negative. If sources of innovation are centrally located, however, the incentive effect of corporate governance are likely to be more positive, causing transnationals such as Telenor Mobile to become more centralized in the later consolidation phase than in the early post-acquisition phase

The following two propositions summarize the above discussion:

Proposition 4: *To the degree knowledge is difficult to transfer corporate governance and transfer capability will have a positive interaction effect on knowledge transfer performance.*

Proposition 5: *When private knowledge sources are concentrated and centralized, knowledge transfer performance will be higher when knowledge is transferred to wholly owned affiliates than when transferred to partly owned affiliates.*

Local context

Not only attributes of the transaction and its transacting parties, but also environmental conditions will affect transaction costs, including various cultural, political and legal conditions. That is, transaction costs will be caused both by (i) inter-firm differences in external culture, politics and legal systems increasing the need for extra translation, conversion or adaptation, and by (ii) specific features that affects the general level of transaction costs such as cultural distance, corruption and judicial weakness. Until quite recently, expanding into less developed, but emerging market was considered an attractive strategy due to lower mobile penetration and correspondingly higher growth potentials than in more advanced and saturated Western markets. Besides, in less developed markets local expertise and capacity for network operations and support services were often scarce or completely missing, causing foreign companies to accept larger corporate responsibility for investment in local infrastructure, knowledge building and market development. In short, the level of investment and corporate responsibilities are higher in these markets, but so are also growth and profit potentials given that the judicial system can provide sufficient protection against unfair competition, expropriation, bribery and corruption.

Also cultural distance may affect knowledge transfer. Even when employing a common business language has reduced linguistic difficulties, 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 judgment and knowledge formed through interaction with customers – and by personal bodily experience rather than by ‘objective,’ scientific conceptualization.” This represents a fundamentally different epistemological tradition to that of the West and contributes to causal ambiguity. 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.” Similar effects may occur within integrated MNCs. 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 the meantime, however, cultural distance may affect knowledge transfer negatively.

The following propositions summarize the above reasoning:

Proposition 6: *Contractual knowledge transfer will be relatively more efficient and corporate knowledge transfer relatively less efficient in foreign mobile telecom markets that are relatively highly developed and where cultural distance is relatively small, regulation standard is relatively high, and corruption level relatively low.*

Proposition 7: *When knowledge is difficult to transfer due to being specific, tacit, diffused, systemic, embedded and leaky, transfer performance will be higher when cultural distance is small, regulation standard is high, and corruption level is low.*

EXPERIENCES FROM MOBILE COMMUNICATION SERVICES

According to our model, as industries mature in relatively advanced markets, and as the respective industrial knowledge become increasingly less tacit, less diffused, less firm-specific, less systemic, and less embedded, and therefore easier to transfer, higher-performing contractual knowledge transfer will replace lower-performing corporate knowledge transfer. As a consequence, fragmentation rather than consolidation will result. More exact operationalization and testing of this and the other propositions derived from our model must wait until the second phase of this project. Here simple observations about knowledge transfer in the international mobile communication industry combined with information about one case firm (Telenor Mobile) must suffice, providing at least some indications as to the usefulness of our model.

Status and trends

In telecom in general and mobile telecom in particular, digitization and computerization of network facilities and service applications exemplify perfectly well the conversion from tacit to explicit knowledge. Such digitization and computerization represent at the same time the most crucial factor affecting the transferability of knowledge and thereby also the need for different knowledge transfer modes. Most important for our purpose, open digitized standards provide the technical conditions for applying the contracting solution in our model (Spiller and Zelner, 1997). That is, intelligent devices and service applications rather than intelligent humans increasingly carry out network operation, management and control. Such devices and applications are mostly built on open technology standards, and further upgraded, mass produced and supported by outside suppliers such as equipment producers, software specialists and data services firms.

Furthermore, not only lower-layer network infrastructure, but also higher-layer network management functions and customer support services are increasingly digitized, computerized and carried out by software programs rather than by humans alone. As a consequence, network management and customer support are increasingly converted into software programs and supplied by software firms and consulting companies in partial competition with the transfer units of multinational mobile operators. That is, consulting firms do not only provide customized solutions, but may also discover presumably best practice among their clients, convert it into explicit knowledge, and resell it as high-priced customized solutions to

competing clients. Also equipment suppliers are regularly asked by leading mobile operators to develop service applications according to the client's own specifications that subsequently may be sold to competing customers.

In the longer run we thus expect corporate transfer to be outcompeted by contractual transfer for easily transferable knowledge, whereas the opposite is expected to hold for less transferable knowledge. Consequently, the knowledge successfully transferred by consulting firm and equipment suppliers will tend to be less tacit, less diffused, less specific, less systemic and less embedded than the knowledge transmitted by the transfer units of multinational mobile operators. The underlying basic knowledge may even become less leaky when applied by professional consulting firms than when applied by similar experts in multinationals client firms because the knowledge protection apparatus of professional consulting firms will be more highly developed than those of their multinational clients. After all, the primary business of multinational mobile operators is not knowledge transfer, but mobile service provision.

In more general terms, the more the knowledge is embedded in technological rather than social systems, and the more the technological systems are built on open rather than closed platform standards, the less tacit, diffused, firm-specific and socially embedded the respective system knowledge, and the more the use of contractual and the less the use of corporate transfer. For example, knowledge about efficient construction, operation and maintenance of standardized cellular networks (physical technology) will probably be less tacit, diffused, firm-specific and socially embedded than knowledge about local best business practice in management, branding, customer service, content provision etc. (social technology). Accordingly we should expect more use of corporate and less use of market transfer mode for less standardized technology (e.g.; higher-layer service applications) than for highly standardized technology (e.g., lower-layer basic cellular networks), and also more for local business practice than for network infrastructure and information technology, at least within the same cultural setting.¹⁶

