THE METANATIONAL CORPORATION

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Abstract

The metanational corporation creates advantage on a world-wide scale. It does not limit itself to the international exploitation of those strategic advantages that it created in a national or "home-country" setting. Building on the fact that the relevant knowledge base in many industries is increasingly dispersed and contextually embedded, the metanational creates value by accessing, melding, and leveraging distant capabilities and market knowledge. It uses effective sensing and capturing nodes in each defining market and critical capability cluster. It manages attractors that coalesce and integrate dispersed knowledge and capabilities, while keeping knowledge nodes effectively and efficiently connected. A framework is presented to assist in understanding the major challenges, and propositions are presented to deal with the implementation of a metanational strategy.

Introduction

Historically, multinational corporations (MNCs) have prospered by transferring and combining first world knowledge, such as innovative technology, predominantly drawn from their home base, with third world resources, such as raw materials and labor. When executed successfully, this has allowed them to approach first world productivity at third world costs. MNCs have thus arisen, as an organizational form, largely where "internalization" in the MNC was the most efficient governance form for international knowledge combination (Hymer,1960; Dunning, 1981)[1].

The capability to efficiently combine knowledge from different locations around the world is becoming increasingly important as a determinant of the competitive success of MNCs (Doz & Rangan, 1997). However, in this paper we argue that the efficiency of the MNC as a knowledge integrating institution is being challenged by changes in both the location and the nature of knowledge combination opportunities. We then briefly assess whether existing theoretical and empirical models on the functioning of the MNC adequately address these challenges. We find them wanting. This is perhaps not surprising since most models are generalizations developed from history, often with the goal of explaining current patterns of MNC investment and activities in terms of administrative heritage and organizational evolution. The spirit and goals of this paper are different. Recognizing the observation made some years ago (Martinez & Jarillo,1989) that MNC management practices have evolved in response to new challenges, and that management research has generally trailed the forefront of practice, this paper attempts to anticipate the next stage of MNC development in response to environmental changes we observe gathering pace.

Drawing on theories of knowledge articulation, mobility and complexity, we identify critical elements of the knowledge integration process. We then develop a set of alternative strategies, structures and processes through which MNCs may choose to manage the simultaneous challenges of knowledge dispersion and knowledge complexity. While our

[1] For a review of the internalization literature, see Dunning, 1993.

conceptual analyses are informed by empirical evidence on the challenges MNCs face and how they address them, the new organizational solutions are not yet sufficiently widespread to permit a full-scale, empirical study. Instead, we highlight the experience of the innovators that we believe will be the forerunners of tomorrow's "Metanational" MNCs.

Challenges to Knowledge Integration

The ability of MNCs to maintain their competitive advantage through efficient integration of knowledge is being challenged by changes in both the location and nature of specialized knowledge.

The location challenge:

Traditionally, MNCs have derived their advantage by transferring (or "projecting") knowledge accumulated in their home country, mainly in the form of technologies and competencies, while accessing local, host country resources, mainly customers, labor and materials. Not only did MNCs' technologies and competencies stem largely from peculiar historical conditions in their home country (Vernon, 1966; Porter, 1990) where both demand and supply conditions were simultaneously favorable to innovation and to the birth and growth of new activities, but even today, the innovative activities of most MNCs are concentrated around their home base or in a very few, long-established foreign subsidiaries (Patel & Pavitt, 1988; Dunning, 1994). Few MNCs perform significant R&D outside the home country. The vast majority of innovations, even in "soft" areas like systems and culture, still emanate from the home country as well.

Increasingly, however, the simple model whereby home country competencies and technologies are married to host country resources is breaking down. Leveraging internationally the know-how advantages derived from a home country competence cluster is no longer sufficient to underpin competitive advantage unless the home base remains the only crucible of new technologies, competencies and leading customers. As new wellsprings of

technology and sophisticated customer demand emerge in non-traditional locations, this assumption of home base supremacy holds true for fewer and fewer companies. As the leading edge of knowledge creation grows more dispersed, the opportunity cost of relying exclusively on the home base as the source of knowledge and innovation increases.

In some cases geographic shifts in the leading edge of key technologies and competencies follow the move of manufacturing. Initially manufacturing moves in search of lower costs, but over time the presence of manufacturing engenders the local development of new technologies, capitalizing on benefits of collocation. Semiconductor manufacturing plants in South East Asia, for example, have spawned local innovation in the technologies for the packaging of semiconductors. Lead users may also be the drivers of innovation. Product innovations calling for different technologies, such as for instance the shift from cathode ray to flat screen monitors, may also make different competencies much more critical and shift and fragment geographically the locus of innovative activities. New critical competencies can emerge in new locations, such as distributed computing and all the supporting technologies in California. This may in turn shift the locus of innovation activities in other industries such as pharmaceuticals, where the critical new disciplines of recombinant chemistry and genetic sciences require access to state-of-the-art information technologies. While some developments can perhaps be anticipated, and take time to grow, others can emerge in surprising locations or with unexpected speed. Consider the example of P&G, the US consumer goods leader, discovering that, in its own organization, some of the best media campaign designs, with world-wide applicability, unexpectedly originated from Taiwan.

With demand for new functionality, variety and customization, goods tend to become more complex. Even simple well-known products like automobiles or personal computers call for a wider range of components relying on a growing number of disparate technologies. The growing move toward integrated information-based networked solutions accelerates the rate at which complexity increases. As goods become more complex, and as competition is increasingly driven by innovation, tapping into the increasingly dispersed leading edge of knowledge creation is key. In the 1980s, for example, when Oerlikon attempted to enter the air defense missile business (a substitute for its traditional line of the anti aircraft guns) it had to assemble competencies and market expertise from several of its subsidiaries and from a

number of partners in half a dozen countries in a novel way. By reaching beyond any single, home-base cluster, Oerlikon was able to build advantages in both product technology and market access compared with established competitors in the missile field who relied on a narrower geographic window for their competencies and information (Doz, 1989).

As relevant knowledge originates from more dispersed parts of the world, and as products and customers require more complex knowledge combinations, the traditional models whereby, say, the US led in farm machinery, Europe led in chemicals and Japan in consumer electronics, and firms from these countries internationalized in these industries in orderly fashion as markets developed around the globe, are becoming obsolete. MNCs need a new prescription.

The knowledge complexity challenge:

To remain competitive, MNCs first have to access unique knowledge that they can make proprietary, usually because it is slow and costly to imitate (Lippman & Rumelt, 1982; Dierickx & Cool, 1989). They then need to develop mechanisms for efficiently moving this proprietary knowledge around. This obviously creates a paradox for MNC managers: the simplest forms of knowledge, such as digital information, are the easiest to move internationally, but they also confer the least sustainable competitive advantage. An important part of global competition is therefore the race to learn to access, connect, exploit and leverage new knowledge, and thus to profitably arbitrage knowledge asymmetries (Stopford, 1995).

