

# **Limits to Growth of Multinational Replicator Companies**

## **The Case of Mobile-Phone Operators**

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## **Abstract**

The notion of a resource-based competitive advantage contains a paradox. How can superior and inimitable resources that are so widely believed to be the source of competitive advantage also be a source of competitive advantage for multinational companies that compete by replicating their highly standardized and increasingly imitable business models in foreign markets? This article examines the competitive advantage of multinational replicator companies through the lens of transaction cost economics, according to which replicators are well suited to some knowledge-based transactions and poorly suited to others. I ask what it is that distinguishes knowledge-based transactions after which I compare the efficacy of multinational and national firms for managing such transactions bundled into replicable business models. I conclude that there is a source of sustainable competitive advantage for multinational replicators, that such an advantage is more likely to be found in the multinationals' dynamic capabilities than in their locally operative business models, but also that such capabilities and business models contain the seeds of their own demise partly caused by the replication strategy itself, partly by attributes of the business model such as open and non-proprietary global standards and weak appropriability regimes.

*Key words: Construct Development and Evaluation; Transaction Cost Economics; Knowledge Transfer*

“Strictly speaking, it is never resources themselves that are the ‘inputs’ in the production process, but only the services that resources can render”  
(Penrose, 1995 (1952): 25).

## INTRODUCTION

Whereas all multinationals to some degree compete by transferring valuable resources and capabilities to foreign affiliates, multinational *replicators* like McDonald’s and Vodafone do so in extreme degrees. Replicators may expand into foreign markets partly by building their own subsidiaries from scratch, partly by acquiring and converting local firms into local affiliates compatible with the standard business model certified by central headquarters. Replication here entails the creation and operation of a large number of similar outlets that deliver a product or perform a local service, sometimes referred to as the “McDonald’s approach” (Winter and Szulanski, 2001). Such replication consists of *knowledge transfer of broad scope* covering a large portion of the total knowledge endowment of the recipient outlets. It is managed by a *central organization* that develops knowledge about *valuable traits* of the business model that need to be replicated, the *methods* by which such traits are replicated, and the kind of *environments* where outlets with such traits can successfully operate. These traits consist of *valued features* of the product or the service that the outlet provides, *procedures* involved in producing those features, *procurement methods* that allow the outlet to acquire the various inputs needed to carry out those procedures, and finally *marketing procedures* that inform customers about the attractive features of their offerings.<sup>1</sup>

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<sup>1</sup> Like in Winters and Szulanski (2001), propositions will be developed below about the conditions under which a replication strategy is more likely to succeed in a competitive setting. In our study, these conditions mainly consist of knowledge transaction hazards that make replications under one governance form (e.g.; corporate mode) more efficient than under another (e.g.; market or hybrid modes) (Foss, 2007).

Such business model features are interdependent because, for example, what is required in terms of production procedures, procurement methods and marketing campaigns depends on the appealing features being replicated. Not all business model traits are possible to replicate or worth being replicated. Only a subset with expected positive effects on performance will normally be selected, refined and prepared for replication. Such core traits cannot possibly be available from the outset, but must instead be acquired through experiential learning, preferably with reference to some guiding best practice example (template). Some of these traits are highly *standardized* and applied uniformly across all outlets, while others are *customized* to the unique conditions of each outlet.

Moreover, information about attractive business model traits is a nonrivalrous good with far-reaching consequences for growth by replication. Being nonrivalrous here means that one outlet's utilization of it does not reduce the amount of the good available for other outlets. In fact, knowledge may instead exhibit increasing return, meaning that it tends to grow rather than to decline with increasing use. The capacity of replicable business models is only limited by the cumulative size of the markets in which they can be usefully replicated, and the larger such markets, the larger the firm's net income from exploiting the models' almost limitless replication capacity (at least from a supplier's point of view). Together, replicable business models and their central support organization make up most essential parts of a replicator's competitive advantage or "*firm resources*" as defined by Barney (1991: 101).

There is, however, a disturbing *imitability paradox* associated with the above replication strategy.

Barriers to imitation such as unique historical conditions, causal ambiguity and social complexity tend

to prevent not only *unfavorable* imitation by rival firms, but also *favorable* replication by the company's own dispersed operations.<sup>2</sup> To improve replication, therefore, *firm resources* such as branded business models first need to be made more *imitable* by making them *less* history dependent (i.e.; by creating substitute resources), *less* casual ambiguous (i.e.; by clarifying causal relations), and *less* socially complex (i.e.; by simplifying social structures). But, and this is the paradox, to the extent sustainable competitive advantage resides in firm resources that are *superior* and *inimitable*, how can multinationals, that compete by replicating their increasingly *imitable* standard business models in foreign markets, sustain their competitive advantage over independent national companies? To examine this paradox with illustrations from the international mobile communications industry is the purpose of this paper.

Although several scholars have recognized the above stickiness dilemmas (Szulanski, 1996; Knott, 2003; Maritan and Brush, 2003), few have so far critically examined their ultimate paradox namely that in certain industries superior and costly-to-imitate (sticky) resources cannot be the most important source of sustainable competitive advantage. Similar boundary conditions have been discussed by Barney (1997: 171), Eisenhardt and Martin (2000) and D'Aveni (1994) in relation to *high-velocity* industries and *supercompetition* markets. Under such dynamic conditions, barriers to imitation do not only protect against technology leakage, but apparently also against competition and its beneficial effects on efficiency and innovations. After all, what we normally associate with protracted isolation from competition is not high, but low performance. Here, we extend this stickiness enquiry to include

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<sup>2</sup> This imitability paradox is different from the imitability paradox of Barney (1997:172): "The less costly it is for managers in a firm to develop and acquire resources that could generate competitive advantage, the less likely it is that these resources will be a source of sustained competitive advantage."

*multinational replicator companies in moderately dynamic markets* such as the mobile communication services market.

With reference to the above critical remarks, the long-term effects of superior and inimitable resources should be considered ambiguous until some supportive governance mechanisms can be applied that promise to improve innovation and replication without increasing imitation correspondingly.<sup>3</sup>

Licensing under intellectual property law is one such mechanism. For example, patents make inventions both highly replicable and highly inimitable by making replications of such inventions illegal to all would-be imitators except the licensee. When intellectual property rights (e.g.; copyrights, trademarks, patents and related rights) are unavailable or ineffective, however, licensing would be equally ineffective, and should therefore be supplemented with additional contractual safeguards, or entirely replaced by more protective firm-like governance (Teece, 1986a). As intellectual property rights continue to improve, the competitive advantage of multinationals over independent local firms will decline and firm-like governance may again change into licensing and market contracting.<sup>4</sup>

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<sup>3</sup> According to TCE, inimitable resources are just another form of non-redeployable assets reliant on appropriate safeguards against the associated friction and leakage. The more redeployable the competitive assets are, the less troublesome the frictions are, but also the more troublesome the associated leakage hazards will be. These contradictory effects create the imitability paradox that successful replicators have seemingly managed to solve by developing effective safeguards against both frictions and leakage.

<sup>4</sup> Normally, replicators' innovative business methods will receive only weak property rights protections and can therefore relatively easily be imitated and commercialized by rival firms. Here, remaining imitation barriers tend to be "self-imposed" by the would-be imitators themselves (e.g.; local independents) rather than controlled by the resource holders (e.g.; the franchisor). According to Knott (2003), failure to imitate superior routines in the quick printing industry may not be due to the attribute of the routine, which is mostly publicly known, but to the potential imitators' *incompetence* (failure to gather public information about best practice) at one extreme and *overconfidence* (deliberate choice to deviate from best practice) at the other. Knott concludes: "The franchisor solves both the incompetence and overconfidence problems by imbedding best practice in a routine and by enforcing that routine." Such "embedding" and "enforcing" capabilities may be viewed as franchisors' and other replicators' most important dynamic capabilities (see also this paper's Telenor case).

To examine the competitive advantage/disadvantage of multinational over national firms, a knowledge governance model will be developed integrating RBV with TCE focusing on replicable business models and their knowledge based features drawing heavily on the discriminating alignment hypothesis of standard transaction cost economics (Williamson, 1999a).<sup>5</sup> Local subsidiaries of multinational companies differ from local independent companies both in knowledge governance respects and in asset specialization and localization respects. Whereas local subsidiaries benefit from access to centralized corporate assets providing *low-cost standardized* products and services, local independents benefit from access to localized assets providing *high-value localized* (and costly) products and services. The smaller the scale economies of centralized corporate assets, the smaller the competitive advantage of multinational over national companies. Furthermore, the larger the dissimilarities (culturally, administratively, geographically, and economically) between prospective markets, the fewer the standardized features, and the smaller the competitive advantage of multinational over national companies (Ghemawat, 2007). Under conditions of extreme dissimilarities (highly unrelated international market diversification), multinationals are more likely to be outcompeted by national firms. Given moderate dissimilarities, multinationals may gain a competitive advantage over most national firms. Under these conditions, differential local adaptation capabilities (“levers for adaptation”) may explain differential firm performance among surviving multinationals.

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<sup>5</sup> To the extent knowledge transfer and utilization are the main functions of multinational companies, as we assume in this study, knowledge transfer and utilization theories are the main theories of such companies (Bartlett and Ghoshal, 1993). Transaction cost economics is one such theory (Williamson, 1981; Teece, 1986, 2006) along with the closely related internalization approach (Buckley and Casson, 1976; Hennart, 1977, 1982; Rugman, 1981); resource-based, dynamic capability and knowledge-based theories of the firm are others (McEvelly et al, 2004).