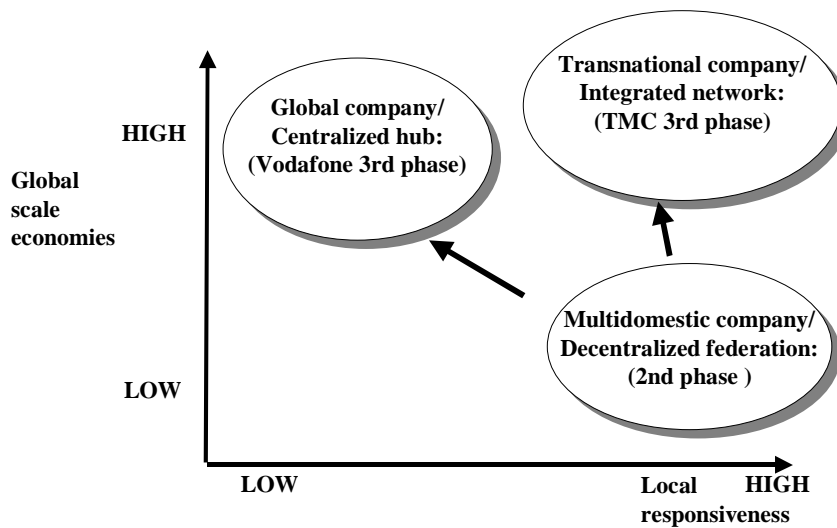
¹⁶ Frequent press releases from leading network suppliers illustrate this perfectly well, such as the following from Ericsson, under the headline **Ericsson to power Vodafone live! in Egypt** (Thursday, January 30, 2003): "We are delighted with the level of commitment and partnership the local Ericsson team has demonstrated in preparation for launching Vodafone live! in April this year", said Thomas Poland, Vodafone Egypt Chief Technical Officer. "Ericsson has shown clear understanding of our business by working together to meet our aggressive rollout plan." ...Ericsson is the clear leader in MMS with 47 commercial MMS agreements and more than 90 trials at customer sites and through Mobility World. It has 40% of all MMS contracts with over 50% of subscribers worldwide. Ericsson has been awarded MMS contracts in all major markets.

As the industry matures, not only will the use of contractual governance increase, fragmentation rather than global consolidation will result.¹⁷ In particular, large multinational operators such as Vodafone will have little to offer their foreign subsidiaries that smaller multinationals such as Telenor Mobile of Norway or national operators such as Radiolinja of Finland cannot provide on their own or through contracting and partnering with others. Paradoxically, this may also apply to the multinationals' main function of building and operating global seamless mobile networks, which increasingly are being organized through collective and contractual arrangements rather than through multinational corporations, similar to the traditional organization of international telephony and international data traffic over the Internet. Lacking any unique and significant source of competitive advantage, multinational giants such as Vodafone may gradually be forced to divest their foreign mobile operations. Fragmentation, not consolidation, may result.

Arguments supporting Corporate Governance and Consolidation

The case for global consolidation assumes, on the other hand, that as national mobile operators are increasingly being exposed to competition, globally applicable unique technology and competencies will be decisive. While national operators may possess several of these assets, large multinational operators would be needed to fully exploit their respective scale and governance economies. Scale advantages will usually result in equipment makers awarding their *larger wireless operator customers* with higher supply priority and larger quantity discounts than their smaller operator customers. Governance advantages are associated with *more efficient controls and incentives* when foreign mobile operators are subsidiaries of the same corporation than when these are only franchisees or business partners and thereby also potential competitors. Expected effects are more efficient monitoring and transfer of best practice among subsidiaries of multinational mobile operators as well as construction of more highly interoperable (seamless) global networks and service platforms. Since different technology standards are currently at work in different parts of the world, and since conversion software and multi-band handsets that cover all standards either are extremely costly or currently unavailable, highly interoperable national networks will not emerge by themselves under the invisible hand of the international market, only under the visible hand of multinational corporations. Increasing consolidation may result (see figure 3.).

¹⁷ Two and a half years ago Orange's financial director, Richard Moat, predicted the rapid consolidation of European mobile telecommunications market. "Within a matter of a few years the market would be dominated

Figure 3. Consolidation

The knowledge-leveraging motive is, however, not the only explanation for acquiring foreign mobile operations, not even the most important one. To understand why, we have to go back to the booming telecom years of the late 90s where leading mobile operators, Telenor Mobile included, spent billions of dollars worth of money in acquiring foreign mobile operators.¹⁸ Although substantial financial risk would normally be associated with such an ambitious acquisition strategy, top management was not then overly concerned. The prevailing economic prospects were simply too bright. Driven by increasing competition from domestic and foreign operators and supported with enormous flows of free cash, bonds and equity, a booming telecom stock market, endless growth expectation, rapidly converging telecom, computer and media markets, and a new-won freedom to invest, incumbents were left with only one option: diversify and expand. And so they did, especially in the mobile telecom sector where the golden future of mobile Internet created skyrocketing prices on mobile networks and radio licenses.

Highly inflated prices, however, did not stop mobile operators from continuing their large-scale investment program at home and abroad. Then by March 2000 mobile stock prices started to fall and the virtuous circle turned vicious. Heavy debt burdens, large accumulated deficits and growing equity scarcity made the future of foreign operations less gloomy and the prospects of mobile operators significantly worse. Thus, the dominant motivation for the

by two or three operators, one of which would be Orange.” – Apparently, this did not happen.

¹⁸ After a series of acquisitions during the late 90s and a couple of recent divestitures TELENOR MOBILE is today part owner in 13 foreign mobile operations and full owner of one (Pannon of Hungary).

investment frenzy in the late 90s was hardly the expected gain from replicating their domestic knowledge advantage in foreign markets, but rather the expected gain from investing into exceptionally promising growth markets.¹⁹

Nevertheless, having once acquired such a vast portfolio of (increasingly) deflated foreign operations, every effort should now be made to turn local operations into profitable businesses, such as searching for best practice and leading technology and transferring these to the rest of the company. This has also been Telenor Mobile's main strategy for the last couple of years along with consolidating their portfolio by increasing ownership shares in affiliates where this is possible, while selling out the rest.

Table 1 provides an overview of Telenor Mobile's international investment portfolio at the end of their acquisition phase (end of 1999). Four points should be noted in particular. First, with the exception of Sonofon in Denmark and Pannon in Hungary, Telenor Mobile was 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 were low indicating growth potential, but also a lack of local expertise. Fourth, the majority of its investments were in developing countries.

¹⁹ After the acquisition spree in the late 90s, the main challenge now facing international mobile operators such as TELENOR MOBILE is (a) to adjust and consolidate their subsidiary portfolio and (b) to design a management system appropriate for further development and operation of fully incorporated subsidiaries.