Firms have learned how to arbitrage simple knowledge, such as differential factor costs. They have also learned to respond to more complex cost adjustments, such as currency fluctuations (Rangan, 1994). However, more efficient, electronic network-based global markets restrict the profit opportunities from arbitraging information about external factors of production. Over time, therefore, firms shifted the emphasis to arbitraging factors for which impersonal, arms-length markets handled very imperfectly: those, for example, with a high intangible content. In particular, they learned to deploy and co-ordinate their assets to

configure an efficient global value chain without losing the advantages of national responsiveness (Doz, 1980, 1986; Prahalad & Doz, 1987, Bartlett & Ghoshal, 1989). They also extended such co-ordination to more complex tasks, from marketing to manufacturing and to product design. with quality of co-ordination and process management becoming the differentiating factors (Doz & Prahalad, 1988).

As they moved from simple to more complex co-ordination tasks, such as the shift from global logistics to global product creation, firms typically bounded the knowledge management task by limiting the type of knowledge they integrated across borders, the forms of knowledge transfer, and the range of locations between which knowledge had to be combined.

MNCs therefore began by focusing on the transfer of highly mobile knowledge. One example is the transfer of whole segments of the computer software industry to lower cost locations such as India, and the development of global subcontractors such as Tata Software. The transfer of more complex types of knowledge was facilitated by embodying it into equipment that could then be transferred more easily than the disembodied knowledge itself (Badaracco, 1991). Alternatively, complex knowledge was broken down into well-defined "knowledge packages", the interfaces between which could be precisely articulated. This allowed relatively complex systems, such as IBM's "Thinkpad" laptop computer to draw on subsystems from vendors and IBM centers from around the world.

When mobility of the relevant knowledge could not be achieved through these mechanisms, MNCs limited the number of locations from which knowledge was drawn and co-located the key, interdependent tasks. Taken to an extreme, this strategy drives an organization back towards the traditional solution of leveraging only home-base knowledge and ignoring other sources of technology, know-how or information. A partial solution is to establish multiple "home bases". This might be achieved , for example, by moving the head office of individual businesses to the most critical hotbed of capabilities, as some European firms are doing by moving the headquarters of their microelectronics or software divisions from Europe to Silicon Valley. Alternatively, the MNCs may move the office of some of its corporate functions, as the Japanese pharmaceutical firm Eisai did by making Boston its

R&D headquarters. New businesses may be developed from scratch in new locations, as Shiseido did quite successfully by starting a "greenfield" fragrance business in France to serve the world market. This kind of major, geographic restructuring, however, is difficult. In practically all the cases in our research, we found that the geographic configuration of the MNC did not change fast enough to track the geographic configuration of strategically significant knowledge. Moreover, only in a few industries, such as microelectronics in California or perfumes in France, are the capability clusters sufficiently few and geographically stable enough to make such re-structuring solutions effective over the medium term.

Overall, we observed that the conventional approaches outlined above were reaching their limits for more and more companies as the quest for competitive advantage demanded that they access, transfer and integrate ever more complex knowledge across an increasingly dispersed and different set of locations. To more fully understand the extent of the challenge, a short discussion of the nature of knowledge is in order.

As we noted earlier, the very characteristics that make a particular piece of knowledge strategically valuable also makes it difficult to transfer. More specifically, articulated knowledge seldom acts as a source of sustainable competitive advantage. Even where institutional devices (such as intellectual property rights) do allow explicit, articulated knowledge to command monopoly rents, these are generally of finite life. They may also be difficult to enforce in many countries. By contrast, tacit knowledge, a category usually attributed to Polanyi (1962, 1966), is potentially the most strategically valuable. But tacit knowledge, by definition, is not articulable, though some can be taught (e.g. by demonstrating) and learned (e.g. by doing). Hence tacit knowledge is difficult for the multinational to transfer and thus exploit.

Faced with this dilemma, the most interesting class of knowledge for a MNC is knowledge that is "potentially articulable", but hard for most organizations to articulate (for instance because it is part of a system and not easily observable in action). The MNC can derive strategic advantage from such knowledge that has not yet been articulated if it can do so, largely because it is otherwise hard to transfer or replicate, sometimes for a considerable

period of time (Winter, 1987). Once an MNC has developed the capability to articulate tacit knowledge from a particular source, competitive urgency (Stalk and Hout, 1990; D"Aveni, 1994) may limit the opportunity for competitors to imitate it because developing such a capability is often a time consuming task. Provided the knowledge can either be kept proprietary or the MNC can create a continuous supply of new, articulated knowledge, competitors may be forced to settle for second-best solutions: ignoring potential valuable, but tacit, knowledge or co-locating other operations with it even if they should optimally be dispersed elsewhere.

The successful articulation of tacit knowledge is, however, only the first step towards reaping its potential benefits. Even articulated knowledge still needs to be understood in a usable manner by "distant" receptors. Knowledge and its expression are rooted in the interactions between the individuals and their local community in particular circumstances, and in this sense, knowledge is locally embedded and context dependent, part of a system of meaning (Fleck, 1979). Sharing knowledge in MNCs therefore faces equivocality, i.e. confusion over the same piece of information being given several meanings leading to different actions (Weick and Van Orden, 1990). Even recontextualization of articulated knowledge by culturally distant receptors may become unpredictable and seriously hinder the MNC's goals - such as in the case of EuroDisney (Brannen and Wilson III, 1996).

We will use three levels of knowledge complexity in order to capture the growing challenge of articulating and transferring knowledge: Explicit knowledge; Experiential knowledge; and Existential knowledge. The least complex knowledge form is Explicit knowledge, codified or articulated in an objective manner. We find it in manuals, patents, technical blueprints, specifications, computer software and so on. We learn by observing and studying. The most complex is Existential knowledge, which we learn by feeling and living. Its truth is taken by its holders as an attribute of existence, as it depends on being in communion with the reality itself. This makes decontextualization and recontextualization difficult and rather uncertain. Examples include "movements" (e.g., the quality movement in Japan or the environment movement in Germany), and cultural artifacts (e.g., fashion, arts, music). The intermediate level of complexity is made of Experiential knowledge. Though

subjective, embedded and contextual, it may be learned through limited experience and practice, such as professional skills, industry norms, or procedural knowledge in action.

The three levels of knowledge are analogous to "taking a picture", "jumping into the shoes", and "creeping into the mind", respectively. Competitive advantage is likely to depend increasingly on the MNCs" ability to combine experiential, and even existential knowledge from culturally differentiated sources.

Knowledge Complexity and Dispersion: the Managerial Demands

Not all MNCs, nor even the majority of them today, are facing the full force of the challenges outlined above. As we began to build a sample of MNCs concerned with knowledge transfer and integration in our exploratory field research, we found relatively few companies that clearly faced the full challenge of both knowledge complexity and dispersion. Instead, we observed that the dispersion challenge took one of three different forms which we labeled projection, integration, and orchestration, respectively. Figure 1, below, summarizes our observations.