Accordingly, and drawing on the discriminating alignment thesis of TCE, this paper set out to examine the performance effects (growth in local market share) of aligning bundles of *knowledge* (business models) transactions which differ in the *superiority*, *stickiness* and *leakiness* attributes with *knowledge governance structures* which differ in their costs and *learning capabilities* in a combined *transaction cost economizing & value creating* way, conditioned by local industrial and institutional conditions (modifications of standard TCE in *italics*).<sup>6</sup> These knowledge transactions are intermediate “business-to-business” transactions. They occur when attractive business model features (individually or bundled) are transferred across technologically separable interfaces (Williamson, 1996:58): one kind of activity ends (e.g.; knowledge supply) and another begins (e.g.; knowledge utilization). More generally, knowledge can be transferred (traded) either in its basic form as a set of principles or in its applied form as a set of applications, bundled into replicable business models.<sup>7</sup> Here, the knowledge transfer process include both the initial search and selection phase where attractive business model features are recognized and their potential value revealed, and the subsequent transfer and utilization phase, where model features are transferred and productively exploited for which an accompanying consulting service may be needed when such features (business knowledge) cannot be fully articulated.

After a short review in section 2 of recent consolidation/fragmentation tendencies in our case industry- *the international mobile communication services industry* – our TCE strategy model for international knowledge transfer will be further developed in section 3 and summarized into three comprehensive

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<sup>6</sup> Knowledge transactions also differ with respect to frequency of transfer (from occasional to recurrent), level of uncertainty (from low to high technical uncertainty) and level of complexity (from single pieces of knowledge to complex bundles, here called business models).

<sup>7</sup> For a collection of papers including either internal or external knowledge flows, see Mankhe and Pedersen (2004). None of these, however, makes use of more comprehensive models capable of examining both internal and external knowledge flows.



propositions (connecting knowledge governance to consolidation and fragmentation via global learning). In section 4, more specific examples from the international mobile communications industry will be used to illustrate our propositions. Section 5 finalizes the paper with a conclusion and discussion.

To set the stage for the coming theoretical discussion, consider recent restructuring tendencies in the mobile communication industry

## THE MOBILE COMMUNICATION SERVICES INDUSTRY – INTRODUCTION

### *Consolidation of local markets*

Towards the end of the 90s, European incumbent operators considered expansion into foreign markets as their most favored business strategy. Acquiring foreign licenses, however, was one thing. Turning these into profitable operations, however, was quite another. Before such multinationals were created in mobile communications, international roaming agreements connected national networks into global networks (and still do, just like in fixed telephony). To justify their creation and enormous investments, therefore, multinational operators needed to provide extra valuable support services such as exclusive distribution of leading technology and best practices to their local affiliates, besides privileged access to other superior corporate assets including the purchasing power of particularly large global operators. To the degree such benefits were significant, global consolidation might result. To the degree they were less significant, or to the degree similar services could be provided using simpler contractual modes, fragmentation might result.

Impressive attempts at global consolidation of the telecom services industry were first made in fixed communication, then in mobile communications, both mainly by acquisitions. Whereas these attempts generally failed in international fixed communication (Ulset, 2008), they are still pending in international mobile communications. Indeed, large-scale acquisitive consolidation efforts may still

fail in mobile communications for similar transaction cost reasons as they failed in fixed communications, despite the existence of such giant mobile operators as to-day's Vodafone.<sup>8</sup>

[Figure 2. Consolidation, about here]

In the figure above, we have classified Vodafone and Telenor as global and transnational respectively. Since Vodafone, until quite recently, appeared to be much more occupied with rebranding acquired companies and implement globally standardized services than Telenor, and since Telenor appeared to be much more concerned with building global learning capabilities than Vodafone, we classify, in accordance with Bartlett and Ghoshal (1993, 2000), Vodafone as a global strategy company and Telenor as an emerging transnational company. In neither company, however, is strategy a static phenomenon. Recently, Vodafone decided to withdraw from the highly developed saturated Japanese market (Economist, 2006b) and move into emerging growth markets instead (e.g.; India and Sub-Saharan Africa).

#### *Fragmentation of local markets*

So far, the level of *global scale economies* achieved by global companies such as Vodafone and transnationals such as Telenor, has not caused radical consolidation of local markets, and may not do

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<sup>8</sup> Almost eight years ago, CFO Richard Moat of the global mobile operator Orange (10-15 times the value of Telenor Mobile at the time) predicted the following “*In a couple of years the European mobile services market will be dominated by a couple of large operators. Orange will be one of them. Telenor has a chance to participate in the consolidation by partnering with a larger international player*” (Ukeavisen Telecom, 26. October, 2000: 9 (translated from Norwegian)). Evidently, this did not happen. The European market is still fragmented and Telenor Mobile is now about the size Orange in number of subscribers.

so in the nearest future.<sup>9</sup> Not only will there be significant additional costs associated with organizing multinational wireless giants, but some of the above scale advantages may also 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 that benefit from having leading network operators around the world as their first-priority customers. Indeed, local mobile operators may often obtain faster and more reliable information about leading technology and best practice from the external suppliers and professional services firms than from their own multinational parent company, the latter having fewer and less advanced subsidiaries to work for and learn from.

Entry-friendly regulation reinforces the tendency. To promote competition and prevent abuse of market power, regulatory authorities may order dominant operators to rent out their monopolized assets to downstream service providers at favorable cost-based prices, thus causing fragmentation rather than consolidation in the downstream retail market. Such downstream markets are also less likely to consolidate to the extent the enabling technology is a public good and therefore equally accessible to all potential players or to the extent such technology (applications) is owned by upstream suppliers rather than by vertically integrated multinationals (as often is the case in the mobile

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<sup>9</sup> China Telecom (369 mill subscribers, 2007) is the world's largest mobile operator in number of subscribers with Vodafone on second (252 mill., 2007) and Telenor on eighth (90 mill, 2007), all in numbers of proportionate subscribers (adjusted for % ownership; see Wikipedia, the free encyclopedia: [http://en.wikipedia.org/wiki/List\\_of\\_mobile\\_network\\_operators](http://en.wikipedia.org/wiki/List_of_mobile_network_operators)).

industry). As the industry matures and competitive entry-friendly regulation is enforced, not only will the use of contractual governance increase, but also fragmentation rather than consolidation may result.

Giant global operators such as Vodafone may therefore end up offering their foreign subsidiaries little more than what national operators such as Radiolinja of Finland can provide on their own or through contracting and partnering with upstream suppliers, related and rival firms (including Vodafone itself). Lacking any unique and significant source of competitive advantage, multinational mobile giants may gradually be forced to divest or withdraw from less attractive markets. In the more advanced mobile markets, subsidiaries of multinationals may even end up being divested and reorganized into separate firms that organize their international traffic through interconnection and roaming agreements, rather than through multinational corporations. If so, fragmentation, not consolidation, will result (see Figure 2).

[Figure 3. Fragmentation, about here]

To examine more carefully the factors causing such consolidation/fragmentation, consider the following TCE strategy model.

## A TCE STRATEGY MODEL ON KNOWLEDGE TRANSFER

### A Strategic TCE Approach

Our TCE strategy model for international knowledge transfer is depicted in Figure 1. Here, replication strategies are defined in terms of a set business model features that affects performance through cost-reducing standardization and value-creating customization. The different governance modes used to exploit competitive knowledge assets provided by suppliers, partners and corporate units consist of market, hybrid and hierarchy respectively. In the model, the replication strategy that affects firm performance is defined as the product of (1) the way replicators exploit internal and external competitive resources through its discriminating alignment logic and of (2) the way they exploit or adapt to local industrial and institutional conditions. In addition, the latter conditions affect the former discriminating alignments by affecting profit capture (price squeezing) and transaction costs. For example, socially conditioned governance structures may be needed to safeguard investment in relationship-specific assets that are made to convert sticky knowledge into transferable and locally customized knowledge. Such discriminating alignments are again affected by institutional conditions such as property rights (Williamson, 1991). General “improvement” in the way property rights are defined and enforced will increase the use of markets relative to hybrids and firms by reducing the transaction costs of market relative to hybrids and firms.<sup>10</sup>

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<sup>10</sup> The knowledge governance model outlined below can be used to examine transfer and utilization of business models in any industry where local subsidiaries of multinational companies compete with local independent firms. Attractive business models consist of the *less tradable* superior knowledge assets that may generate substantial scale and scope economies when replicated in an increasing number of foreign markets (e.g.; Vodafone’s global business model). Service industries such as fast food (McDonald’s), lodging (Hilton Hotels), retailing (e.g.; Wall-Mart) and mobile communications (e.g.; Vodafone, Telenor Mobile) are particularly interesting. All these industries consist in part of multinational companies replicating and upgrading their

[Figure 1. TCE Strategy Model for International Knowledge Transfer, about here]

In the model, *knowledge governance modes* differ with respect to incentive intensities, formal/informal controls and dispute settling mechanisms, here combined into the three generic and coherent structures of firm, hybrid and market (where administrative control, the use of low powered incentives and non-legalistic conflict resolutions bear a supporting and complementary relation to each other in the sense of doing more of one increases the return of doing more of the others). Since the clusters of attributes that define firm, hybrid and market provide contractual safeguards of high, medium and low degrees, these three governance modes are also assumed to be operationally more efficient in situations where contractual hazards are of high (firm), medium (hybrid) and low (market) degrees, respectively.

By *efficient* knowledge transfer we mean transaction cost efficient transfer. Transaction costs involve both the ex ante costs of drafting, negotiating and safeguarding knowledge transfer agreements and, more important, the ex post costs of adjustment and maladaptation that arise when contract execution is misaligned as a result of gaps, errors, omissions, and unanticipated disturbances (Williamson, 1996: 379). As there are serious ex ante and ex post contractual hazards involved in knowledge transfer that may cause unpleasant surprises and serious delays, particular incentives and safeguards are needed to accomplish the transfer in a timely fashion so that knowledge can be fully utilized

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business models in foreign markets while searching for the most profitable trade-off between global scale, scope and learning economies on the one hand and local responsiveness on the other. Attractive business model traits can be transferred either to wholly owned subsidiaries, to partly owned joint ventures, to franchise operations, or to non-competing local independent firms (associates). Some business model traits can be adapted to local tastes and regulations, while others cannot because they already belong to a global standard such as the global GSM technology standard or to the company's own global product brand.

