

Toward a Phase-Model of Global Knowledge Management Systems in Multinational Corporations

Nielsen, Bo Bernhard; Michailova, Snejina

Document Version
Final published version

Publication date:
2004

License
CC BY-NC-ND

Citation for published version (APA):
Nielsen, B. B., & Michailova, S. (2004). *Toward a Phase-Model of Global Knowledge Management Systems in Multinational Corporations.*

[Link to publication in CBS Research Portal](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

If you believe that this document breaches copyright please contact us (research.lib@cbs.dk) providing details, and we will remove access to the work immediately and investigate your claim.

Download date: 05. Jun. 2023



**Toward a phase-model of global
knowledge management systems in
multinational corporations**

**Bo Bernhard Nielsen and Snejina Michailova
CKG WP 3/2004**

CKG Working Paper No. 3/2004
ISBN: 87-91506-18-2

Department of Management, Politics and Philosophy
Copenhagen Business School
The Center for Knowledge Governance
Blaagaardsgade 23 B
DK-2200 Copenhagen N
Denmark
Phone +45 3815 3630
Fax +45 3815 3635
E-mail: ckg.lpf@cbs.dk
www.cbs.dk/ckg

Toward a Phase-Model of Global Knowledge Management Systems in Multinational Corporations

Bo Bernhard Nielsen
Western Washington University
College of Business and Economics
Department of Management
516 High Street
Bellingham, WA 98225
Email: bo.Nielsen@wwu.edu

Snejina Michailova
Copenhagen Business School
Department of International Economics and Management
Howitzvej 60, 2,
DK 2000 Frederiksberg C
Denmark
Email: Michailova@cbs.dk

This paper is currently under revision at *Long Range Planning*

Toward a Phase-Model of Global Knowledge Management Systems in Multinational Corporations

ABSTRACT

According to Heinrich v. Pierer, CEO at Siemens, “an e-business year is only three months long. If you want to be a leader in this fast-paced world, you must be faster than the others. Just being on board is by far not enough”. The ability to be faster than others, however, is only relevant if it is linked to management of key assets in the pursuit of continuous competitive advantage. The key asset of the present is knowledge and in the future it is likely to be continuous and timely innovation based on effective management of knowledge assets. Most firms today, however, lack an effective Knowledge Management System. Although many companies have Management Information Systems in place, this is only the first step in a knowledge-based company. Companies that understand and actively manage the process of designing, developing and advancing effective KMS’ are likely to, in the words of Heinrich v. Pierer, “e-outperform competition and become leaders of the e-economy”. Using examples from a number of large multinational companies this paper proposes a phase model for the development of a global Knowledge Management System with attention to pertinent policy and management issues in each stage.

Keywords: Knowledge management system, phase-model, multinational corporation, management actions

INTRODUCTION

The twentieth and twenty-first centuries have been marked by a transition from a matter-based economy to a knowledge-based economy, where most of a firm's value is embedded in knowledge assets. In such an economy, effective management of knowledge can be considered one of the main sources of competitive advantage (capabilities) for multinational corporations (MNCs). The argument is that firms that effectively expand, disseminate and exploit organizational knowledge internally, that protect knowledge from expropriation and imitation by competitors, and that accumulate and distribute knowledge effectively and efficiently, enjoy a competitive advantage¹. The ability of firms to protect the value of knowledge from exploitation is linked to strategic behavior, as the incentive to innovate is dependent upon the degree to which a firm can protect its knowledge-related capabilities. This is consistent with traditional theories of the scope of the firm that are based on arguments of knowledge-protection². In similar fashion, foreign direct investment theory also traditionally considered the process by which MNCs create value from knowledge to be a linear sequence: Knowledge was created in the firm's home base and was then diffused worldwide in the form of new products and processes³. Knowledge transfer tended to be internalized within the firm to avoid the transaction costs associated with market contracts in knowledge assets. Hence, the focus on knowledge has traditionally been a (static) matter of explaining the existence of the MNC by focusing on failures in the markets for knowledge rather than on stressing the MNC's distinct capabilities of realizing competitive advantage through managing knowledge flows⁴.

As product- and market complexity increases, however, new organizational structural arrangements emerge to address this complexity. MNCs no longer rely on the traditional headquarter-subsidiary division of labor with centralized, one-way information flows; rather a new Knowledge Management System (KMS) based on globally networked flows of knowledge has

emerged. Thus, the differentiated MNC is more favorably positioned than the non-differentiated MNC (or the purely domestic firm) with respect to mobilizing knowledge in the creation and renewal of competitive advantage, *ceteris paribus*, simply because of its access to more knowledge networks⁵. The basic premise is that subsidiaries control heterogeneous stocks of knowledge and that competitive advantage can be achieved from orchestrating knowledge flows between MNC units in such a way that knowledge is transferred to those units where it will increase value-added.