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Insert Figure 1 about here
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Projection:

Quite a few companies in our sample were facing a seemingly simple (but while the challenge was simpler, companies facing it were also typically least experienced internationally) projection challenge: how to exploit the benefits of home base knowledge leadership in a way that is sufficiently sensitive to the deeper differences between their home environment and the new international environments in which they are attempting to operate.

Managerially, the projection challenge can be summarized as: How to learn to find a balance between blindly applying rules developed at home to the new environment, and

failing by under-adaptation, versus playing entirely by rules of the local environment and thereby failing to leverage the home-base knowledge (trying to be "more local than the locals" -- an objective surely destined to fail). The need for some optimal balance is obvious, but the right balance can rarely be determined ex-ante, as it usually involves discovering "what you don't know you don't know", a process which necessarily blends cognitive and experiential learning (Burgelman, 1983).

The managerial issue thus becomes improving the odds of trial and error learning. This is particularly difficult where the required local knowledge is more complex than the knowledge projected by the MNC. Disney, for instance, was successful in projecting precise but ill-suited procedures and processes into its EuroDisney theme park near Paris, but found it extremely difficult to understand why they did not work successfully. Experiential knowledge of how these procedures were perceived by employees and "guests" would have been required, and such knowledge would have had to be experienced from the standpoint of Europeans, bordering on existential knowledge.

Disney overcame this difficulty by transferring principles and values, and making their essence meaningful to Europeans, but letting these redefine processes and procedures to fit local conditions, provided the local process innovations stood the test of fitting with the Disney values and principles. This shift from emphasis on the "form" to focus on the "essence" of management encouraged local organization and process innovations in Europe in the context of a decentralized and more entrepreneurial organization than in the US. Disney was now learning at the periphery. The next challenge, integration, was to bring such learning back home, to the US theme parks.

Integration:

The integration challenge most often goes one step beyond what Disney faced: not just to learn from one's own operations but also from the outside. The same issues of understanding existential, or even experiential, knowledge from a basis of articulated knowledge often arise (Nonaka & Takeuchi, 1994; Leonard Barton, 1995) whether the context of one's own operations (Asakawa, 1996) or through alliances or partnerships (Doz, 1996;

Doz & Hamel, 1997 forthcoming). Furthermore, the contextual embeddedness of non-explicit knowledge may be difficult to grasp, and the constraints of the local "ecosystem" poorly understood. Simply stated: why does an Italian designer lose her/his touch when away from Milan for a while? or, does a Silicon Valley engineer become less innovative if far from the Valley? So, moving the people who hold the knowledge -seemingly the most effective way to move non-explicit knowledge without having to articulate it- may not work, or at least not for long. Knowledge creation is network-embedded, and networks are local (Powell et al., 1996). A similar issue may exist within individual firms rather than within local milieus: the correspondence between knowledge type and architecture on the one side, and the "ways" of an organization on the other, may be tight enough to make individuals or teams uprooted from their pre-existing organizational context ineffective.

Integration also calls for listening to different, often new, voices. The trusted lieutenants sent out to run distant outposts may not pick up local clues all that easily and quickly, hence the trusted voices have little to contribute. Yet, voices from the periphery who would have something insightful to say may not be sufficiently trusted to be heard, particularly when they challenge the central head office. Furthermore, newcomers to an unfamiliar environment may well suffer from an adverse selection problem, making the issue of whose voice to trust intrinsically ambiguous. This is the case, for example, of several Japanese MNCs that have recently established basic research labs overseas (Asakawa, op. cit.).

In consequence, reversing the knowledge flow to capture knowledge from the periphery may well be a difficult feat for most MNCs. Perhaps even more critically, this flow reversal seems difficult to accomplish once the MNC has matured into a set pattern of relationships, typically with a strong center which muffles peripheral voices or with autonomous dispersed units which become increasingly self-sufficient (Prahalad & Doz, 1981, Bartlett & Ghoshal, 1989; Malnight, 1995). Rather than to keep trying to reform their head offices, this observation may lead CEOs of MNCs to bypass them and to minimize their role, building a capability to share and orchestrate knowledge directly between multiple dispersed units (Hedlund, 1986).

Orchestration:

Orchestration brings together and fuses multiple capabilities and insights from different environments. It is important to note that orchestration is not simply an extension of the projection and integration challenges. Not only is it organizationally different, it also corresponds to a different logic: rather than merely responding to the erosion of the home country advantage by providing for adaptation of home country capabilities and access to new distant and differentiated capabilities and market knowledge, it is predicated on the realization that the MNC's global network can in itself become a source of growing returns through the combination of elements of complex knowledge that would not otherwise be likely to come together (Dunning, 1994; Gupta & Govindarajan, 1991; Kogut & Zander, 1993).

The specific challenges of projection, integration and orchestration which we have identified in our research are summarized in Table 1.

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Insert Table 1 about here

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Which of these three responses to the challenges of global knowledge complexity and dispersion a firm chooses depends partly on its industry and competitive environment and partly on its own stage of development. Oerlikon, in the air defense field, had little choice. Its significant home-base advantage was the dual experience of its management as suppliers of air defense weapons and as users, through the peculiar Swiss system of popular militia of which they all were reserve officers. But the potential markets were in NATO countries and the missile technologies lay with other subsidiaries of Oerlikon, such as Contraves in Italy, and even more with leading edge specialized developers in North America for the differentiating technologies, such as laser guidance. Complex relevant knowledge, such as how to influence the setting of specifications and to handle proposals in the North American context, lay with large US system integrators such as Litton and Martin Marietta. So, Oerlikon had to achieve successful orchestration to create an opportunity for itself in the missile field.

At the other extreme of the spectrum, a company such as Intel can have a much simpler approach. The US remains so much the "center of the world" for innovations in microprocessors and distributed computing that Intel hardly has to worry much about the

challenge of projection, and faces the other challenges only in limited areas such as specific production equipment where Japanese suppliers may play a leading role. Intel may position itself to smartly "ignore" some of the differentiated and dispersed knowledge by staying out of application markets where such knowledge would play a big role, automotive electronics for instance, and focus on those where it does not, such as personal computers.

As their experience grows, companies may also become more ambitious in how they want to face the knowledge challenge. Twenty years ago, P&G was painfully struggling to learn how, and whether, to project its US approach to distant and different markets, such as Japan. Today it has become an effective knowledge orchestrator. Beyond having accessed French fragrance development capabilities, Shiseido's management now considers whether to leave them as the basis of a very successful stand-alone fragrance business based in France, which is the situation today, to connect them to Japan, a major step towards integration, or to connect them to related activities in other beauty areas, such as make-up or lipstick products, centered so far in North America, which would be a first step toward orchestration.

The Knowledge Management Cycle

Given the different challenges of projecting, integrating and orchestrating knowledge, what are the appropriate mechanisms for international knowledge transfer and sharing? We need to consider what to transfer, its nature and complexity, who transfers, where to transfer and how to transfer. The knowledge linkage mechanisms that are used will depend on the location and context of the potential users of knowledge (e.g., a potential market), the desired time horizon (speed) of local knowledge appropriation, and, primarily, the purpose of knowledge transfer and sharing - projection, integration, or orchestration.