When *successfully applied*, knowledge is not only *efficiently transferred*, but also *productively utilized*. Successful application may cause increasing consumer surplus and growing market shares to the extent such knowledge represents a sustainable competitive advantage. *Consolidation* occurs when independent local firms are acquired and successfully turned into profitable subsidiaries of a few giant MNCs. *Fragmentation* indicates the reverse process and occurs primarily when business models disintegrate into two parts, one set of globally applicable features most efficiently developed and provided by upstream multinational suppliers, and one set of locally customized features more effectively developed by local independent firms than by “captive” subsidiaries of giant multinationals.

## **Propositions**

The main consolidation thesis of the above strategy model’s reads as follows: To the extent attractive business model features are the superior and costly-to-imitate assets that generate huge scale economies when successfully replicated in an increasing number of similar local markets, global scale economies will also benefit local subsidiaries and contribute to increasing growth and consolidation until local markets are dominated by the subsidiaries of a few giant multinational enterprises.<sup>11</sup> Such

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<sup>11</sup> Such economies are realized as excess capacities in valuable assets are more fully utilized in the production of an increasing number of identical (scale) or related (scope) products at decreasing cost per unit produced. Among potential scale and scope assets, knowledge is assumed to be the most important since knowledge tends to grow with increasing use, contributing not only to static economies, but also to dynamic economies of scale and scope, particularly when disseminated through the global intra-firm learning systems of multinational enterprises. For this to happen, local markets must be similar in terms of their requirements for such scale and



growth depends on a number of strategic factors, as indicated in the introductory section, one of which is the choice of governance structure for continuous development and exploitation of the company's knowledge-based competitive advantage. Dependent on where main sources of competitive knowledge are located, knowledge governance can take the form of a centralized *autocratic* hierarchy (of the Vodafone type), or a more decentralized *democratic* hierarchy (of the Telenor type) where knowledge assets are more equally shared between local and central levels.<sup>12</sup> Whereas responding to local tastes, traditions, regulations and other uniquely local conditions are the main responsibility of local operating companies, global learning and replication are the main responsibility of the central organization. Most typically, global learning takes place in some central organization and constitutes as such the replicator's most important "dynamic capabilities". These are the partly routinized activities carried on to expand or change the capabilities that directly affect revenue generation (sales of the local outlets).

Under more specialized knowledge governance structures, more sophisticated knowledge processing capabilities can also be developed as an integrated part of such governance structures.<sup>13</sup> Then,

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scope assets. The more different they are, the less need there will be for shared scale and scope assets and the need there will be for multinational companies to organize the respective service transactions.

<sup>12</sup> In the outmost cases, where critical knowledge is either fully centralized into purely global firms (e.g.; Vodafone case) or fully decentralized into purely multidomestic firms (e.g.; early Telenor phase), little basic knowledge is transferred at all to local operating units. Whereas in purely global firms only standard recipes are transferred while basic knowledge is retained in central units, in purely multidomestic firms both standard recipes and basic knowledge are retained in the local units. Subsequent knowledge-based growth is restricted in both instances: in the global case, by limited demand for highly standardized and locally unresponsive global products, and in the multidomestic case, by limited demand for increasingly locally customized high-cost products

<sup>13</sup> With social conditioning included as part of the TCE setup (Williamson, 1999b), the TCE logic has become more compatible with the capability logic (Kogut and Zander, 1992; Nonaka and Takeuchi, 1995), although the behaviour assumptions are still somewhat different. According to the capability view, social conditioning tends to evolve as initially appointed experts from one subsidiary continue to successfully interact with fellow experts from other subsidiaries, face-to-face, over an extended time period.

supported by more sophisticated governance and knowledge processing capabilities, superior and sticky knowledge can be converted and bundled into globally replicable business models; meaning that *diffused* knowledge (best practice) can be made more replicable by collecting, integrating and assembling separate pieces of knowledge into more coherent and transferable business models, firm *specific* knowledge can be made more replicable by converting firm-specific solutions into company-wide standards adopted by most subsidiaries, and *tacit* and socially *embedded* knowledge can be made more replicable by transferring the key personnel that possesses the knowledge along with the necessary teaching, training and customer support.<sup>14</sup>

The above discussion can be summarized in the following consolidation proposition:

**Proposition 1:** Superior and sticky (inimitable) business model features will be more efficiently converted, transferred and utilized under the corporate form than under alternative market and hybrid modes, causing knowledge governance capabilities to grow richer and their beneficial effects on knowledge transfer and utilization to grow stronger, gradually reinforcing the relative advantage of the corporate mode over alternative market and hybrid modes, causing increasing consolidation of similar local markets.

The above proposition assume that the company operates in fairly similar countries (local markets). As successful replicators continue to expand into culturally, administratively, geographically and economically more dissimilar countries, the pressure for local adaptation increases correspondingly.

Whereas *global* companies represent the most centralized and globally standardized, and *multidomestic* the most decentralized and locally customized, *transnationals* represent the most complex of companies deploying their *global learning capabilities* to pursue the “best of both

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<sup>14</sup> Nonaka and Takeuchi (1995) used the notions of socialization when one version of tacit knowledge is converted into another version, internalization for conversion of explicit into tacit knowledge, externalization for converting tacit into explicit knowledge, and combination for converting one explicit version of knowledge into another explicit version.

worlds”.<sup>15</sup> *Local independent* companies, on the other hand, freed from any global replication restriction, tend to be more locally customized than even the most responsive of the multinationals, the multidomestics. Thus, the competitive advantage of multinational over national depends very much on the multinationals’ capability to respond to increasing pressure for local adaptation.

To examine the how such capabilities develop, a more evolutionary TCE approach would be useful. Such an approach alerts us to certain myopic learning biases affecting replicator companies as they evolve from multidomestic companies in the immediate post-acquisition phase to increasingly more global or transnational companies in subsequent phases.<sup>16</sup> As pointed out by Williamson (1999a: 1104), economic actors may not always have the capacity to look ahead and recognize contractual hazards and investment opportunities. Often, the requisite recognition will come as product of experience that often tends to be rather confusing (Levinthal and March, 1993). To minimize

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<sup>15</sup> Although structurally different, all types of MNCs may benefit from applying the same cost economizing *M-form design principles* (Chandler, 1962; Williamson, 1970, 1981). According to these principles, the larger multinational organization should be divided (i) *horizontally* into separate quasi-independent units to minimize needless interactions and (ii) *vertically* into separate strategic and operating levels to benefit from vertical specialization of the respective strategic and operating activities. Then, control and incentive mechanisms should be designed within and between units and levels so as to promote both (i) *local* (subsidiary) goals and (ii) *global* (corporate) goals (Williamson, 1981: 1550). Both global and transnational firms can be viewed as deliberate attempts at reorganizing local subsidiaries that initially were operating as quasi-autonomous units to pursue local goals, into administratively more integrated units to promote global goals of which enterprise-wide knowledge processing and transfer is supposedly the most important. Transnationals represent, however, a rather challenging corporate structure. As pointed out by Gooderham and Ulset (2002), unresolved conflicts between competing subsidiaries may cause transnational matrix companies such as ABB to fail and change into a multi-divisionalized structure.

<sup>16</sup> In contrast to its original, static version, evolutionary TCE permits replicator companies to behave less farsighted implying that their decisions sometimes may occur more as a result of myopic experience than farsighted calculation (Williamson, 1999a: 1104). The remaining core arguments are otherwise consonant with standard TCE theses, including the general reasoning that “governance is the means by which order is accomplished in relations in which conflict threatens to upset or undo opportunities to realize mutual gain” (Williamson, 1999b: 312), and that “problems of organizations are not predominantly technological but have their origins in the attributes of transactions on the one hand and of human actors on the other” (Williamson, 1999a: 1100).

confusion and facilitate learning, organizations tend to *simplify* and to *specialize* their learning processes. Learning processes get simplified through minimizing interactions and restricting effects to the spatial and temporal neighborhood. They get specialized through focusing attention and narrowing competence.

While the above simplification & specialization mechanisms facilitate local learning in the short run, they may also lead to (i) longer-run potential decay of adaptive capability in other domains (ignoring the longer run), (ii) incentives to free-ride on the efforts of others (ignoring the larger picture), and (iii) tendency to overestimate the likelihood of success in other domains (overlooking failure).<sup>17</sup> Thus, a tradeoff exists between the positive experience of learning facilitation and the negative experience of learning myopia. *“Whether positive or negative, the basic proposition is that, once the relevant features affecting such tradeoffs are disclosed the firm will react to such knowledge by taking actions that mitigate future hazards and more fully realize future gain.”* (Williamson, 1999a: 1104).<sup>18</sup>

For example, in the immediate post-acquisition phase, most replicators will be operating as relatively inefficient multidomestic firms, combining high degree of local responsiveness with low degree of global cost economies. Profitability can then be improved by building more elaborate knowledge governance and processing capabilities for exploiting unrealized global cost and learning economies.

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<sup>17</sup> As expressed by Levinthal and March (1993: 105): “As learners are allowed to settle into domain in which they have competence and develop experience in them, they experience fewer and fewer failures. Insofar as they generalize that experience to other domains, they are likely to exaggerate considerably the likelihood of success”

<sup>18</sup> Due to path-dependency and slack resources, the above transformation and restructuring processes will normally proceed with a lag that varies both with decision makers’ foresight and with the transactional attributes that condition such farsighted behavior (e.g.; uncertainty and complexity). In managing these processes, knowledge governance is expected to play the central role (as outlined below).

Learning myopia may now start to hurt full-fledged global replicators such as Vodafone more severely than emerging transnationals such as Telenor Mobile. Whereas “temporal” myopia leads to longer-run potential decay of adaptive capability in other domain, “failure” myopia may cause companies to overestimate the likelihood of success in these domains (Levinthal and March, 1993: 110). That is, insofar as they generalize successful experience from current and nearby markets to more distant markets (by reason of failure myopia) in which they already have experienced decaying adaptive capabilities (by reason of temporal myopia), companies are likely to exaggerate considerably the likelihood of success in these more distant markets.