KMS', whether they be local, global, enterprise-wide, industry-wide, or perhaps even industry-defining, are becoming part of the agenda in many of today's leading firms. One reason is that managers recognize the need to become flexible and adaptive to the rapidly changing international business environments. Part of this evolution in KMS' has been facilitated by advances in information technology (IT) as firms seek to adapt to global hypercompetition, where continuous improvement and innovation in organizations is essential. However, although many firms have Management Information Systems (MIS) in place, this is only the first step in building a knowledge-based company. The major difference between a MIS and a KMS is that the second is more systemic, interactive and multidimensional⁶.

A KMS offers a way to integrate innovative management tools like total quality management, business process reengineering, and organizational learning in the pursuit of innovativeness and flexibility. In addition, the processes involved in the effective management of knowledge (i.e. its capture, development, sharing, and utilization) are becoming increasingly better understood.⁷ Despite that, however, relatively few firms master the successful implementation of –and continuous attention to effective KMS'. As we will illustrate later, it is not rare that the good intentions of top management in terms of KMS development, often initiated during favorable economic market conditions, are abandoned in later stages of the KMS life-cycle, particularly as

economic conditions change and attention shifts from long-term strategic projects to short-term financial concerns.

Based on examples from MNCs, where we have studied knowledge management initiatives and activities, as well as relying on examples described in the knowledge management literature, the main objective of this article is to trace main tendencies and features in the development of a global KMS. The article proposes a phase model of the global KMS suggesting four different development stages. Additionally, pertinent policy and management issues characteristic for each phase are presented and discussed.

A PHASE-MODEL FOR GLOBAL KMS'

A closer look into the experiences of some leading MNCs suggests that these firms move through distinct phases of KMS development. Four stages can be identified in the process of establishing and developing a KMS (see figure 1). Although overlapping in nature and difficult to discern in reality, each phase faces management with a different set of issues, which needs to be addressed in order to successfully leverage knowledge and elevate the system to the next phase. Furthermore, external environmental factors also play an important role in the process of developing effective KMS', sometimes leading to a recursive dynamic as firms return to prior phases of development due to negative industry trends. The company examples provided in the article illustrate the different stages of the KMS development process and highlight some of the main barriers to an effective KMS. Siemens AG provides a particularly illustrative example as this company has moved through all four phases and emerged as an e-company contender.

INSERT FIGURE 1 HERE

Represented by the simple S-curve in figure 1, as MNCs progress through the different stages of KMS development, complexity increases as more value-creating activities are involved in order to increase the utilization of knowledge within the firm as well as across the entire value system. The slope of the suggested S-curve is a function of the increase in resource commitment to the KMS. At the awareness stage few resources (financial, human or time) are devoted to building the KMS as information management is mostly regarded a technical issue. During the take-off stage a number of spontaneous initiatives and activities that emerged during the awareness phase become formalized and operationalized. Consequently, management tends to recognize the need to commit more resources to build an infrastructure for establishing a formalized KMS. This carries over to the development stage, which is characterized by shifting the management focus from information management to knowledge management. The increased complexity of the KMS at this stage requires a much more active management of both internal and external knowledge assets as the organization would typically have developed into a learning organization. Finally, at the advanced stage, companies act as true 'e-companies' and this again requires a refocus of their strategic and organizational value-creating activities. In terms of the KMS, which has already been functioning and tested for a period of time, the emphasis is on a different set of issues. Thus, at the advanced stage, it contributes to dealing with the tension between the costs of knowledge exchange coordination and the bargaining power arising from knowledge monopolies. Resource commitment needs are more stable as infrastructures (both technical, organizational and human) are in place and focus shifts to continuous improvement and refining.

The four stages of the KMS development: Characteristics and management issues

As firms progress at different rates through the different phases, the challenge is to identify the key managerial issues pertaining to each stage in order to generate value from knowledge. Three clusters of issues must be considered in each phase: (1) policy/strategy issues, (2) organizational/structural issues, and (3) cultural/human issues. Table 1 summarizes the key features that tend to be typical for these three clusters of issues in each of the phases of the KMS' development process.