Table 1. Telenor Mobile's Foreign Direct Investment

(Source: Telenor Prospectus, 03.12.2000)

Company	Market	Mobile Telephony Penetration by Market Sept. 30, 2000	Date of Commencement of Operations(1)	Date of Initial Telenor Investment	Telenor's Investment(2) Sept. 30, 2000 (NOK in millions)	Telenor's Ownership Interest Sept. 30, 2000	Telenor's Share of Profit after Tax(3) Year ended Dec. 31, 1999
Nordic Region							
Sonofon	Denmark	62.9%	July 1992	2000	14,801	53.5%	—
Western Europe							
Esat Digifone	Ireland	56.8%	March 1997	1995	958	49.5%	(93.5)
Viag Interkom	Germany	49.5%	October 1998	1997	11,011	10.0%	(540.6)
Connect Austria	Austria	70.7%	October 1998	1997	1,208	17.5%	(254.8)
Central & Eastern							
Europe							
Cosmote....	Greece	51.5%	April 1998	1997	417(4)	18.0%(4)	38.8
Pannon GSM	Hungary	24.7%	March 1994	1994	673(5)	25.8%	109.9
ProMonte	Montenegro	13.6%	July 1996	1997	62	4 0.1%(6)	(24.7)(6)
Russia/Ukraine							
VimpelCom	Moscow and nearby counties	10.1%(7)	June 1994	1999	1,678	30.4%(8)	(88.7)
Kyivstar....	Ukraine	1.0%	October 1997	1998	475	35.0%	(25.1)
Extel GSM	Kaliningrad	1.3%(7)	April 1998	1997	97	49.0%	(17.5)
Stavtelesot....	Stavropol	1.1%(7)	December 1997	1997	129	49.0%	(34.9)
North-West GSM	St. Petersburg	4.2%(7)	December 1994	1994	15	12.7%	—(9)
Southeast Asia							
TAC/UCOM	Thailand	5.2%	September 1991	2000	6,370	39.8%(10)	—
DiGi.com	Malaysia	21.5%	May 1995	1999	2,268	32.9%	—(11)
Grameen Phone....	Bangladesh	0.2%	March 1997	1997	254	46.4%	(49.1)

- (1) Date company commenced operations to provide commercial mobile services.
- (2) Includes capital contributions, loans and other advances.
- (3) Excluding amortization of excess values/goodwill.
- (4) Ownership share as of November 6, 2000.
- (5) Investment includes both Telenor's direct investment in Pannon GSM and indirect investment through its 100% owned subsidiary, Telenor Hungary.
- (6) European Telecom owns 91.1% of ProMonte and Telenor owns 44% of European Telecom.
- (7) Based on company estimates.
- (8) Ownership interest on a fully diluted basis after the completion of the convertible bond and ADS issuance in July 2000.
- (9) Results not consolidated. Telenor uses the "cost method" under Norwegian GAAP if Telenor's interest is usually less than a 20% interest.
- (10) Investment includes Telenor's direct ownership of 29.5% and Telenor's indirect interest held through Telenor's 24.9% shareholding in UCOM.
- (11) Results included using the equity method as of January 1, 2000.

The table also clearly shows that the return on investment in new mobile start-ups located in emerging markets with low penetration will be negative for several years after the operation has started. These are also the markets with the largest growth potentials given services can be offered at prices that most people can afford. Since prices may still be regarded as too high for most people in these low-income markets, a profitable return may require localization in large population centers with a larger absolute number of potential customers (still a small percentage of total population). Then, early entry and fast network roll-out may be developed into a competitive advantage, particularly if combined with launching of popular value-added services that stimulate further consumption and growth in local business.

Lacking the financial muscles as Vodafone, Telenor Mobile believed they had more to gain by expanding into emerging and less saturated markets such as parts of Eastern Europe and Far East than into highly developed, competitive and preliminary saturated markets like those in Western Europe. Two of their European subsidiaries were consequently sold returning a windfall profit several times the invested amount. By investing in the remaining affiliates and transferring to these whatever best practice Telenor Mobile may possess, value may be created that eventually will turn also remaining operations into profitable businesses.

In Telenor Mobile selection and transfer of tacit and diffused private technology and knowledge, appropriate to foreign subsidiaries were at the beginning of the consolidation phase organized through mHorizon. The unit was organized as a matrix, consisting of five company value teams supervising five groups of partly owned subsidiaries, and four skill teams with the responsibility of acquiring, developing, formalizing, transferring and implementing leading technology and best practice in the following fields: business development, marketing, network infrastructure and IT-systems. Selected technology and know how were partly transferred through formalized tools, models and programs, partly by providing own consultants to assist in diagnosing, problem solving, adaptation and implementation, partly by seconding key administrative and technical personnel for a longer period if needed, especially in the build-up phase or in major turnaround processes. When the mission was accomplished, most of the seconded personnel would return to their Norwegian base company until needed next time at some other location.

As selected solutions were discovered and successfully applied, these could later be standardized and transferred as “best practice” to other Telenor Mobile subsidiaries in remaining countries. In this way private knowledge were developed, transferred and utilized by many other affiliates. To handle such a geographically distributed system of specialized knowledge creation and diffusion, a more complex knowledge management network of

interactive web pages and workshops were designed and applied, in addition to the traditional consulting and seconding arrangements. As critical knowledge continues to develop, foreign affiliates that succeed in developing specialized and superior knowledge could even be granted a center of excellence status with corporate responsibility for the further development and diffusion of specialized knowledge. Although Telenor Mobile's own solutions and expertise have natural first priority, external solutions and expertise would be selected and transferred when internal ones were insufficient or missing. When external suppliers offered only marginally lower price or higher quality, internal suppliers might still be chosen because of less expected frictions in the subsequent transfer and implementation phase for internal than for external supplies.

Besides, knowledge input from Telenor Mobile was only one out of several competing alternatives for most affiliates. Other "knowledge networks" were also accessible, organized by other major owners, or by major supplier or customers, acting as "flagship firms" for the local market, the region or larger part of the worldwide industry (Rugman and D'Cruz, 2000). Whereas freely available external network technology and business knowledge will not by itself contribute to competitive advantage, the specialized capability that develops from systematic and recurrent exploitation and combination of external and internal knowledge may become one. Increasingly, and quite similar to supply-chain management in non-service industries, knowledge transfer mechanisms along with supportive transfer capabilities are developed in Telenor Mobile at home and abroad for external as well as internal transfer.