In particular, by ordering a growing number of local subsidiaries to adopt centrally certified standard solutions as part of the company’s global strategy, successful exploitation of global scale economies is enforced, but only at the cost of longer-run decay of adaptive capabilities in other market domains. As global standardization continues to increase, local adaptation and innovation will start to decline causing subsequent decline in local revenue. In transnational companies, on the other hand, where knowledge processing is more highly developed, global learning is achieved through a two-step search and transfer process where best company practices are first discovered and selected from a large number of operating units, then explicated and transferred as standard practices to all other relevant local units who will start applying them after having learned how to use them and how to adjust to local conditions (Bartlett and Ghoshal, 1993; this paper’s Telenor case).

Besides, in industries where most services need to be locally produced and consumed at the same time, most significant cost savings may not result from increased utilization of central corporate resources, but rather from increased utilization of local resources, particularly in the poorest developing countries (“bottom of the pyramid” countries). This may then turn third-world nationals into more cost efficient

local companies than subsidiaries of traditional Western multinationals. In “bottom of the pyramid” countries, innovative local business practice can be developed that is more valuable to local operations in other similar developing markets than to subsidiaries in more highly developed markets. These practices may then be more effectively replicated in similar developing markets by other types of international organizations than traditional Western (“top of the pyramid”) multinationals.<sup>19</sup>

Thus, without effective myopia corrective mechanisms (e.g.; devil’s advocate, dialectic enquiry, and outside view; see Hill and Jones, 2008), successful multinationals will continue to expand into more distant markets until difficulties in converting and replicating their sticky knowledge assets exceed their abilities to solve such difficulties after which they will be forced to withdraw and to concentrate on a smaller selection of profitable core markets instead (where local industry conditions are more attractive and local institutions more supportive). Whereas experience based myopic learning explain tendencies towards strategic misalignment and overexpansion, myopia corrective mechanisms explain the absence of such tendencies.

The essence of the above discussion can be summarized in the following global learning proposition:

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<sup>19</sup> One such famous example is the Village Phone program of Grameenphone, a joint venture between Telenor (62%) and Grameen Telecom Corporation of Bangladesh (38%). Grameen Telecom is a non-profit sister company of the internationally acclaimed microcredit pioneer Grameen Bank that won the Nobel Peace Prize for 2006 together with Professor Muhammad Yunus. The Village Phone enables rural people who normally cannot afford to own a mobile phone to avail the service while providing the owner of the phone (Village Phone Operators) an opportunity to earn a living. Financed with microcredit from Grameen Bank, local Village Phone Operators are renting the use of the phone to their community on a per-call basis. Village Phone programs are now exported to other similar developing countries in Africa (Uganda, Rwanda, Cameroon), not by Telenor, but Grameen Foundation, whose mission is “to replicate the success of Grameen Bank internationally by supporting microfinance institutions that embody its vision and values” (Grameen Foundation, 2006).

**Proposition 2:** As replicators continue to expand into more dissimilar local markets, the growth rate of global replicator companies will gradually start to decline relative to the growth rate of competing transnational, multidomestic and local independent companies due to stronger learning myopia in global than in transnational, multidomestic, and local independent firms, eventually forcing global replicators to change their international strategy into a locally more responsive one.

One common, effective method of reducing the costs of adapting to increasingly dissimilar markets is modular systems (Ghemawat, 2007). Modular designs allow components with shared interface standards to be mixed and matched into locally customized systems.<sup>20</sup> When based on open standards (e.g.; the global GSM standard), modular designs may enable external suppliers to provide standardized services at lower cost than what central support units of integrated operators can manage. Remaining business model features can then be more effectively customized to local conditions by national operators than by multinational operators (Sanches and Mahoney, 1996; Christensen, 1997; Christensen et al, 2002).

In electronic systems industries such as the computer and telecom industries, open digitized interface standards provide the technical conditions for outsourcing to upstream equipment suppliers and service providers (Spiller and Zelner, 1997). 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 standard software programs supplied by upstream software firms and professionally services companies in competition with the central support units of multinational operators. As a further consequence, the competitive

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<sup>20</sup> According to Ghemawat, modular designs such as flexibility, partitioning, common platforms, and full modularity are common interrelated ways to reduce the cost of adapting to cross-country variations. The resemblance between this unbundling/disintegration hypothesis and those of Hill and Chan Kim (1988) are obvious.

advantage of downstream multinational companies over national companies may decline, and fragmentation rather than consolidation of the respective local markets may result.<sup>21</sup>

Besides, information about best operating practice may also leak out to upstream multinational technology suppliers and professional service firms that collaborate closely with a diverse array of foreign operator customers.<sup>22</sup> After all, major equipment suppliers such as Ericsson and Nokia, or specialized telecom consultancies such as A.T. Kearney (providing benchmarking analysis based on data supplied by the industry itself), will have a much larger and more diverse group of local operating companies to work with and learn from than any of their multinational customers, including giants such as Vodafone.<sup>23</sup> Such upstream migration (leakage) of learning occurs naturally as a result of suppliers' participation in a number of customer related activities such as (i) providing large quantities of after-sales services, (ii) developing best operating procedures based on most recent customer feedback, (iii) participating in joint R&D projects with leading customers, and (iv) recruiting key service personnel from local customers' own service departments. Then, after having converted best operating practices into best industry standards, multinational consulting firms such as A.T. Kearney

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<sup>21</sup> Ghemawat (2007) classifies "levers and sublevers for adaptation" to such cross-country differences into: Variation (responding fully to local variations), Focus (reducing the need for variation), Externalization (reducing the burden of variation), Design (reducing the cost of variation) and Innovation (improving the effectiveness of variation).

<sup>22</sup> In general, leading technology and industry best practices tend to originate in the larger world outside each single company. For example, to the extent most valuable knowledge assets (mobile technologies and operating knowledge) tend to originate in upstream foreign markets, these assets must first be discovered and acquired before they can be further processed and exploited by the company's local operations. Rising transaction costs from discovering, transferring and appropriating such knowledge may then force multinational operators to terminate further acquisitions and to concentrate on their own second best technology and competence instead. Giant multinationals may still triumph, however. By exploiting their second best technology and practice to a much larger extent than what smaller players can exploit their industry best practice, a larger profit may still be returned in the former than in the latter case.

<sup>23</sup> AT Kearney is the consulting company providing critical benchmarking analysis based on data supplied by the industry itself, gradually also allowing it to provide best industry practices (AT Kearney, 2007b).



will be able to transfer these standards to their local customers just as expeditiously as multinational replicators transfer their firm standard solutions to their local subsidiaries. In this way, professional service firms (consultants) may function as the most efficient conveyors of industry best practice. Not only do they develop and provide their own unique solutions. They also benefit from converting best client practice into tradable services and selling these to a larger number of competing clients.

Similarly, as multinational network suppliers extend their network outsourcing services (“managed services”) also into emerging markets (e.g.; the rapidly growing Indian mobile market), local operators may benefit more from contracting with multinational suppliers and services firms than from integrating with multinational operators, thus causing fragmentation rather than global consolidation also here (Economist, 2006c, 2007b; Figure 3). Indeed, Ericsson, the network equipment supplier that not only produces, but also operates, many of its customers’ mobile networks, would rank as the world’s third largest mobile-phone operator serving more than 195 million subscribers (Ericsson, 2008). Handset suppliers such as Nokia and Sony Ericsson are also frequently being asked by leading mobile operators to develop service applications according to the operator’s own specifications. After a short transitional period where the operators are granted exclusive user rights, innovative service applications can also be sold to competing customers.

Furthermore, as owner of the enabling technology, upstream integrated technology & services providers may also be more concerned than their downstream operator customers with developing *leakage-protecting* measures, and equally more proficient at exploiting them. Such leakage-protecting measures may include (i) concealing the enabling knowledge and selling only its derived applications and services (like professional service firms do), (ii) designing economic, social and technical mechanisms that protect against technology leakage by making leakage less beneficial, less acceptable

and less convenient (like many high-tech firms do; see Liebeskind, 1996), and, last but not least, (iii) acquiring intellectual property rights that protect the enabling technologies and their most important applications by making copying illegal and licensing profitable (Teece, 2000).<sup>24</sup> Gradually, then, as suppliers and their local operator customers learn more about the greater tradability of technology services and advantages of outsourcing, local operators may feel compelled to unbundle additional elements of their business models and outsource also these to upstream technology suppliers, similar to what we find in other industries (Womack, Jones, and Roos, 1990; Clark and Fujimoto, 1991; Langlois and Robertson, 1995, Langlois, 2004).

More recently, pro-competitive interface regulations have produced similar results in the fixed telecom services industry (Ulset, 2007, 2008). Also multinational mobile operators may start to realize what mobile virtual network operators (MVNOs) recognized long before them, that there is a lot more to benefit from outsourcing network operations, collaborating with local companies and sourcing innovative ideas from rival and related firms than what most incumbents used to think (Ulset, 2002; Blycroft, 2007).<sup>25</sup> Such outsourcing would allow upstream companies to excel in exploiting global cost economies and the downstream companies to excel in adapting services to local needs and conditions.

Much of the above observations can thus be summarized paraphrasing Christensen's (1997)

“innovator's dilemma” proposition: After the progress in mobile phone technology vastly overshoot the

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<sup>24</sup> Copying may be considered illegal if patent rights protect such knowledge or technology. Such rights have two different functions. They may protect the technology from leaking out to competitors or other companies, and they may facilitate trading by making it possible to sell or to license out the right to use the technology (on more or less exclusive terms).

<sup>25</sup> According to Blycroft Publishing there were roughly 255 active MVNOs, as of November, 2007 (<http://www.mvnodirectory.com/>).

functionality that most customers in emerging low-income markets could utilize, operators that wanted to win those customers overserved with functionality needed to start to compete on cost, convenience, customization, and speed to market, rather than on functionality. To achieve this, modular business systems that allow more productive mixing and matching of globally standardized components and locally customized business practices, tend to be created by national companies rather than by multinational companies. Competitive advantage may then start to migrate from global operators such as Vodafone towards local operators such as Bharti (see further illustrations below).<sup>26</sup>

The following comprehensive proposition summarizes the above discussion:

**Proposition 3:** As attractive business model features that initially were bundled into systemic business models to improve local performance, are later converted into standard modules (bundles of features) to improve global replication, such modules tend to develop into tradable products, more efficiently developed and produced by upstream suppliers and transferred to downstream operators using market and hybrid contracting rather than vertically integrated corporations, thus causing gradual fragmentation of local downstream markets.