We have identified three major elements of the knowledge management process: accessing, melding, and leveraging knowledge. These can be detailed further in a seven phases model that we have termed the "7 As" (see Figure 2). The "7 As" can be used to model the management of either capabilities or market knowledge.

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Insert Fig. 2 about here
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Accessing knowledge involves Anticipation, Awareness and Access itself. A major challenge here is that the firm possibly does not even know where and what kind of knowledge it should access (e.g., knowledge uninteresting to one side of the MNC may be valuable to another side). Therefore, extensive random informal interaction among knowledge holders and seekers is desirable. To maximize the exposure of the knowledge holders, the intentional planning of "mismatches" may lead to surprisingly productive encounters. The preferred linkage mode is random socialization for the purpose of increasing the interaction among knowledge providers and receivers. At this stage, external connectivity plays an important role (e.g., having the right "environmental scanners" for sensing the outside world, or extending the MNC network outwards towards local actors who have a strong absorptive capacity to recognize and master tacit or locally specific knowledge). An effective linkage mechanism at the stage of knowledge management is process linkage[2].

Melding knowledge relates to Appropriation and Assimilation. Both external and internal connectivity are relevant. Whereas at the stage of knowledge access, selecting the right kind of connectivity was important, at the stage of knowledge appropriation, the issue is how to mobilize the selected mode of connectivity effectively (e.g., mobilizing relevant resources within the firm so as to obtain the targeted local knowledge effectively). Internally, network mobilization requires flexible ad hoc linkages among relevant parties, which need to be sustained over time (Hedlund and Ridderstrale, 1995). Knowledge conversion can entail either process or output linkage, depending on the location of conversion. Previously appropriated knowledge can be converted from tacit to articulated immediately within the

[2] Process linkage refers to the transfer of knowledge via the direct interaction of people, and *output linkage* refers to the transmission of knowledge in some documented form (Asakawa, 1996). The former often takes the form of informal communication, and is more suitable for the transfer of tacit or of non-articulated knowledge. The latter, on the other hand, often takes the form of formal communication and is more suitable for the transfer of articulated knowledge. Therefore, the method of knowledge transfer depends to a large extent on the type of knowledge involved, and on what means there are to convert (decontextualize and recontextualize) knowledge.

sender's unit, so that the thereby standardized information can be transmitted to the receiver via output linkages. Or it can be sent to the receiving unit in the form of raw information, to be converted on the receiving side: here knowledge transfer takes place via process linkages. During melding, appropriated and converted knowledge will be deployed in a different context and possibly at a deferred time. The decontextualized and standardized knowledge becomes implanted into the context of the receiver. It is mainly internal connectivity which plays a major role. This inter-temporal knowledge transfer provides time to reflect on the transferred knowledge in the context of the existing knowledge framework. External actors can play the role of "catalyst" or of "legitimizor", and reduce internal resistance to absorbing new knowledge and unlearning old one.

During steps required to leverage knowledge -- Accumulation and Allocation -- more system-related conditions than process-related linkages are required. The knowledge-based organization asks for a solid support or rich media, as well as a proactive corporate culture and reward systems. The continuous questioning of existing knowledge leads to inquiry into emerging knowledge, which leads to another stage of anticipation and accessing.

The transition from one stage to another entails difficult challenges, especially in switching from the use of one tool to another. Even with accurate identification of the right tools at each stage, it may not be so easy to time the switching of these tools. For instance, while the "environmental scanner" may be an external linkage in earlier stages of the knowledge management cycle, that role may need to be taken over by the more interventionist knowledge broker[3]. Similarly, while a network "extension" strategy may be effective up to the knowledge access stage, that strategy may need to be replaced with network "mobilization" and "internalization" strategies beyond the knowledge appropriation phase of the cycle. Also, at each stage, external and internal linkages need to be coordinated smoothly. In earlier stages, external linkages may play a relative larger role than internal ones, but the

[3] Again, there are several approaches, ranging from interposing a gatekeeper to socialization. The *broker approach* (Allen 1977; Tushman, 1977) means that only a small number of liaison people interact with one another while a majority of headquarters and the subsidiary staff are disconnected from one another. The *socialization approach* means that knowledge is transferred by way of repeated interaction among all members.

success of the external linkage role depends on the supporting role of the internal linkage. The reverse may be true in later stages of the knowledge management process.

Towards Generic Strategies for Metanational Knowledge Management

We basically argued that the knowledge management challenge can be understood along three key dimensions:

1. The type of knowledge that needs to be managed: explicit, experiential, or existential;
2. The complexity of the network of knowledge flows required to underpin competitive advantage : projection, integration, or orchestration;
3. The phase in the knowledge management cycle being addressed: accessing, melding, leveraging.

This is sketched diagrammatically in Figure 3, below. The furthest away from the origin, the more difficult the knowledge management task becomes. Managing the orchestration of existential knowledge through the complete cycle from accessing to leveraging borders on the impossible, while accessing and melding explicit knowledge in an integration configuration is relatively easy[4].

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Insert Fig. 3 about here
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Companies can basically address these challenges by choosing between two generic strategies: "simplification" and "metanational capability building".

The simplification strategy:

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[4] While some aspects of the interaction between these three dimensions have been researched in considerable depth (e.g., Asakawa, 1996; Doz and Hamel, 1997 forthcoming, chapters 7 and 8) more empirical work is needed.

Within the generic strategy of simplifying the complexity of the knowledge management task, we observed companies acting on all three axes of Figure 3:

Reducing knowledge complexity

Knowledge complexity can be reduced by articulating knowledge and making it explicit, as we suggested earlier. This typically calls for a series of steps in manipulating the knowledge present in the organization: decomposition into specific, well-delineated modular pieces, articulation of the content of each, expressing the knowledge in ways that maximize its independence from a specific context, codification so that the overall knowledge architecture can be reconstituted, and standardization of both the content and the codes.

Limiting geographic complexity

The complexity of knowledge melding and orchestration increases exponentially with the number of locations involved. It is therefore essential to keep the number of locations to a minimum and to carefully consider how to collocate different knowledge. Nestlé, for example, has significantly reduced the number of its research centers around the world, from 21 in 16 countries to a dozen research centers between the late 1980s and today, finding that a strong desire to adjust to local differences in materials and expertise, and the inheritance of R&D centers from acquired companies made its knowledge management task excessively complex.

Adjusting the corporate aspiration back from orchestration to integration, perhaps with multiple integration hubs, is another simplifying approach. Some of the obvious drawbacks of this strategy have already been outlined. A further disadvantage is that fewer centers of excellence, with larger roles, may not be as effective as more focused ones, the competencies of which are honed and sharpened over a more limited knowledge base (Surlemont, 1995).