Since knowledge transfer to minority-owned subsidiaries represented a hybrid solution, achieving high performance in transferring tacit knowledge would be difficult unless the transfer capability of the subsidiary was strengthened with a larger group of motivated and highly competent expatriate managers and operating specialists. This was typically the solution chosen for the build-up phase and major turnarounds. Alternatively, more explicit knowledge related to network construction and IT-systems implementation could be transferred before proceeding to the more tacit, diffused, site-specific and socially embedded knowledge fields, such as local business development and local distribution and marketing. In local business development, closer partnership with well-established national companies would be necessary for further expansion into national markets, thus reducing the need for foreign knowledge transfer also here. In Russia, therefore, Telenor and its partly owned Russian subsidiary VimpelCom formed a new strategic partnership with Eco Telecom (part of the Alfa Group of companies in Russia) to accelerate the planned regional expansion of VimpelCom's mobile operation in Russia. According to Tormod Hermansen, previous Chief

Executive Officer of Telenor: *"The growth potential in Russia is very strong with a population of 145 million people and yet only 3.4 million cellular subscribers nationwide. VimpelCom is well positioned to strengthen its role as a leading national mobile operator in Russia by combining Telenor's expertise in telecommunications with Alfa's established record of developing businesses in Russia."* ²⁰

After best local practice had been discovered, explicated and transferred, successful local implementation could still be obstructed by a series of unfavorable local conditions. Telenor Mobile was normally only one of several owners, and Telenor Mobile's representatives counted only a handful of consultants and expatriate managers and specialists in each of their foreign affiliates. To achieve successful local utilization, other local managers and specialists also had to contribute in a productive and mutually supportive way. This did not always happen due to insufficient local knowledge or even insufficient motivation. In minority-owned subsidiaries Telenor Mobile most often had to leave the positions as chief executive officer and president to other shareholders. While some owners represented businesses that were neutral or complementary to Telenor Mobile, others would be representing competing international mobile operators, or potentially competing local ones. As a consequence of weaker representation, insufficient local competence or conflicting interests, recommended solutions were often ignored, sabotaged or leaked to competing firms.

Besides, in many emerging markets, personal relations with public authorities as well as with private business partners were (and still is) crucial. Bribery and corruption may often determine the allocation of licenses more than competitive performance in terms of quality and price. Majority ownership that gives Telenor Mobile more influence will also provide the company with a better opportunity for avoiding at least some of the negative effects associated with these conditions. Consequently, increasing their ownership share and thereby their strategic control over selected local operations has been Telenor Mobile's main strategy the last couple of years.

²⁰ Eco Telecom will acquire strategic stakes in VimpelCom and its wholly-owned subsidiary, VimpelCom-Region, for a total of USD 220 million. Telenor will maintain its strategic voting stake of 25 percent plus one vote in VimpelCom through share purchases of USD 24,7 mill. The Alfa Group of Companies was established in Russia in 1988 and has evolved today into one of Russia's largest financial industrial groups. Alfa Group is active in the banking, insurance, asset management, oil & gas, real estate and retailing sectors. Alfa Eco is the group's trading and industrial arm with interest oil, metals, mining, and wholesale. Alfa Bank is one of the largest privately-owned banks in Russia in terms of assets with an extensive nationwide branch network of 51 branches in 26 regions throughout Russia and 4 international branches. Alfa Bank recently acquired a strategic stake in Golden Telecom (NASDAQ: GLDN), a provider of integrated telecommunications services throughout Russia and other countries of the Commonwealth Independent States (see Telenor presse@telenor.com, Wed, 30 May 2001 15:01:08).

Arguments supporting Contractual Governance and Fragmentation

So far, the above *scale* and *corporate governance* advantages have not caused radical consolidation in local markets, and may not do it in the nearest future. Not only will there be significant additional costs associated with organizing multinational wireless operators. Some of the above scale advantages may turn out to be smaller than originally envisioned, whereas others can be achieved at lower costs through simpler contractual arrangements. In particular, smaller national operators may to some extent compensate for the lack of most-favored customer status, larger quantity discounts and more advanced network capacities and operating capabilities. This can be done partly by renting advanced network capacity from other network operators, partly by collaborating with a group of advanced multinational equipment makers, IT-specialists and consulting firms having leading network operators as their customers. Indeed, local mobile operators may often obtain faster and more reliable information about leading technology and best practice from the market of multinational suppliers than from their own multinational parent company, having fewer and less advanced subsidiaries to work for and learn from.

Recent initiatives may indicate that the advantage that subsidiaries of giant operators such as Orange, T-Mobile and Vodafone may have over national operators and subsidiaries of smaller multinationals such as Telenor are smaller than originally envisioned (Vodafone being more than ten times the size of Telenor Mobile in numbers of consolidated subscribers). First, Vodafone along with several other operators and suppliers, are voluntarily contributing to international standardization through joint efforts such as "Open Mobile Architecture", thus supplementing the work of industry bodies such as UMTS Forum and GSM Association and official standardization bodies such as 3GPP and ETSI. As a consequence, technical features that otherwise could have served as basis for differentiation and competition, will gradually vanish. The growing influence from pro-competitive national regulations in terms of unbundling and leasing requirements will furthermore diminish the difference in competitive strength between multinational giants and national network operators.

Second, it is increasingly possible for national operators to access private global networks, services and brands through partnership such as "Vodafone Partner Agreement" or through international alliances such as the one between Telefónica Móviles, T-Mobile International and TIM (Telecom Italia Mobile) rather than through subsidiary membership in Vodafone or

similar multinational mobile wireless operators.²¹ Recent proposals for the financing and operation of third generation (3G) wireless networks indicate the same. Essential facilities such as masts, ditches, cables, base stations and radio frequencies may be jointly owned and operated by one or two operators, but rented out to as many facilities-less operators and service providers as possible to minimize service unit costs. Especially in the more highly developed markets such as in the Scandinavian and UK markets (Ulset, 2002), network capacity is increasingly being resold and radio access rented out to competing service providers. The latter operators and providers will be competing on the basis of the remaining non-essential facilities, with a special focus on advanced service applications and smart cards inside mobile phones (so-called SIM cards). At the same time, equipment suppliers and service firms increasingly perform network construction, upgrading, operation service and maintenance.²² Increasingly, therefore, basic network operation and capacity wholesale are developing into a commodity business, separated from downstream retailers that carry out subscription sales, branding, marketing, billing and customer support. These contractual arrangements may contribute to reducing the costs of building and operating the enormously expensive 3G mobile networks by as much as 40%. As soon as the first couple of players achieve this, the remaining ones have nothing else to do but to adopt the same contractual practice.