The international mobile communications industry will now be used to further illustrate the workings of our TCE strategy model.

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<sup>26</sup> In this case, however, the global operator (Vodafone) proactively sought to mitigate such hazards by buying into the more efficient local operator (Bharti), thus illustrating Williamson's (1999a) more general "hazards mitigating" proposition cited above.

## THE MOBILE COMMUNICATION SERVICES INDUSTRY - FURTHER ILLUSTRATIONS

### Proposition 1

First, to illustrate the role of knowledge governance for the consolidation proposition, *Proposition 1*, consider the following knowledge transfer development at Telenor.<sup>27</sup>

*mHorizon*. At the beginning of the post-acquisition consolidation phase, Telenor established mHorizon to deal with international knowledge transfer. The unit was organized as a matrix, consisting of five company value teams (CVT) 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 practices. Selected technology and know-how were partly transferred through formalized tools, models and programs, partly by providing own experts to assist in diagnostics, 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, partly by designing an international network of interactive web pages and best practice workshops.

By 2001 Telenor had established nine specialized knowledge networks: customer service, customer retention, prepaid, UMTS, contract and procurement, GPRS, sales and distribution, finance, and accounting. These networks connected appointed local experts representing most affiliates. Regular

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<sup>27</sup> This case study is based on interviews and discussions with top management and staffs of Telenor Mobile over several years, besides annual reports and press releases from the company. The following account of mHorizon and its successor, Global Coordination, is based on Gooderham and Ulset (2007) "Telenor's third way", EBF, Issue 31, Winter 2007: 46-49.

meetings were held. While many innovative solutions and practices were discussed, and a friendly collegial atmosphere developed, lacking formal authority the knowledge networks had to rely on convincing arguments and telling experience rather than authoritative selection and implementation.

Besides, successful local implementation was often obstructed by a variety of unfavorable local conditions. Telenor was normally only one of several owners, and Telenor 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 not only due to insufficient local knowledge, but also due to insufficient global integration. In minority-owned subsidiaries, Telenor 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 represented competing international or local operators.

In Russia, for example, Telenor and its partly owned Russian subsidiary VimpelCom formed a 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.<sup>28</sup> As it turned out, however, conflicting interests and opportunistic behavior, along with numerous lawsuits launched by their Russian partner, precluded further productive relations from developing. Since then, majority ownership has by Telenor been considered a prerequisite not only for efficient knowledge transfer, but

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<sup>28</sup> 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."

also for efficient control over foreign direct investments, particularly in transition economies. As a consequence of insufficient local representation, competence and cooperativeness, recommended solutions were often ignored, sabotaged or never implemented as intended. The number of active knowledge networks thus declined steadily over the coming years until mHorizon was finally dissolved in 2003 to be replaced by a more powerful and centrally governed global coordination system.

*Global Systems Approach.* Gradually, Telenor intensified its pursuit for dominant ownership and shareholder agreements that would secure them strategic control over local operations. In areas where the economic benefit of scale economies was most important, such as procurement, Telenor could no longer allow voluntary local compliance. These were also the areas where best practices were most codifiable, and local managers most clearly recognized their own economic benefit from actively supporting a more centralized and explicitly standardized approach. As a consequence, global procurement became the most visible success of the many global coordination efforts. In other areas, however, where criteria for best technical solutions and operating practices were less obvious, initial development could to some extent be hindered by a lack of willingness to share whereas subsequent transfer and implementation were often obstructed by a “not-invented-here” attitude. In one particular instance concerning the choice of service technology, for example, Telenor tried to replicate their centrally authorized choice of technology. Being less convinced about the virtue of the selected technology, however, many local managers consistently postponed their decision to implement. Their reluctance to implement was later justified as the recommended technology proved to be immature and the timing for standardization was wrong, thus demonstrating the classical early adoption dilemma in regimes of rapid technological change. Gradually top management of Telenor realized that the central staff units had grown too large and ignorant of local operational conditions and challenges.

*Global Coordination Approach.* Being a majority owner is, however, no more than a precondition for effective knowledge transfer. Without highly motivated local managers that want to share, and amenable managers that feel obliged to implement, best solutions and practices cannot be successfully transferred and utilized. In 2004 Telenor therefore started to develop its so-called Global Coordination approach, consisting of two distinct elements. On the one hand there is a bottom-up democratic best practice selection process. On the other hand there is a hierarchy that corrects, approves, executes and monitors best practice outcomes of this process. To take the first element, this comprises five global teams - *Global Infrastructure, Global Procurement, Global Services, Global Consumer Segment, and Global Business Segment* - comprising two representatives from each of the subsidiaries plus representatives from corporate headquarters, and covering most fields of shared global interests such as human resource management, procurement, best practice, service concepts, market segmentation, and physical infrastructure.

Global teams are charged with identifying a knowledge-transfer project which they believe will improve global performance. It works in the following way. As representatives for their local subsidiaries, global team member are invited to select their most successful and widely applicable best practices and present these at global team meetings that the chief marketing officers (CMO) and chief technology officers (CTO ) from all main subsidiaries attend. After having presented and carefully discussed and scrutinized among themselves each and every proposal, global team members prioritize among the proposals on the basis of the value-creating potential they believe these proposals would represent for their particular subsidiaries. Final aggregate subsidiary priority is achieved by summarizing the representatives' individual priorities. This process is competitive, lively and

involving. Each global team will often be debating among as many as forty alternatives before the priority vote is cast and the leaders of the projects emerge.

Thereafter the second element of Telenor's knowledge sharing strategy is triggered. The team's collective decision has to be presented and defended at a meeting of the Telenor's Mobile Management Board (MMB) consisting of chief executive officers of the subsidiaries and members of Telenor's General Executive Management (GEM) with Telenor CEO, Fredrik Baksaas, acting as MMB chairman. MMB approval is usually forthcoming, but the board's main role is to determine evaluation criteria for the project and to approve a time-table. There is to be no hiding-place for any of the members of the global project team. They will be judged by the MMB collectively. Responsibility for development of final solutions is delegated to local operating companies with leading expertise in the respective fields. Local subsidiaries are expected to implement centrally approved best practices, unless exempted due to special local conditions. The active presence of CEO Fredrik Baksaas at MMB meetings assures maximum corporate backing and the avoidance of costly appeals of disputable decisions to higher corporate levels. With the MMB approved decision in place the project leader sets about implementing the project. After having actively participated in the decision making process and having pledged to act in accordance with the MMB's final decision, local managers are committed and motivated to assisting the project leader in her task. Apparently, Telenor's "democratic hierarchy" is succeeding in breaching "not-invented-here" mentalities and in bridging cultural and geographic distances.<sup>29</sup>

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<sup>29</sup> The respective knowledge governance forms differ accordingly, being more decentralized at Telenor, resembling a kind of *democratic hierarchy*, than at Vodafone, resembling a more traditional *autocratic hierarchy* (similar to the hierarchy imposed on company-owned operations of plural form replicators such as McDonald's in the fast food restaurant industry, see Bradach, 1997). Both democratic and autocratic structures can be



Telenor's *democratic hierarchy* for knowledge transfer thus resembles an internal knowledge services market where subsidiaries first present, discuss and select their favorite candidate solutions, then continue to develop and implement centrally approved final solutions. Judged by its impressive subscriber growth and dominant market position in many foreign markets, and by its rather successful development of knowledge governance structures from the early less integrated mHorizon to the later more fully integrated Global Coordination, Telenor Mobile may have achieved the kind of productive mix of global scale economies (based on standardization) and local responsiveness (based on customization) suggested by our knowledge governance model. At the same time, Telenor has continuously been reducing the numbers of globally exploitable knowledge fields (synergy areas) in response to the growing maturity of the industry, which lately have been showing increasing use of market and hybrid contracting also in connection with knowledge transfer and utilization.<sup>30</sup>

## Proposition 2

Now, to illustrate the global learning proposition, *Proposition 2*, consider the expansion strategy of a global replicator company such as Vodafone.

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contrasted with the “hypermodern” *heterarchy* alternative of Hedlund (1986, 1994). Among replicator companies such as multinational mobile-phone operators, however, heterarchy corresponds to a collection of newly acquired local companies before they are fully integrated into the larger multinational enterprise, more generally termed multidomestic companies. In our setting, however, these “heterarchies” are traditional multidomestic companies rather than “hypermodern” organizations.

<sup>30</sup> As such, Telenor's *democratic hierarchy* represents something very close to what Hedlund (1994: 86) might have envisaged as the *optimal mixture* of heterarchical N-form features (e.g.; Telenor's Global Team) and hierarchical M-form features (e.g.; Telenor's Mobile Management Board). According to Hedlund (1994: 86): “The various trade-offs between M- and N-form show that the choice between them depends on the nature of the field in which the company operates and that the optimum probably is some mixture of the two.”

As Vodafone continues to expand into more distant markets (like the Japanese market), and as the local responsiveness disadvantages of their globally standardized strategy start to exceed its cost advantages, failing performance may force Vodafone to change its globally strategy into a locally more responsive one. Seemingly, this implies redirecting its growth from advanced markets with already very high penetration and moderate growth expectations (e.g.; Sweden, Japan) to emerging markets with low penetration and high growth expectations (e.g.; India, Sub-Saharan Africa) while simultaneously designing low-cost business models capable of providing the services that low-income customers in emerging market can afford to buy.<sup>31</sup>

The most prominent example of such learning trade-offs, and associated hazards mitigation, is the recent divestiture of Vodafone Japan, the previously local independent operator J-Phone. Having failed miserably in introducing their standard third-generation (3G) world phone to the saturated and competitive Japanese market, Vodafone Japan was divested and sold to the Japanese conglomerate Softbank (Economist, 2006b). As compensation for its loss of the Japanese market, Vodafone decided to acquire a larger share of the rapidly growing Indian mobile market, and bought a controlling interest in the 4<sup>th</sup> largest operator, Hutchison Essar Limited, and a minority interest in the largest national operator, Bharti, known for its innovative business model. A few months later Vodafone bought remaining shares of Essar, and turned it into a local Vodafone subsidiary.