"Out-sourcing" or segregating knowledge conversion

Thirdly, some companies avoid having to position themselves to cover the whole knowledge management cycle. Some use learning partnerships extensively for sensing and accessing new knowledge and encourage their partners to make the conversion of that knowledge into a form that can easily be absorbed into their organization. This mechanism may be used for both new competency and technology, through supplier and developer

partnerships, and for market understanding through distributors. ACER, for instance, relies on partnerships with semiconductor developers such as Texas Instruments, and on distributors, and, increasingly, spun off local subsidiaries which configure and customize products as a function of local demand peculiarities. Similarly, Caterpillar relies on partnerships with its dealers for knowledge about local markets and local conditions. Segregating knowledge conversion achieves internally some of the same benefits as relying on external partners or distributors for conversion. A semi-custom chip maker putting its design centers in close partnership with its key customers and having them report through its sales organization may, for example, achieve the same benefits internally as by partitioning the adjustment needs externally.

A few companies, Intel for instance, as discussed above, can ignore the need for distant and differentiated knowledge by focusing on universal product features and basic advantages (such as user-friendliness and quality). Japanese companies have historically relied on such an approach to ignore the challenges we discuss here. However, as products and industries mature, and as competitors catch up, this may become an increasingly untenable strategy. Further, universality does not emanate from the home base alone. A "world car" or a "universal copier" cannot be designed solely on the basis of information from Japan, as Toyota or Honda, and Canon or Sharp know well. Therefore, even universal products may call for very sophisticated sensing and accessing capabilities.

In sum, while the simplification strategy designed to limit the magnitude of knowledge management challenge by reducing knowledge complexity, limiting geographic complexity and "outsourcing" or segregating knowledge conversion, may be effective in some circumstances, it has obvious drawbacks. We observe fewer and fewer companies actively choosing this approach.

The "metanational" strategy:

The alternative to the simplification strategy is to expand the capabilities of the firm to manage complex and dispersed knowledge. In other words, to build "metanational capabilities". This involves the MNC putting in place the structures, tools and processes

necessary to move from projection, through integration to orchestration, while simultaneously improving the capability to perform these tasks with ever more complex types of knowledge along the spectrum from explicit, through experiential to existential (as depicted in Figure 3).

This does not imply, however, that an aspiring metanational should seek to absorb and process the full panoply of knowledge around the world that it could use to create value. There is an obvious trade-off between the costs involved in accessing dispersed knowledge and the incremental costs of complexity imposed on the organization in attempting to make use of this knowledge, on one hand, and the potential benefits on the other. In addition to building new capabilities, therefore, the metanational strategy also involves an element of "smart ignorance" -- i.e. choosing to ignore certain types of specialized knowledge or certain knowledge clusters where the costs required to access and utilize it would outweigh the benefits. Smart ignorance may require investment in sufficient sensing capacity to enable the metanational to identify pockets of potentially valuable knowledge and take an informed judgment on whether to access and utilize it, or to ignore it[5]. If a metanational is able to reduce the costs of accessing, melding and leveraging knowledge, it will be in a position to create competitive advantage from complex and dispersed knowledge that competitors who are less effective at knowledge orchestration are forced, by cost considerations, to ignore.

To summarize, we can conceive two generic strategies for handling knowledge complexity and dispersion: a simplification strategy, which involves measures explicitly designed to bound the challenge and make it more manageable, or a metanational strategy which involves augmenting the capacity of the firm to leverage highly complex, differentiated and dispersed knowledge to create competitive advantage. Although more empirical work needs to be done, we have observed in the companies studied so far (Doz, Asakawa, Santos, Williamson, forthcoming) a general move in favor of the metanational strategy. This was the product of two sets of forces. First, the fact that the competitive advantages from simplification were progressively being eroded through imitation. Second, that the opportunities for profitable knowledge orchestration were being expanded by the emergence

[5] In practice, MNC managers sometimes choose to ignore pieces of knowledge that they might fully comprehend but do not believe. This is another aspect of knowledge management that is worthy of further research.

of new knowledge clusters around the world combined with improvements in the range and efficiency of connectivity mechanisms available.

Implementing the Metanational Strategy

In practical terms, there are three major tasks involved in effectively implementing the metanational strategy:

1. Designing effective sensing/capture nodes in each defining market and critical capability cluster;

2. Establishing a set of "attractors" (or focal nodes) which act to mold dispersed market knowledge and capabilities and focus them on an action agenda;

3. Connecting knowledge nodes effectively and efficiently so that they interact on an on-going basis to continually create new sources of competitive advantage.

In what follows we outline a number of mechanisms through which these building blocks can be put in place.

Means of Creating Effective Sensing/Capturing Nodes:

Traditionally, many companies assumed that building an effective sensing and capturing node required the establishment of a local subsidiary in critical locations or at minimum a representative office. Frequently, the obvious starting point for a local subsidiary was to establish a sales office (Johanson & Valhne 1977; Malnight 1995; Vernon 1966). All too often, however, such sales subsidiaries were focused on "selling what we have" and proved to be of limited use in sensing complex external knowledge or in probing the latest needs of an unfamiliar market. Without a clear operational role, representative offices could easily find themselves confined to the periphery of the markets with no gateway to the market mainstream "inner circle". Their usefulness as market and/or capability sensing nodes was sharply constrained as a result. Alternative approaches therefore need to be considered including: capabilities programs with these customers or suppliers; links with research

institutions in emerging knowledge centers; knowledge broking between (or within) large players; deliberately shifting the locus of critical functions out of the home base into lead or emerging geographies; or alliances/joint ventures with key players. Table 2 outlines the advantages, potential pitfalls and enabling conditions required to implement each approach. While the appropriate tactics and mechanisms will vary by industry and corporate context, the proposition is that designing more effective and cost efficient sensing/capturing nodes is the first important stage of building competitive advantage through international knowledge management.

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Insert Table 2 about here
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Means of Building Effective "Attractors" or "Focal Points":

Once differentiated market knowledge or competencies have been captured by a set of dispersed nodes, the next key issue is how to meld and leverage that knowledge. The initial response of some companies in our research was to establish a dense network of connectivity mechanisms to "publish" new information across the corporation. While this approach created "an informed global network", the tangible results were often disappointing. Early experimenters discovered that simply moving knowledge around was insufficient to create value. The imperative for action was often lacking. Likewise, a dense network of connectivity mechanisms risked knowledge becoming more fragmented. Each node held a few pieces of the proverbial jigsaw, but no group could see the entire picture necessary to create a new source of competitive advantage. The lost economies of conglomeration dissipated the learning. The strategy of "broadcasting" information across a dense network also risked individuals becoming swamped with information overload. A set of "attractors" was necessary to concentrate the required pieces of knowledge jigsaw, establish a clear action goal, and to provide sufficient incentives for the recipients to act on new knowledge backed by suitable performance measures to monitor the results.