Third, it is far from obvious that multinational network operators will emerge as more natural owners of the “mobile” brand than national network operators or portal operators to the Internet. On the contrary, the most popular brand is “Nokia”, and the start page of your new mobile phone can be owned and supplied by any Internet portal operator. The greatest potential for differentiation lies probably in the delivery of content services, but the most attractive of these will probably have a local rather than a global flavor. Extra profits will consequently be derived more from local responsiveness than from global coordination. Neither do exclusive content distribution agreements appear to be particularly attractive as long as multinational operators are seldom dominant operators in local markets.

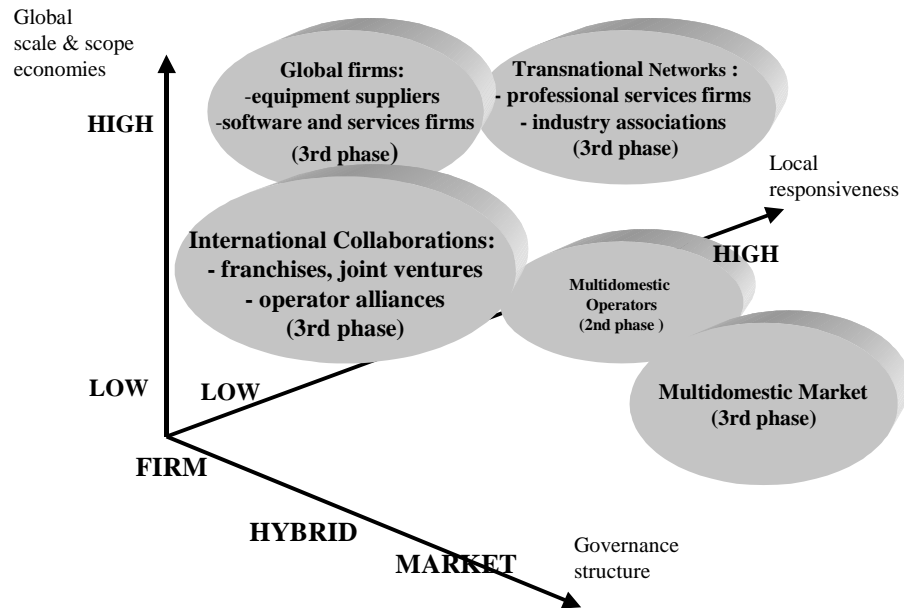
²¹ As announced by T-Mobile (04/07/03): “Telefónica Móviles, T-Mobile International and TIM (Telecom Italia Mobile) today announced a cooperation to set up an alliance to provide their customers with a unified and superior offering of products and services in all the countries where the three operators are present, thereby strengthening their ability to compete in cross-border markets....The alliance will be open to the possible incorporation of other world mobile operators interested in contributing to the enhancement of the different areas of collaboration.” (http://www.t-mobile-international.com/CDA/tmo_alliance,20,,newsid-1629,en.html?w=1024&h=603):

²² In Norway, for examples, a dozen or so service providers are currently marketing and selling mobile services produced by the physical networks of Telenor Mobile and NetCom.

Fourth, heavily deflated stocks of Vodafone and other multinational wireless giants do not only reflect stagnant ARPU (average revenue per user) in a saturated market along with continuing postponements of next generation mobile wireless technology and services. It also reflects that future ARPU and stock prices may depend more on equipment makers, content providers and even alternative fixed-wireless access (e.g.; Wireless Fidelity networks) than on their own efforts as mobile wireless operators. Should the former upstream suppliers succeed in protecting their property rights in technology and content to a larger degree than today (similar to Microsoft), they will also succeed in appropriating a larger share of future profit of downstream wireless operators. As a consequence, stock prices of multinational wireless giants will continue to decline, increasing the giants' risk of being broken up and dissolved.

As the industry matures, not only will the use of contractual governance increase, fragmentation rather than global consolidation may result. Large multinational operators such as Vodafone may then have little to offer their foreign subsidiaries that smaller multinationals such as Telenor Mobile of Norway or national operators such as Radiolinja of Finland cannot provide on their own or through contracting and partnering with others. Paradoxically, this may also apply to the multinationals' main function of building and operating global seamless mobile networks, which increasingly are being organized through collective and contractual arrangements rather than through multinational corporations, similar to the traditional organization of international telephony and the Internet. Lacking any unique and significant source of competitive advantage, multinational giants such as Vodafone may gradually be forced to divest their foreign mobile operations. In the more advanced mobile markets, subsidiaries of multinational wireless operators may end up being divested and reorganized into separate firms or franchisees that organize their international traffic through interconnection and roaming agreements, rather than through multinational corporations. If so, fragmentation, not consolidation, will result (see figure 4).

Figure 4. Fragmentation



SUMMARY AND DISCUSSION

In this paper we have presented a combined governance-capability model that examines knowledge transfer performance and its possible consequences in terms of industry consolidation or fragmentation. The model's core message is the following: When knowledge-based solutions to problems cannot be provided without also transferring the underlying less-transferable knowledge that generates large economies of scale and scope, corporate will dominate contractual knowledge transfer, and consolidation of previously fragmented industries will gradually result. Conversely, when the solution can be provided without transferring such knowledge, or the knowledge is easy to transfer and therefore tradable, contractual will dominate corporate knowledge utilization and transfer, and industry fragmentation will therefore result.

According to our main thesis, intra-firm utilization of knowledge is supposedly more suitable for knowledge that is difficult to transfer due to being tacit, sticky, diffused or leaky, and/or applied in markets that are less developed and thus costlier or more risky to operate in. As foreign telecom markets develop and the underlying technology and knowledge are made increasingly more explicit, standardized and modularized, corporate knowledge transfer will increasingly be replaced by contractual knowledge transfer, although never completely. This combined and differentiated strategy is also the one that allows maximum profitability to be exploited from leading technology and business practice, irrespective of where these are located, inside or outside the parent company.