In particular, the “super-light” operator Bharti outsources most of its operations to IBM, Ericsson and Nokia and spends nothing on research and development in order to focus on its downstream core skills

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<sup>31</sup> As pointed out by industry observers, whereas the average revenue per user (ARPU) for the first billion users was 20\$ a month, it can be as low as 2\$ for the next billion.

of marketing and customer management (Economist, 2006c). Local independents like Bharti compete against multinationals by pursuing even higher levels of local responsiveness than what can be pursued by multidomestic firms, but without the attendant cost disadvantage. Here, global scale economies is realized by contracting and collaborating with a diverse range of upstream suppliers, related and rival companies (market mode) instead of acquiring and integrating these into the downstream network operator (corporate mode). To serve emerging low-income markets better, a plethora of specialized low-cost modular devices, programs and services have emerged, capable of causing similar unbundling of the mobile wireless system as open interface standards once did to the minicomputer and similar system products (Langlois and Robertson, 1995; Christensen, 1997; Christensen et al, 2002). To the extent local independents face greater variety of competing solutions and enjoy greater freedom to experiment and innovate than subsidiaries of multinational replicators, learning myopia may even hurt independents like Bharti less than most multinational companies.

[Figure 4. Indian mobile-phone operators, about here]

Thus, in response to increasing market saturation and industry maturity, also Vodafone seems fully prepared to change its international growth strategy from a globally standardized strategy into a more locally responsive one. After a period of declining financial results and declining share prices (despite growing numbers of subscribers), the company now promotes transfer of replicable elements of their business model not only to their own consolidated local subsidiaries, but also to external network

partners and local independent firms while outsourcing other elements to upstream suppliers and service providers.<sup>32</sup>

### **Proposition 3**

To illustrate the final fragmentation proposition, *Proposition 3*, consider recent initiatives indicating that the advantage that giant operators such as Vodafone might have over national operators and medium sized multinationals such as Telenor may be smaller than originally envisioned (Vodafone now being “only” 3 times the size of Telenor Mobile in numbers of 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 (Rehak, 2007).

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 rather than through subsidiary membership in Vodafone or similar multinational mobile-

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<sup>32</sup> Thus, the Vodafone stock gradually regained its strength, and rose 30 % last year (Economist, 2007).

phone operators.<sup>33</sup> 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 even radio frequencies may be jointly owned and operated by two or more 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, UK and US markets (Ulset, 2002, 2008; AT Kearney, 2007a; Blycroft, 2007), 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, multinational equipment suppliers and professional services firms increasingly perform network construction and upgrading, operation service and maintenance. Increasingly, therefore, basic network operation and capacity wholesale are developing into commodity businesses, 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 significantly (by as much as 40%).<sup>34</sup> As soon

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<sup>33</sup> As exemplified in a press release from 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](http://www.t-mobile-international.com/CDA/tmo_alliance,20,,newsid-1629,en.html?w=1024&h=603))

<sup>34</sup> Nokia Press Release February 13, 2007. *Nokia to expand its 3G radio access network sharing solution for up to four operators*. Nokia will expand its 3G radio access multi-operator solution to enable the sharing of a radio access network (RAN) between as many as four operators. ....This unique Nokia solution will now allow network sharing between three or even four operators and give additional opportunities to significantly reduce the costs of WCDMA rollout and operation, enabling over 40% savings in initial RAN network investments," says Ari Lehtoranta, Senior Vice President and General Manager, Radio Networks, Nokia.

as the first couple of players have managed to achieve this, remaining players cannot but 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. Supernormal 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 subsidiaries of multinational operators seldom are dominant operators in local markets.

Fourth, once declining stocks of Vodafone and other multinational wireless giants may not only reflect stagnant ARPU (average revenue per user) in a preliminary saturated market waiting for the next generation mobile wireless services to catch on. It may also reflect that investors expect future ARPU and stock prices to depend more on equipment makers, content providers and even alternative wireless communications technologies (e.g.; WiFi (Wireless Fidelity) and WiMAX networks) than on mobile wireless operators’ own capabilities. 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 capturing a larger share of future profit of downstream wireless operators. As a consequence, several competing forces emanating from local rivals, new entrants, substitutes and even

shareholder activists will continue to prevent multinational wireless giants from dominating local markets (Economist, 2006a, 2006b, 2007a).<sup>35</sup>

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<sup>35</sup> Since open interface standards seem to have such profound effects on the limit to local growth of multinational replicators, any factors that affect evolution of open standards are of the utmost importance. Different players tend to have different interests in supporting such open standards. Whereas *incumbents* that want to profit as much as possible from their proprietary assets (e.g.; network facilities) would prefer to release only the peripheral interface of such assets, not their core operating functions (e.g.; the “source code” of the operating system), *new entrants* that want to capture a larger share of the market, *regulators* that want to have more competition, and *consumers* that want more innovative products to choose from, would all prefer to have also the core operating functions released, shared or regulated at favorable prices. Further inquiries into these matters must, however, be left for later research. Here it suffices to emphasize that whereas entry-friendly regulation may increase the utilization of existing essential facilities, incentives for building new innovative facilities may suffer.

## CONCLUSION AND DISCUSSION

The foregoing discussion reaches the conclusion, contradictory to mainstream RBV, that superior and inimitable (costly-to-imitate) knowledge can hardly be a source of sustainable competitive advantage of multinationals that compete by replicating their business models in foreign markets when these models are based on open and non-proprietary global standards. In these cases, global standards perform the coordination that multinational enterprises otherwise might have performed. Most of the remaining firm specific parts of the business model that might have differentiated the focal firm from its competitors are converted into increasingly imitable, or even tradable, elements as a result of the replication strategy itself. That is, to succeed as multinational replicator, superior and sticky knowledge assets must first be converted into explicit and imitable information and bundled into replicable business models for which a specialized knowledge processing hierarchy will be needed. If not converted, inimitable knowledge isolated from competition is likely to depreciate relatively quickly even in moderately dynamic markets. Under such competitive conditions, local subsidiaries of multinationals may no longer be advantaged over local independent firms in accessing leading technology and industry best practice, while still being somewhat disadvantaged in responding to variations in local needs, traditions and regulatory conditions. Thus, the competitive advantage that subsidiaries of integrated multinationals once had over local independent firms may start to erode, probably affecting global companies more severely than transnationals due to stronger learning myopia among the former than the latter (since the simplification & specialization mechanisms that most typically characterize learning myopia characterize global companies to a greater extent than transnational companies). If so, vertical fragmentation (increasing disintegration) rather than consolidation (increasing integration) will result.



That is, fragmentation (declining local market share) rather than consolidation tends to occur as previously integrated business models evolve into modular systems causing the *globally standardized* parts of such models to be outsourced to upstream competing suppliers and service providers whereas the *locally customized* parts are increasingly being exposed to competition from smaller and more innovative rival and related companies. Such modularity will not only enable competing upstream suppliers and service providers to participate in developing more innovative, locally responsive, and even cheaper, business models. It will also produce indirect network externalities under which greater availability of complementary system components (e.g.; applications and services) increases the return to each single system innovation (e.g.; new network technology) thereby increasing the incentives for developing more innovative business models, especially to the extent open interface standards are also non-proprietary (like the GSM standard), thus favoring creative entrants more than protective incumbents.

Whereas the disintegration effects are similar in advanced and emerging markets, the drivers are different. In both markets, operators need to collaborate upstream in order to compete more effectively downstream. For example, in emerging high-growth markets, physical networks are outsourced to upstream equipment suppliers in order to increase speed to market (network roll-out) and to release management capacity to focus on downstream marketing and sales; in advanced markets, network capacity is rented out to specialized service providers, content providers and reseller in order to increase demand and utilization of large scale “third generation” (3G) capacity. Some operators may even prefer renting other rival companies’ network instead of building their own networks thereby positioning themselves as mobile virtual network operators (MVNOs). Indeed, modern MVNOs providing new innovative business models are currently one of the strongest impetus for further

innovation and growth in many Western wireless markets (e.g.; Virgin Mobile in France). For such collaborative contracting to happen, however, interfaces that regulate interactions between diverse business models elements (facilities, applications, services) need to be fairly clearly specified, measured and understood so that these elements can be outsourced to upstream equipment suppliers and network service providers as well as to downstream virtual operators and resellers at lowest possible transaction costs (thus causing fragmentation).<sup>36</sup>

In many replicator industries, therefore, where regimes of appropriability are rather weak, sustainable competitive advantage may simply not be attainable, as far as replicable business models are concerned. If so, any remaining sources of sustainable competitive advantage must reside elsewhere. Most likely candidate would be some kind of “dynamic capability” whose purpose is not to convert and replicate itself but to search and select appropriate business model elements, to convert and bundle such elements into replicable business models, to reproduce the bundles they chose to replicate, and finally to select appropriate sites (attractive foreign markets) where bundles can be replicated. One such candidate is Telenor’s international knowledge transfer organization Global Coordination supervised by its corporate Mobile Management Board. In the parlance of TCE, such a “dynamic

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<sup>36</sup> Alternatively, using our general growth proposition, the above RBV-contradictory conclusion can be stated as follows: When business models are the superior and less tradable knowledge assets that generate huge scale and scope economies when replicated in an increasing number of foreign markets, multinationals will tend to rise and continue to grow until local markets are dominated by subsidiaries of a few global enterprises. By reverse logic, *limits to local growth* tend to occur as the initial superior business models of multinational replicators turn increasingly less superior, and as their underlying knowledge assets turn increasingly tradable. Superior business models may start to erode as sources of innovations start to migrate from inside the multinationals to outside specialized suppliers, related and rival firms and from home markets to more distant frontier markets (e.g.; bottom-of-the-pyramid markets) where political, cultural and legal “rules of the game” may prohibit successful operation of Western multinationals. In the remaining and institutionally more attractive markets, contractual access to innovative business knowledge will improve as the result of open and non-proprietary global standards, causing declining transaction costs between suppliers of innovative business methods and national operators of the resultant modular business models.

capability” would either be conceived of as a specialized governance structure (“democratic hierarchy”) closely aligned with the larger multinational governance structure, or as just another firm-specific organizational assets specialized in international knowledge transfer.