A number of means of building effective attractors are outlined in Table 3 along with their advantages, potential pitfalls and the conditions necessary for them to become both equitable for melding knowledge and a focal point for action. Traditionally, perhaps the most common approach was to cast the corporate center in the role of attractor by centralizing responsibility for collecting and deploying dispersed knowledge in a headquarters function (such as global manufacturing), a global product champion, or even a corporate "knowledge management" impresario. Again, we believe that in designing an effective metanational corporation, multinationals need to consider a wider range of potential attractors including a global customer account management structure (which focuses the organization on utilizing dispersed knowledge and capabilities to meet the total needs of a particular customer on an international basis), global platforms (which can offer a mechanism for sharing world best practices), shared activities (such as a single logistics system), establishment of a single internal customer (on whose needs dispersed capabilities can be focused), global centers of excellence (which may or may not be located at the traditional headquarters), or a competence management organization where individuals are given responsibility for the global management of a competence in an analogous way to global product or global account management. All of these share a common role: to provide focus and discipline around a concrete effort and to mobilise connectivity toward practical action, not just information sharing.

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Insert Table 3 about here

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Once in place, the network of sensing/capture nodes and attractors provides the basic architecture of the knowledge management structure. In order to decide on this structure, analysis and evaluation comparing the costs versus value generation potential of each linkage needs to be undertaken. The object is to move away from simply connecting every node to every other node, instead ensuring that only those connections with economically-justified, potential value-added are in place. It is important to recognize here that, on the cost side, factors well beyond the technical cost of an information linkage need to be considered. Excessive levels of connectivity can result in information overload, inability to identify the

knowledge that is really valuable in a particular application arena, and reduction of receptivity of individual nodes in the network.

Collecting Knowledge Nodes Effectively and Efficiently:

Our research suggests that there are two key considerations in building an efficient and effective network of linkages. The first concerns the preconditions that must be established within each node in order to make the connectivity effective. Second is the issue of what form of knowledge should be transferred between two nodes to balance the objectives of minimising degradation of that knowledge with minimising the cost of transport. For example, rotating individuals with tacit knowledge may help to minimise degradation but, as most companies in our research discovered, was a highly costly and often cumbersome means of moving knowledge around the network.

We identified four pre-conditions that need to be in place for an efficient and effective network linkage:

A common vision and shared context between the nodes involved:

This not only helps ensure congruent goals between the nodes involved, but also reduces the need to transfer high level assumptions and values that tend to be embedded, tacit and holistic – features which make them very difficult to move. In fact, an important part of the difficulty in moving non-articulated knowledge lies not with the nature of the knowledge itself, but with the lack of a common basis for interpretation shared between the emitter and receptor at either end of the knowledge link. National cultures get in the way of shared contexts, and metanationals need to transcend the culture of their home base by identifying exactly what parts of their stock of knowledge and processes are universal, or, at least, can be recast in different national cultures. Disney's procedures and processes, as we suggested, were highly culture-bound, Disney's values and principles were not. Developing more cosmopolitan managers, managers who can understand and separate what is similar across countries (and cultures) and what is different, is, perhaps, a preliminary step to the decontextualization / recontextualization of corporate culture. Cosmopolitan managers are sometimes born, to multi-cultural parents for example. More often they are grown through a

series of international assignments in which they are given the opportunity to experience various national contexts and to operate in them from various perspectives (e.g., local responsiveness, global integration, functional excellence).

Capability differentiation with structured overlaps:

Excessive degrees of overlap tend to undermine the effectiveness of the network. Ideally, each node has a tangible and differentiated role in the process. At the same time, overlaps needed to be sufficient to ensure that nodes were forced to work interdependently to produce the outcomes.

Measurement and incentive systems that facilitate and reward connection:

Appropriate measurement systems to track the costs and value creation from knowledge management and connectivity were often even more difficult to design than for more traditional, global product or account management. Because of the less tangible nature of much of the knowledge management, however, measurement systems in this area were even more critical. In order to make connectivity effective it was also important to design systems such that the managers who were directly involved played by relatively similar rules, faced broadly similar personal incentives, risks and returns, and used similar data to make decisions.

Communication intensity:

Frequent communication, involving a number of individuals tended to enhance the efficiency and effectiveness of the network, but this was especially true in the cases where the knowledge to be transferred was at the tacit and embedded end of the spectrum versus the "hard" or more codified information. In the case of complex knowledge each individual communication tended to achieve the transfer of a different and relatively small piece of the overall puzzle so that repetition and accumulation were necessary features of an effective linkage. The second important aspect of communication intensity was the "bandwidth" of the channels linking each node (i.e., the maximum amount of information that could successfully pass through any given channel per unit of time). Bandwidth can be increased in a number of ways. Use of new electronic communications technologies such as e-mail or video conferencing is an obvious example. However, it is equally important to recognize that

socialization, through past opportunities to meet face to face, is a key contributor to increased bandwidth when individuals communicate.

Turning to the issue of in what form to transfer knowledge across the network (in other words how to package it for transmission), Figure 4 sets out two of the key dimensions of this decision: complexity of market knowledge and complexity of capability knowledge.

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Insert Fig. 4 about here
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When the complexity of both market knowledge and capability knowledge are low, knowledge can be expressed as relatively simple, codified specifications. In this case, the external market is likely to be an efficient mechanism to move knowledge between capability nodes and market nodes. Therefore, traditional trading or sourcing arrangements utilizing arms length transactions are likely to be efficient and effective.

In the case where local market knowledge is complex (either because it is tacit, embedded, or holistic) and therefore very difficult to codify, while at the same time the capability knowledge is relatively simple and easily codified, then it makes sense to move the capabilities knowledge across the network to be deployed locally in each specific market location.

The opposite case arises when the complexity of local market knowledge is relatively low, but the complexity of capability knowledge is relatively high. In this case it makes sense to move the market knowledge to the capability node so that it can be combined with local capabilities to produce technology, components, sub-assemblies or products which can then be moved into each local market. Attempts to move the capability knowledge are likely to face a high level of informational degradation due to its complexities. By contrast, the relative simplicity of market knowledge in this case means that raw information about the market is sufficient to adapt the technologies and products to meet local market needs even where this development phase is conducted remotely at the capabilities node.

The most difficult case, depicted in the upper right hand quadrant of Figure 4, is where both market knowledge and capability knowledge are complex. In this case, the complex knowledge must move in both directions. Market knowledge must be transferred to the capabilities node in order that individuals working there have sufficient appreciation of the local customer needs. At the same time, complex capabilities knowledge must be transferred to the local market node in order that staff charged with serving local customers can sufficiently appreciate the kinds of customer benefits the technologies/ capabilities residing at the competence node can deliver. The companies in our research tended to deploy two main approaches to solving this problem. The first approach was to rotate people with tacit knowledge between both market and capability nodes for extended periods. While this mechanism proved costly, and sometimes cumbersome, it also scored highly on effectiveness. An alternative approach was to partly codify the knowledge without degrading its essential messages, and then to move the knowledge across the network accompanied by an interpreter from its source who could provide the tacit nuances not captured in the core package of codified knowledge.