The usefulness of the model was demonstrated by applying it to international mobile communications where there is a trend towards outsourcing of standard service provision in advanced markets and more firm-like insourcing of tacit and diffused knowledge for emerging markets. On lower infrastructure layer, technology and knowledge will generally be less tacit, less diffused, less firm-specific and more standardized, causing also the interfaces linking lower-layer network operation with higher layer service applications and downstream service provision to become more standardized. As a consequence, contractual access to basic network services is offered both to higher-layer service providers and to downstream resellers and marketers.

One may therefore conclude that competitive advantages in highly developed telecom markets are seemingly more intensively sought in downstream activities such as branding, service bundling, marketing and sales where critical knowledge is more tacit than in midstream activities such as network planning, operation and maintenance where critical

knowledge to a larger extent is converted into standard professional services or standard application software. In particular, as Telenor Mobile continues its expansion deeper into selected foreign and less developed markets, the growing body of more tacit, diffused and culture-specific knowledge needed for local business development, marketing and distribution, is increasingly accessed through equity-based partnership with the respective specialists rather than through contracting. Therefore, a significant larger share should normally be outsourced in the more advanced and mature markets where alternative sources are many than in the less advanced and less mature where alternative sources are few or even missing.

Discussion

The assertion that knowledge assets may not cause consolidation despite their scale and scope economies may sound like a contradiction. This contradiction disappears, however, once one recognizes that what matters are not the assets themselves, nor necessarily the transfer of them, but rather the utilization of these knowledge assets (Penrose, 1959). What additionally matters, therefore, are all the conditions and mechanisms that favor contractual over corporate utilization (Teece, 1980; Williamson, 1981). In other words, when solutions to problems can be provided without transferring the knowledge and without teaching the recipients to become expert users, most productive use of knowledge would be worldwide sales of its applications without also transferring and selling the knowledge as such. This simple, but still fundamental recognition is largely ignored by the capability approach, which, as a consequence, tends to appear as a rather *over-socialized*, *expansionist* and *myopic* approach (Levinthal and March, 1993). Correcting such biases is exactly the benefit of a combined governance-capability approach.

In particular, the capability approach attributes the advantage of the MNC over international markets to its ability to build a favorable social community of a kind that is impossible to build in a market, especially in many developing countries, and particularly with respect to the development, transfer and utilization of unique knowledge. The governance approach would agree that such an important advantage exist, but disagrees that such an advantage is the essential difference between MNCs and markets. Their assertion would be that the advantage of firm over market still resides in the governance mechanisms and their combined ability to economize on bounded rationality while curbing opportunism.

The combined governance-capability approach has also implications for the choice of competitive core competence since governance may be used to discipline the implicit expansionist bias of the capability approach. From the capability approach we may get the impression that corporate intra-firm transfer mechanisms and capabilities are the primary means for the development and utilization of knowledge, and that transfer of less-tradable knowledge (due to being tacit, diffused, specific, systemic, embedded, leaky) is the main strategy by which related-diversified companies attain competitive advantage, at least within knowledge-intensive industries, and especially among internationally diversified enterprises.

From the point of view of transaction cost economics (Williamson, 1999a), this may seem a bit farfetched, both concerning the implicit governance form used (corporate governance), the transfer capabilities involved, the volume of knowledge to be transferred and the non-tradability associated with this knowledge. Implicit in the capabilities approach there is a certain expansion bias in the sense that it states no explicit limit to the size and diversity of the firm, only to the speed by which it grows and diversifies. The less transferable the knowledge (tacit/sticky, diffused, specific, systemic, embedded), the more transfer capabilities you need (in terms of shared language, social relationships, higher-level organizing principles). Since competitive advantage is assumed to reside in less-transferable knowledge, increasing profits are made by expanding (i) the amount of less-transferable knowledge, (ii) the volume of transfer capabilities, and (iii) the number of operating units to which less-transferable knowledge can be efficiently transferred by using available transfer capabilities.

In contrast to the capabilities approach, the governance approach works out of a cost minimizing last-resort perspective in which neither knowledge transfer nor corporate governance as transfer mode are regarded as the most cost efficient solution (the zero-hypothesis) unless very specific conditions are fulfilled. That is, if the customer can benefit by buying the appropriate solutions without buying and transferring the respective knowledge this may also be the most efficient way of developing and utilizing the knowledge unless the customer thereby risks to be abused by an opportunistic repeat supplier that over time develops a unilateral monopoly position with his customer. If maximum benefit of knowledge requires transfer of this knowledge, corporate transfer would be the solutions of last resort, only to be recommended to the degree simple market or hybrid contracting are significantly more costly or less creative alternatives.

In particular, integrated units may be expected to learn faster in depth than separate stand-alone units to the degree learning opportunities are locally concentrated and accumulated learning is relationship-specific, whereas the separate units will learn faster in breadth than

integrated units to the degree learning opportunities are widely distributed and accumulated learning non-relationship-specific. From recurrent transactions shared language and capabilities develop as a byproduct and platform for further communication and learning. The governance mechanisms that safeguard trading relations and recurrent transactions thus also safeguard learning relations and the development of shared capabilities. When accumulated learning from recurrent transactions is local and partnership-specific, integrated corporation is the most efficient governance form, whereas market contracting is most efficient when accumulated learning is widespread and non-specific. While serving their business customers, network operators (like consultancies) develop both customer-specific and customer-non-specific solutions. Although customized solutions will often be needed to benefit from satisfied customers and repeat sales, the future competitiveness of the network operator depends primarily on the development and subsequent application of non-specific knowledge and technology. Without continuous accumulation and internal distribution of such non-specific knowledge among its own practicing units, the larger network operator will soon run itself into the sand.