Not only non-transferable assets, but also prohibitive cross-country dissimilarities (CAGE distances) and inefficient governance structures may delay or prevent further growth of multinational replicators and subsequent consolidation of local markets. The moderating effects of these factors are in themselves important topics for further research. The message of this study is, however, that to fully recognize limits to growth of multinational replicator companies, a more comprehensive knowledge governance approach will be needed. Under such an approach, knowledge transfer under the corporate form is viewed as a “last resort option” to be tried only after alternative transfer modes have proven deficient or inefficient. The fact that in many (modular systems) industries intra-firm transfers seem to be in decline relative to inter-firm transfers only reflects Penrose’s original statement that “strictly speaking, it is never resources themselves that are the inputs in the production process, but only the services that resources can render” to which we might add: “and to the extent such services can be traded without their enabling resources, contracting and fragmentation will result rather than integration and consolidation”.

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Appendix A. World's largest mobile-phone operators (source: Wikipedia, the free encyclopedia, March 13, 2008)

Rank	Company	Main Markets	Technology	Subscribers (proportionate, in <a href="#">millions</a> )	Subscribers (total, in <a href="#">millions</a> )
1	<a href="#">China Mobile (China)</a>	China (inc. Hong Kong) & Pakistan	<a href="#">GSM</a> , <a href="#">GPRS</a> , <a href="#">EDGE</a> , <a href="#">TD-SCDMA</a>	369.33 <a href="#">[1]</a> (December 2007)	369.33 <a href="#">[2]</a> (December 2007)
2	<a href="#">Vodafone (United Kingdom)</a>	<a href="#">Most of Europe</a> , Australia, USA, New Zealand, South Africa, Egypt, India, Turkey	<a href="#">CdmaOne</a> , <a href="#">CDMA2000 1x</a> , <a href="#">EV-DO</a> , <a href="#">GSM</a> , <a href="#">GPRS</a> , <a href="#">EDGE</a> , <a href="#">UMTS</a> , <a href="#">HSDPA</a>	252.3 <a href="#">[3]</a> (December 2007)	
3	<a href="#">China Unicom (China)</a>	China (inc. Macau)	<a href="#">CdmaOne</a> , <a href="#">GSM</a> , <a href="#">GPRS</a>	160.1 <a href="#">[4]</a> (December 2007)	160.1 <a href="#">[5]</a> (December 2007)
4	<a href="#">Telefónica / Movistar / Telcel / O2 (Spain)</a>	Spain, Most of <a href="#">Latin America</a> (Brazil, Argentina, Mexico and more countries), UK, Germany, Czech Republic, Morocco, Republic of Ireland, Slovakia, Bosnia and Herzegovina	<a href="#">D-AMPS</a> , <a href="#">CdmaOne</a> , <a href="#">CDMA2000 1x</a> , <a href="#">GSM</a> , <a href="#">GPRS</a> , <a href="#">EDGE</a> , <a href="#">UMTS</a> , <a href="#">HSDPA</a>	160.1 <a href="#">[6]</a> (September 2007)	160.1 <a href="#">[7]</a> (September 2007)
5	<a href="#">América Móvil (Mexico)</a>	USA, Argentina, Chile, Colombia, Paraguay, Uruguay, Mexico, Puerto Rico, Ecuador, Peru, Brazil, Dominican Republic, Guatemala, Honduras, Nicaragua, Ecuador and El Salvador	<a href="#">D-AMPS</a> , <a href="#">CdmaOne</a> , <a href="#">CDMA2000 1x</a> , <a href="#">EV-DO</a> , <a href="#">GSM</a> , <a href="#">GPRS</a> , <a href="#">EDGE</a> , <a href="#">UMTS</a>	153.4 <a href="#">[8]</a> (December 2007)	153.4 <a href="#">[9]</a> (December 2007)
6	<a href="#">T-Mobile (Germany)</a>	Germany, USA, UK, Poland, Netherlands, Austria, Czech Republic, Hungary, Slovakia, Croatia, FYR Macedonia, Montenegro, Bosnia, Herzegovina, and Puerto Rico	<a href="#">GSM</a> , <a href="#">GPRS</a> , <a href="#">EDGE</a> , <a href="#">UMTS</a> , <a href="#">HSDPA</a>	119.6 <a href="#">[10]</a> (December 2007)	119.6 <a href="#">[11]</a> (December 2007)

7	<a href="#">Orange / France</a> / <a href="#">Télécom (France)</a>	France, UK, Switzerland, Poland, Spain, Israel, Romania, Moldova, Slovakia, Netherlands, Bosnia and Herzegovina, several African and Caribbean countries	<a href="#">GSM</a> , <a href="#">GPRS</a> , <a href="#">EDGE</a> , <a href="#">UMTS</a> , <a href="#">HSDPA</a>	109.7 <a href="#">[12]</a> (December 2007)	109.7 <a href="#">[13]</a> (December 2007)
8	<a href="#">Telenor (Norway)</a>	<a href="#">Scandinavia</a> , <a href="#">Serbia</a> , Eastern Europe, Bangladesh, Pakistan, and various Asiatic countries	<a href="#">GSM</a> , <a href="#">GPRS</a> , <a href="#">EDGE</a> , <a href="#">UMTS</a> , <a href="#">HSDPA</a>	90.0 <a href="#">[14]</a> (December, 2007)	142.7 <a href="#">[15]</a> (December 2007)
9	<a href="#">MTS (Russia)</a>	Russia, Ukraine, Belarus, Uzbekistan, Turkmenistan, Armenia	<a href="#">GSM</a> , <a href="#">GPRS</a> , <a href="#">EDGE</a> , <a href="#">UMTS</a>	81.97 <a href="#">[16]</a> (December 2007)	81.97 <a href="#">[17]</a> (December 2007)
10	<a href="#">AT&amp;T Mobility (United States)</a>	United States, Puerto Rico and US Virgin Islands	<a href="#">GSM</a> , <a href="#">GPRS</a> , <a href="#">EDGE</a> , <a href="#">UMTS</a> , <a href="#">HSDPA</a> , <a href="#">HSUPA</a>	70.1 <a href="#">[18]</a> (January 2008)	70.1 <a href="#">[19]</a> (January 2008)
11	<a href="#">Verizon Wireless (United States)</a>	United States	<a href="#">CdmaOne</a> , <a href="#">CDMA2000 1x</a> , <a href="#">EV-DO</a>	65.7 <a href="#">[20]</a> (December 2007)	65.7 <a href="#">[21]</a> (December 2007)
12	<a href="#">SingTel (Singapore)</a>	Singapore, Australia, India, Indonesia, Thailand, Philippines, Bangladesh, Pakistan	<a href="#">GSM</a> , <a href="#">UMTS</a> , <a href="#">HSDPA</a>	61.38 <a href="#">[22]</a> (December 2007)	171.54 (December 2007)
13	<a href="#">Telecom Italia / TIM (Italy)</a>	Italy, Brazil	<a href="#">D-AMPS</a> , <a href="#">GSM</a> , <a href="#">GPRS</a> , <a href="#">EDGE</a> , <a href="#">UMTS</a> , <a href="#">HSDPA</a>	61.1 (June 2006)	61.1 (June 2006)
14	<a href="#">Bharti Airtel (India)</a>	<a href="#">India</a> , <a href="#">Seychelles</a> , <a href="#">Jersey</a>	<a href="#">GSM</a> , <a href="#">GPRS</a> , <a href="#">EDGE</a>	60 <a href="#">[23]</a> (January 2007)	60 <a href="#">[24]</a> (January 2007)
15	<a href="#">Orascom Telecom (Egypt)</a>	<a href="#">Algeria</a> , <a href="#">Bangladesh</a> , Egypt, <a href="#">Greece</a> , <a href="#">Italy</a> , <a href="#">Pakistan</a> , <a href="#">Tunisia</a> , <a href="#">Zimbabwe</a>	<a href="#">GSM</a> , <a href="#">GPRS</a> , <a href="#">EDGE</a>	53.0 <a href="#">[25]</a> (September 2007)	65.0 <a href="#">[26]</a> (September 2007)
16	<a href="#">Sprint Nextel (United States)</a>	United States, Puerto Rico	<a href="#">iDEN</a> , <a href="#">WiDEN</a> , <a href="#">CdmaOne</a> , <a href="#">CDMA2000 1x</a> , <a href="#">EV-DO</a>	53.8 <a href="#">[27]</a> (December 2007)	53.8 <a href="#">[28]</a> (December 2007)
17	<a href="#">VimpelCom (Russia)</a>	Russia, Kazakhstan, Ukraine, Uzbekistan, Tajikistan, Georgia, Armenia	<a href="#">D-AMPS</a> , <a href="#">GSM</a> , <a href="#">GPRS</a>	53.3 (November 2006)	53.3 <a href="#">[29]</a> (November 2006)
18	<a href="#">NTT DoCoMo (Japan)</a>	Japan	<a href="#">PHS</a> , <a href="#">PDC</a>	53.15 <a href="#">[30]</a>	53.15 <a href="#">[31]</a>