Table 4 addresses the alternative means of packaging knowledge for transfer along the spectrum from raw knowledge to tacit knowledge embedded in individuals rotated between nodes. Again the advantages, potential pitfalls and enabling conditions for each mechanism are set out.

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Insert Table 4 about here

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The priorities and tools of connectivity are likely to be different at different stages in the knowledge management cycle (accessing, managing, leveraging). But they also need to be designed to facilitate continuity of knowledge flows between these stages, i.e. connectivity across time (Asakawa, 1996, chapter 8).

Conclusion: The Metanational Corporation

As the process of globalization proceeds, there are diminishing returns from internationally "projecting" advantages built in a single location: the home base. At the same time, there is an expansion in the number of clusters around the world with specialized and potentially valuable knowledge on which a multinational can draw. This is because new markets and technologies are emerging in non-traditional locations, while there are increasing opportunities to transfer knowledge between historically unrelated and geographically distant industries that today share similar customers or competence needs. As a result, the capability to manage complex and geographically dispersed knowledge in innovative ways is becoming the source of sustainable competitive advantage. Yet the global management of complex knowledge is not susceptible to "traditional recipes", such as co-location, establishment of multi-domestic structures, or sequential internationalization. The increase in knowledge dispersion and differentiation is challenging companies to find new ways of managing knowledge that may be both geographically distant and outside of the firm's experience base. It requires a corporation to simultaneously access, meld, and leverage locally-bound and context-dependent knowledge from around the world.

In response to these developments, the metanational corporation is emerging as the orchestrator of knowledge in the modern world. Some MNCs are gradually restructuring their existing global networks towards the metanational ideal. Building metanational capabilities can be a staged process. A division of an established MNC, for example, can adopt the principles of metanational architecture ahead of its sister units. A global account management team, or a world-wide product platform, can act as mini-metanationals within the corporation. A global program or a single world-wide project can be metanational -- as long as it creates value by accessing, melding and leveraging complex knowledge from dispersed and differentiated capabilities clusters and markets. In some other industries, especially those with inherently high knowledge intensity, however, new competitors are emerging who are adopting the metanational blueprint from day one.

The metanational organization creates advantage on a world-wide scale. It does not limit itself to the international exploitation of those strategic advantages that it created in a national

or "home-country" setting. The creation of metanational advantage through the fusion of dispersed knowledge at a level that transcends nations is the essence of the metanational corporation.

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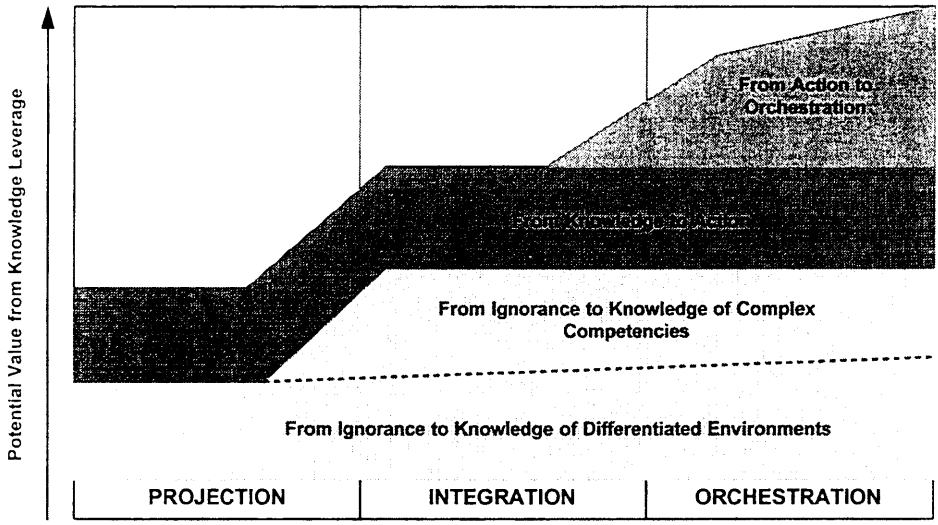

Fig. 1 - The Dispersion Challenge

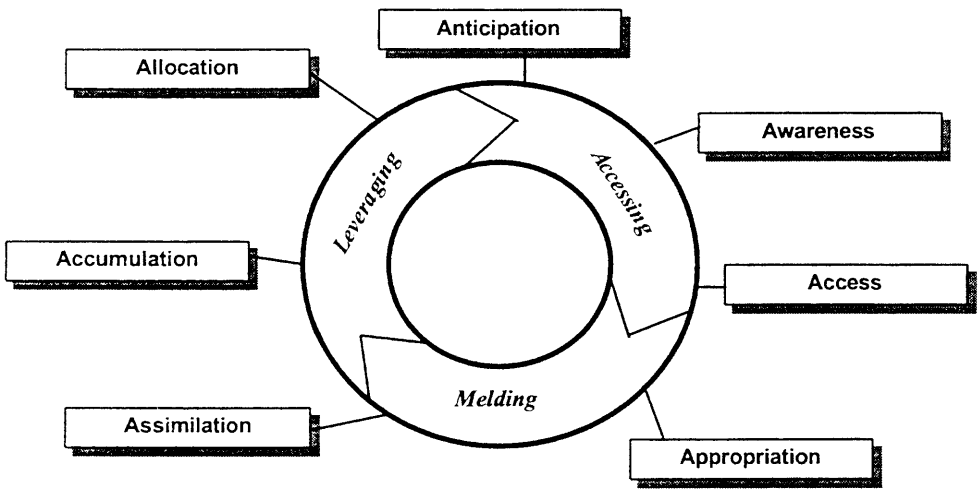

Fig. 2 - The "7 As" of Knowledge Management

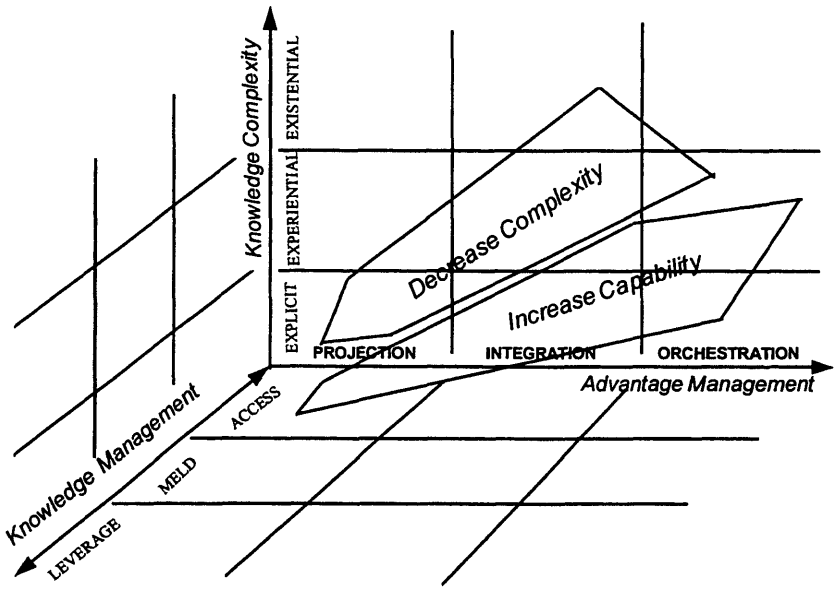

Fig. 3 - The Metanational Challenge

High	Market knowledge stays put, capabilities move as raw knowledge to be deployed locally	Market knowledge must be transferred to capabilities site and capabilities knowledge to market site
Complexity of market knowledge	Knowledge can be expressed in simple specifications so external market is efficient	Market knowledge moves raw to capabilities which are then used locally to create a technology/ component
Low		