Since size and diversity limits definitely exist, something is missing in the capability approach. On the other hand, the expansion bias of the capability approach (within speed limits) may have something important to tell us about firm behavior. But contrary to the capability approach, this expansion bias is just as often associated with economic failures as with success. The expansionist tendency is well documented both for the traditional U-form companies that were replaced by the more efficient multidivisional companies when the former companies expanded beyond limits that could be handled by the U-form organization (Chandler, 1962) Williamson, 1971, 1972, 1981), and for the succeeding M-form companies which upon a series of mergers and acquisitions into unrelated business were subsequently broken up and transformed into flatter, slimmer and more specialized enterprises (Jensen, 1986, 1997; Shleifer and Vishney, 1990). The strength of transaction cost economics is that it reminds us on such limits, and advice us to use a balanced trade-off approach to the study of organization, including the possibility of opportunistic behavior and the need for safeguarding mechanisms. Such a balanced approach should also be receptive to the possible inclusion of organizational transfer capability conceptualized as shared language, social relationships, and high-level organizing principles.

The tendency of attributing competitive advantage to tacitness, well known from the capability approach, is not shared with the governance approach. First of all, the heavy costs involved in transferring tacit knowledge should not be discounted, but explicitly made part of

the calculus. The protection this source of causal ambiguity (tacitness) offers against competitors also impinges on the firm's ability to transfer its proprietary assets and skills across its own organization (Szulanski, 1996). Thus the greater the tacitness of the knowledge the more expensive it is to transfer across corporate as well as divisional borders, especially when divisional borders coalesce with national borders (Teece, 1981). The most obvious solution to this cost problem would be to convert tacit into explicit and more transferable knowledge, but having done that, such knowledge may also be traded as commercial assets or sold as consulting services in the open market.

Second, the fact that tacitness may prevent knowledge from being copied by competitors does not mean that tacit knowledge constitute any competitive advantage. Quite the opposite, since tacit knowledge is not only difficult to articulate, but also tend to be embedded in relatively stable social relations and normative structures, tacit knowledge that initially was hailed as superior core competence, may later be abused as core rigidity (Leonard-Barton, 1992). Since tacit knowledge embedded in firm-specific social relations, norms and values may just as well constitute a competitive disadvantage as a competitive advantage, the conditions for one or the other should be clarified before hypothesizing any causal relation. This, however, is seldom done.

Besides, the "social community" idea of the capability approach is a multi-dimensional concept with a number of conditional and unpredictable effects. It contains not only a cognitive dimension in terms of shared language and information codes that may emerge from long-time interaction and shared experience, but also a social-normative dimension in terms of owing others a debt of gratitude built up over previous transactions and a certain desire to repay this to avoid the social exclusion and bad conscience that otherwise may follow. In fact, learning may be considered more of a cognitive than a social process. What take place under apprenticeship and similar arrangement are not primarily socializing (getting to know each other), but rather the cognitive process of transferring tacit knowledge (know how) from one to the other. Although social and cultural mechanisms may promote learning, their role will still be mainly supportive and secondary, possibly even destructive (e.g.; the core rigidity argument). Thus, failing to discriminate clearly between the social and cognitive dimensions of the "social community" concept is a major mistake.

More important in a dynamic context is the range of experiences from which alternative solutions can be developed and the best alternative finally selected. Although the conditions for deeper learning and more informed choice are probably better among integrated than non-integrated firms, the number and variation of experiences from which alternatives are

developed and best solution finally chosen, are less among a smaller number of integrated firms than among a larger number of non-integrated firms. In particular, due to the well-known rigidity and myopia tendency of intra-firm learning processes (Levinthal and March, 1993), not only the experience base, but also the learning and selection mechanisms may become too narrow (specialized and simplified). In other words, a trade-off will exist between the benefit of deeper learning and informed choice provided by the integrated firm on the one hand, and the benefit of a wider range of relevant experiences to work with and a larger number of alternative solutions to choose among provided by the market on the other. This depth-by-breadth trade-off will change as the market and the industry evolve.

REFERENCES

- Bartlett, C.A. & Ghoshal, S. 1989. *Managing across Borders*. Boston: Harvard Business School Press.
- Bartlett, C. A., & Ghoshal, S. 1993. "Beyond the M-form: Toward a managerial theory of the firm," *Strategic Management Journal*, **14**: 23-46.
- Bartlett, C.A. & Ghoshal, S. 2000. *Transnational Management. Text, Cases, and Readings in Cross-Border Management*. Third Edition. Boston: McGraw-Hill.
- Barney, J. B. 1991. Firm resources and sustained competitive advantage. *Journal of Management*, **17**: 99-120
- Bresman, H., Birkinshaw, J. & Nobel, R. 1999. Knowledge transfer in international acquisitions. *Journal of International Business Studies*, **30** (3): 439-462.
- Cantwell, J.A. & Piscitello, L. 1997. The emergence of corporate international networks for the accumulation of dispersed technological competences. In K. Macharzina, M-J. Oesterle and J. Wolf, (eds.) *Global Business in the Information Age*, vol. 1., 166-191. Proceedings of the 23rd Annual EIBA Conference, Stuttgart, December 14-16, 1997.
- Chandler, A.D. 1998 (1st edition 1962). *Strategy and Structure*. Cambridge, Mass.: The MIT Press Paperback Edition, 20th printing.
- Chandler, A.D. 1977. *The Visible Hand. The Managerial Revolution in American Business*. Cambridge, Mass.: Harvard University Press.
- Chandler, A.D. 1990. *Scale and Scope. The Dynamics of Industrial Capitalism*. Cambridge, Mass.: Harvard University Press.
- Demsetz, H. 1991. The Theory of the Firm Revisited. In Oliver E. Williamson and Sidney G. Winter (eds.), *The Nature of the Firms. Origins, Evolution, and Development*. New York: Oxford University Press.
- De Meyer, A. 1995. Tech talk. In Drew, J (ed.) *Readings in International Enterprise*. London: Routledge.
- Dyer, J.H. & Nobeoka, K. 2000. Creating and managing a high-performance knowledge-sharing network: The Toyota case. *Strategic Management Journal*, **21**: 345-367.
- Foss, N.J. 1999. Research in the strategic theory of the firm: "Isolationism" and "integrationism". *Journal of Management Studies*, November, 725-755
- Gooderham, P.N. & Ulset, S. 2002. "Beyond the M-form": Towards a Critical Test of the New Form. *International Journal in the Economics of Business*, **9**: 117-138.