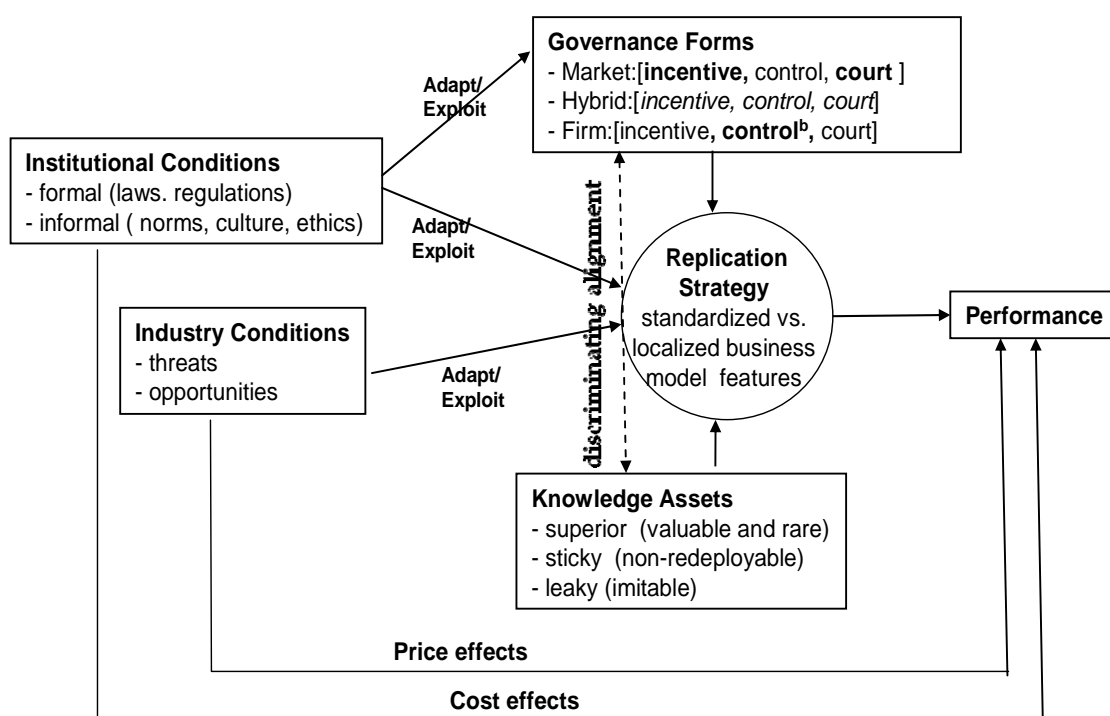
			<a href="#">FOMA,</a> <a href="#">HSDPA</a>	(December 2007)	(December 2007)
19	<a href="#">Telkomsel</a> ( <a href="#">Indonesia</a> )	<a href="#">Indonesia</a>	<a href="#">GSM</a> <a href="#">UMTS</a>	42.81 (June 2007)	42.81 <a href="#">[32]</a> (June 2007)
20	<a href="#">TeliaSonera</a> ( <a href="#">Sweden</a> and <a href="#">Finland</a> )	<a href="#">Scandinavia</a> , <a href="#">Baltic</a> , Russia, Turkey, Eurasia, Spain	<a href="#">GSM</a> , <a href="#">GPRS</a> , <a href="#">EDGE</a> <a href="#">UMTS</a> , <a href="#">HSDPA</a>	41.7 (December 2006)	100.2 <a href="#">[33]</a> (March 2007)

## Appendix B: 3G myopic learning

An even more impressive myopic learning case is the adoption of the European third-generation (3G) wireless technology just before the Internet bubble burst in 2000. Compared with the previous second-generation (2G) network, 3G radio networks offered significantly higher wireless data transmission capacity and enabled the use of powerful mobile phones that would function more like PCs connected to the Internet (transmitting large amounts of data and videos in addition to voice and simple text messages). New 3G licenses were up for bid, but only at highly inflated “Internet” prices. Under mounting threats from new entrants, most incumbents, however, felt they had no choice but to bid and pay whatever the price. The problem was that there appeared to be little demand for the new technology, particularly after the telecom boom went bust. European incumbents burned 150 billion \$ for the 3G licences and wrote off plans for network roll-out. Like in many other industries before them, such as the computer, pharmaceuticals, automobile, retailing and steel industries, technological progress had dramatically overshot what mainstream customers could utilize (Christensen, 1997). Companies that now wanted to win the business of customers overserved with functionality had to change the way they competed: they had to design modular upgradeable products and start to compete on speed to market, price, flexibility and convenience, rather than on functionality (Christensen, 2001:

75-76; Christensen et. al.; 2002). Based on a non-proprietary and open architecture, second-generation (2G) networks was not only modular, but also upgradeable to low grade 3G capacity (called 2.5G or 2.75G), allowing a rapidly growing number of innovative and disintegrated suppliers, content providers and facilities-less operators to compete in bringing higher-quality and lower-priced products and services to market more quickly.

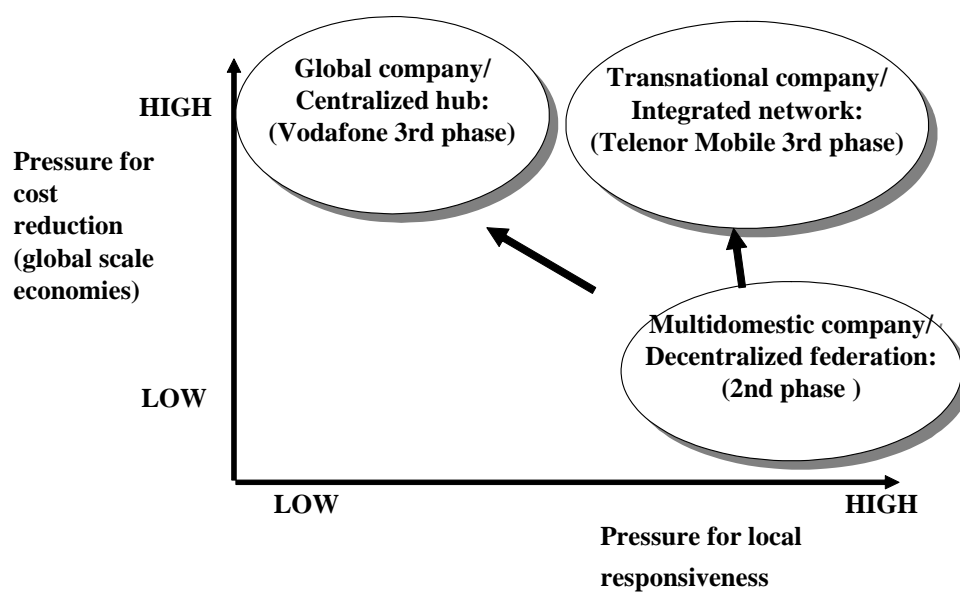
**Figure 1. TCE Strategy Model for International Knowledge Transfer**



<sup>a)</sup> bold/italics/normal indicate high/medium/low degree of incentive intensity, administrative control and court ordering, respectively (Williamson, 1991).

<sup>b)</sup> **control** (in bold) indicates extensive use of both formal administrative control and informal normative social control (Williamson, 1999b).

**Figure 2. Consolidation**





**Figure 3. Fragmentation**

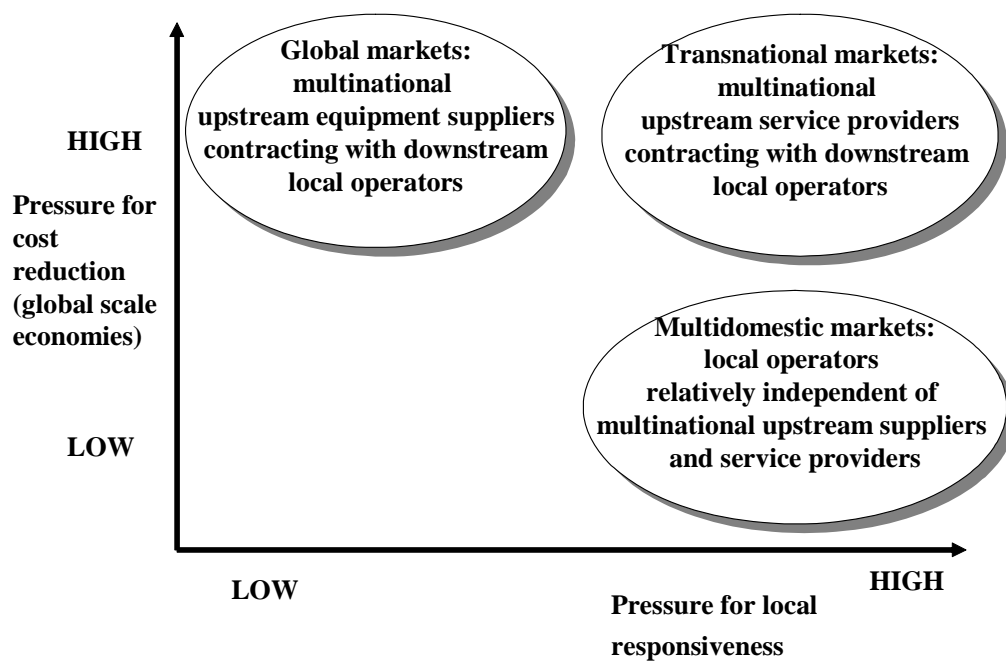
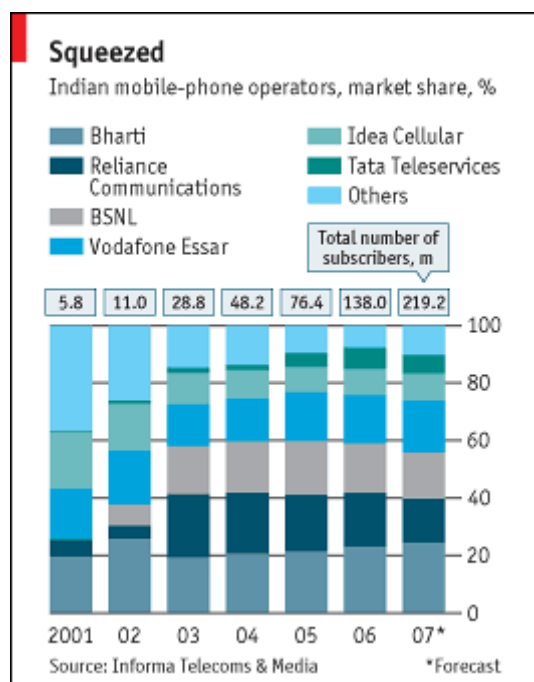


Figure 3. Indian mobile-phone operators



Source: The Economist 2007b