Low — ***Complexity of capability knowledge*** — High

Fig. 4- Deciding Which Knowledge to Move and Which to Keep Local is Critical

Table 1- Specific Challenges of Projection, Integration and Orchestration

Projection	Leverage customer/distributor understanding and expertise Accelerated "variation - selection retention" (VSR) learning Drive central organisation from the periphery Transfer key functions and headquarters roles to lead environments Provide "visceral" experience of differences Blend local diversity with corporate uniformity Decontextualize company culture from home country culture Hire/develop cosmopolitan managers
Integration	Leverage supplier understanding and expertise Link with research institutions in emerging knowledge centres Build differentiated local centres of excellence with quick build up of connected roles on the strength of local environment Move key knowledge interpreters together with knowledge Build central "receptor" units to facilitate knowledge translation/ integration at the centre Build common ground with wide bandwidth socialization and transfer of norms and values but extensive local differentiation
Orchestration	Blending/melding multiple skills in challenging environments to build competence models Build "attractors" to meld knowledge from different nodes Transfer "easier to move" knowledge to places where knowledge is hard to decontextualize Balance local-global anchors Temporary co-location of key attractor teams Eliminate headquarters

Table 2 -Means of Creating Effective Sensing/Capturing Nodes

Means	Advantages	Potential Pitfalls	Enabling Conditions
Co-development programs with lead customers/ suppliers in "lead" geographies	Lead customers may provide an efficient "proxy" for wider market knowledge	- Coordination of knowledge which cuts across locations - Slow to respond to shifts in the locus of knowledge	Typically requires co-located, multi-disciplinary resources at each location
Links with research institutions in emerging knowledge centers	Relationships may provide a low-cost "option" on emerging knowledge and on the key people who hold it	- Adverse selection problems - Low "hit-rate" from research	Reciprocity in the relationship - access to technical knowledge in exchange for commercial skills/ market access or "voice"
Knowledge broking between (or within) larger players	Can uncover "hidden wealth" by exploiting inefficiencies in knowledge sharing between (and within) larger players	Limited evidence that this strategy is scaleable	Reciprocity in the relationship - often based on development of a common platform / technology in exchange for proprietary market/ technology knowledge and/or downstream skills
Deliberate shifting of the locus of critical functions out of home-base into "lead" geographies	- Forced interdependence between dispersed nodes may drive connectivity benefits - May provide an efficient platform to make sense of complex knowledge locally	- Coordination demands on senior management team can be substantial - Cultural and infrastructural heritage of mature MNCs may be an obstacle	Typically demands a cadre of cosmopolitan managers to operationalize
Local subsidiaries in critical locations	Similar to advantages outlined above	Use of sales subsidiaries alone, although commonly used, is of limited use in sensing complex external knowledge or in probing for latest needs	- Combined sales/ R&D/ technical team at defining nodes is needed if knowledge is highly complex - Use of local nationals is important to decontextualize knowledge - Opportunity must be substantive enough to support minimum fixed cost
Alliances/ joint ventures with key players	Effective means of capturing embedded knowledge/ proprietary technology where partner demands an on-going state	Danger of accessing static/ discrete technology rather than dynamic learning/ internalization	Alliance management skills - particulary capturing real learning - are critical

Table 3 - Means of Building Effective Attractors

Means	Advantages	Potential Pitfalls	Enabling Conditions
Centralized Headquarters function	Relative organizational and administrative simplicity	Risk of the dispersed nodes becoming passive actors in the global integration process	Works well only if the HQ possesses the depth of capabilities to perform integration
Customer / Global account structure	May provide a proxy for global knowledge management structure	Risk that customer may over time, become less aligned with lead capabilities/ market knowledge	Effective when needs are sufficiently well defined that they can be communicated to dispersed participating nodes
Global platforms	- Can offer a mechanism for sharing world best practices - May improve overall efficiency by avoiding duplication of effort	Risk of ignoring superior technical solutions that don't fit the architecture of the approved global platform	Effective when nodes will be future users of platform, hence they have incentives to contribute
Shared activity or discipline -- e.g. joint sourcing / logistics systems, or TQM practice	Creating interdependence forces underlying trade-offs and conflicts to be raised and resolved	Risk of escalating coordination costs and efficiency loss	Nodes using a common system must have a shared interest in improving effectiveness/ efficiency
Internal customer	Allows capabilities sourced from a dispersed network to be integrated locally by the internal user	- Low "weight" approach but customers may lack "voice" - Potential duplication of effort	Effective when local market knowledge is difficult to decontextualize and transfer
Global Centers of Excellence (COEs)	Allows MNEs to build and maintain critical mass in geographies which are home to lead capabilities	Risks loss of innovation by limiting trans-disciplinary exchange	- Tends to work well when knowledge is neither contextual nor tacit - readily codified, imported and exported - Typically, COEs have global mandates by discipline
Competence management organization	Resource-based view of the firm can provide a powerful platform for growth	Potential degradation of knowledge quality between users and suppliers	Effective when knowledge can be codified and users/ suppliers share a common language/ culture

Table 4 - Means of Packaging Knowledge So That It May Be Transferred

Means	Advantages	Potential Pitfalls	Enabling Conditions
Raw Data / Information	Simplicity, low cost, minimal local presence	Limited, given scope of applicability	Effective when knowledge complexity is low and risk of misinterpretation is limited
Codified knowledge	Avoids degrading/ omitting vital information Generally applicable technologies/ processes/ systems/ frameworks	Risks overloading non-codifiable knowledge components	Effective when context of application is same at each end of link
Product sub-assemblies/ specialized services	Modularity in packaging Ease of transfer of embedded knowledge	Risk of "tissue rejection" at receiving end -- lack of local context	Effective when knowledge provider can accurately sense distant needs
Part codified knowledge bundled with an interpreter	Local interpretation/ adaptation to local context is possible	Need for interpreter may slow knowledge transfer	Effective when knowledge has a high tacit or contextual component
Tacit knowledge embedded in individuals	May be the only possible way of ensuring knowledge transfer	Slow, costly, difficult to scale	Effective when complexity of knowledge is extreme - cannot be decontextualized or codified