- Ghoshal, S., Moran P. and Almeida-Costa L. 1995. The Essence of the Megacorporation: Shared Context, not Structural Hierarchy, *Journal of Institutional and Theoretical Economics*, **151**: 748-759
- Gupta, A.K. & Govindarajan, V. 2000. Knowledge flows within multinational corporations. *Strategic Management Journal*, **21**: 473-496.
- Hedlund, G. 1994. A model of knowledge management and the N-form corporation. *Strategic Management Journal*, **15**, Summer special issue: 73-90.
- Jensen, M. 1986. The agency cost of free cash flow: Corporate finance and takeovers, *American Economic Review*, **76** (2): 323-329, May
- Jensen, M. 1997. The modern industrial revolution, exit, and the failure of internal control systems, in Chew D.H. (ed.), *Studies in International Corporate Finance and Governance Systems. A Comparison of the U.S., Japan & Europe*, New York: Oxford University Press.
- Kogut, B. & Zander, U. 1992. Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science*, **3** (3): 383-397.
- Leonard-Barton, D.1992. Core capabilities and core rigidities: A paradox in managing new product development, *Strategic Management Journal*, **13**: 111-125.
- Leonard-Barton, D.1995. *Wellsprings of Knowledge*. Boston: Harvard Business School School Press.
- Levinthal, D.A. & March, J.G. 1993. The myopia of learning. *Strategic Management Journal*, **14**: 95-112.
- Madhok, A. 1996. The organization of economic activity: Transaction costs, firm capabilities, and the nature of governance. *Organization Science*, **7** (5), September-October, 577-590
- Meschi, P-X. 1997. Longevity and cultural differences of international joint ventures: Toward time-based cultural management. *Human Relations*, **50** (2): 211-227.
- Nelson, R. & Winter, S. 1982. *An Evolutionary Theory of Economic Change*. Cambridge, MA: Harvard University Press.
- Nonaka, I. 1994. A dynamic theory of organizational knowledge creation. *Organization Science*, **5**: 15-37.
- Nonaka, I, Takeuchi, H. 1995. *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*. New York: Oxford University Press.
- O'Donnell, S. 2000. Managing foreign subsidiaries. *Strategic Management Journal*, **21**: 525-548.
- Penrose, E., *The Theory of the Growth of the Firm*. Oxford: Basil Blackwell, 1959.

Polanyi, Michael. 1962. *Personal Knowledge: Towards a Post-Critical Philosophy*. New York: Harper Torchbooks.

Reger, G. 1997. Internationalisation and coordination of R&D of western European and Japanese multinational corporations. In K. Macharzina, M-J. Oesterle and J. Wolf, (eds.) *Global Business in the Information Age*, vol. 2, 573-604. Proceedings of the 23rd Annual EIBA Conference, Stuttgart, December 14-16, 1997.

Rugman, A.M. & D'Cruz, J.D. 2000. *Multinationals as flagship firms : Regional business networks*. Oxford : Oxford University Press.

Simonin, B.L. 1999. Transfer of marketing know-how in international strategic alliances: An empirical investigation of the role and antecedents of knowledge ambiguity. *Journal of International Business Studies*, **30** (3): 463-490.

Shleifer, A. & Vishney, R. W. 1990. The Takeover Wave of the 1980s. *Science*, **249**: 245-249.

Spiller, P. T. & Bennet, Z. A. 1997. Product Complementarities, Capabilities and Governance: A Dynamic Transaction Cost Perspective, *Industrial and Corporate Change*, 1997: 561-594.

Szulanski, G. 1996. Exploring internal stickiness: impediments to the transfer of best practice within the firm. *Strategic Management Journal*, **17** (Winter Special Issue): 27-43.

Teece, D.J. 1977. "Technology transfer by multinational firms: The resource costs of transferring technological know-how," *Economic Journal*, **87**: 242-61.

Teece, D. J. 1980. "Economies of Scope and the Scope of the Enterprise," *Journal of Economic Behavior and Organization*, **1**: 223 - 47.

Teece, D.J. 1981. The market for know-how and the efficient international transfer of technology. *Annals of the American Academy of Political and Social Science*, **458**: 81-96.

Teece, D. J. 1982. "Towards an Economic Theory of the Multiproduct Firm," *Journal of Economic Behavior and Organization*, **3**: 39-63.

Teece, D.J.. 1983. "Technological and organizational factors in the theory of the multinational enterprise," in Mark Casson ed., *Growth of international business*, London: Allen and Unwin, 51-62.

Von Hippel, E. 1994. "Sticky in formation" and the locus of problem solving: Implications for innovation". *Management Science*, **40** (4): 429-439.

Ulset, S. 1996. R&D outsourcing and contractual governance: An empirical study of commercial R&D projects, *Journal of Economic Behavior and Organization*, **30**: 63-82

Ulset, S. 2002. Mobile virtual network operators: a strategic transaction cost analysis of preliminary experiences, *Telecommunications Policy*, **26**: 537 – 549.

Williamson, O.E. 1971. Managerial Discretion, Organization Form, and the Multi-division Hypothesis, in R. Marris and A. Wood (ed.), *The Corporate Economy. Growth, Competition, and Innovative Potential*, Macmillan and Co. Ltd.

Williamson, O.E. 1972: Assessing and Classifying the Internal Structure and Control Apparatus in the Modern Corporation, in K. Cowling, ed., *Market Structure and Corporate Behaviour*. Basic Blackwell.

Williamson, O.E. 1975. *Markets and Hierarchies: Analysis and Antitrust Implications*. New York: Free Press.

Williamson, O.E. 1981. The Modern Corporation: Origins, Evolution, Attributes. *Journal of Economic Literature*, December: 1537 – 1568.

Williamson, O.E. 1985. *The Economic Institutions of Capitalism*. New York: Free Press.

Williamson, O.E. 1991. Comparative Economic Organization: The Analysis of Discrete Structural Alternatives. *Administrative Science Quarterly*, **36** (June): 269-296.

Williamson, O.E. 1996. *The Mechanisms of Governance*, New York: Oxford University Press

Williamson, O.E. 1999a. Strategy research: Governance and competence perspectives, *Strategic Management Journal*, **20**: 1087-1108.

Williamson, O.E. 1999b. Public and Private Bureaucracies: A Transaction Cost Economics Perspective. *Journal of Law, Economics, and Organization*, **15**: 306-342.

Winter, S.G. 1991. On Coase, Competence and Corporation. In Oliver E. Williamson and Sidney G. Winter (eds.), *The Nature of the Firms. Origins, Evolution, and Development*. New York: Oxford University Press.