INSERT TABLE 1 HERE

As argued later in the article, many efforts in establishing KMS' fail because management neglect to integrate strategy-related, structural and cultural elements simultaneously, but rather tend to focus on only some of these while ignoring others. This often leads to termination of the KMS development process as a conscious managerial decision or as a natural consequence of the KMS' unforeseen 'death'. Both options (illustrated by the dotted lines in figure 1) can take place at any point of time. However, as shown in figure 1, due to the processes of accumulating changes during the respective stage, while the transition periods between two different phases are especially fertile in terms of creating the necessary environment for preparing and introducing the subsequent KMS development stage, these periods also may lead to an increase in tensions, conflicts, and contradictions.

The following sections discuss in detail the summary presented in Table 1. Each phase will be presented in terms of its defining characteristics and pertinent managerial issues. Three clusters of issues that appear to be specific for each phase, namely policy/strategy, organizational/structural

and cultural/human issues will be discussed. These issues are closely related. In fact, it is difficult to imagine management in general and knowledge management in particular in today's organizations without applying certain strategies and policies. Neither is it possible to exclude the organizational and the human factors from the set of knowledge management considerations and practices. Recognizing the importance of these dimensions and their mutual interdependencies does not, however, solve the tension among them when it comes to concrete management actions. It is an idealistic view to recommend treating all three clusters as *equally* important all the time in terms of top management attention. One way of coping with this tension is to shift the priority towards some issues depending on the concrete circumstances while keeping in mind (and never fully ignoring) the other issues.

Awareness stage

The essence of the awareness stage is that top management formally recognizes the importance and manageability of the knowledge assets in the company. For some businesses, knowledge can relatively easily be identified and its strategic value appreciated. For instance, firms involved in various consulting services utilize knowledge on a day-to-day basis and usually have little trouble appreciating its importance. For other businesses, however, the nature of their knowledge assets and their strategic value can be much more difficult to assess. For instance, many low-tech manufacturing companies do not explicitly focus on the active management and strategic value of their knowledge-related capabilities and assets. Moreover, even firms with a clear sense of *part* of their knowledge portfolio often lack attention to potentially value-creating knowledge assets further along the value-chain as well as the potential juxtaposition of these. Hence, in the awareness stage, the MNC utilizes a limited amount of its knowledge across a limited number of value-chain

activities in a rather *unorganized* fashion. The following managerial issues are characteristic for this phase:

Policy/strategy issues

In the words of Gary Hamel and C.K. Prahalad⁸, ‘to create the future a company must first be capable of imagining it’. Awareness of the potential value of knowledge assets is, however, not equivalent to conscious action toward the strategic management of knowledge. Strategy can be understood as bridging the gap between policy and tactics, or, as suggested by Clausewitz, ‘war is the continuation of political relations via other means’ that is strategy is the means by which policy is effected⁹.

Businesses in the awareness stage typically do not have an explicit strategy pertaining to knowledge management issues. Top management will often attest to the fact that knowledge is important and bring forward vague vision statements. Consider the following examples from Coloplast, a multinational manufacturer of medical devices¹⁰:

‘Knowledge management activities provide vital information on aligning our Mission, Values and Strategies with the current expectation of our stakeholders’
(From 1999 annual report of Coloplast A/S)

‘Knowledge sharing is an important competition parameter, and all employees are responsible for developing, documenting and communicating their knowledge about factors impacting Coloplast’s competitiveness’
(From 2002 annual report of Coloplast A/S)

However, without a clear strategy for how this officially stated policy is to be carried out operationally and, perhaps even more importantly, without allocation of the necessary resources effective management of knowledge is impossible. MNCs in the awareness stage will exhibit many of the characteristics of the traditional MNC¹¹ as the main focus is on capturing, storing and, to a limited extent, transferring or relocating existing, predominantly internal *information*. Efforts are

not organized in a systematic way and knowledge flows between two or more activities along the value-chain are not mapped, understood, or managed.

Organizational/structural issues

For effective management of knowledge to take place, the organizational structure has to be supportive of such efforts. Part of the aforementioned knowledge management strategy needs to deal with structural issues pertaining to how to secure effective flows of knowledge, both within the firm and externally. Systems need to be developed for knowledge capture, storage, development, sharing, and utilization along the entire value-chain. Traditional divisional structures or hierarchical functional organizational structures are not conducive to knowledge development and sharing across the value-chain. Rather, explicit mechanisms for knowledge sharing and organizational learning, such as the use of cross-functional teams, communities of practice and learning spaces, support strategic management of knowledge. Moreover, external sources of knowledge can best be tapped for particularly tacit knowledge via flexible structural configurations.

Businesses in the awareness stage lack the organizational infrastructure to effectively extract value from their knowledge assets. Though aware of the potential value of knowledge within and outside the organization, these firms typically rely on existing organizational structures in their knowledge management efforts. Many firms are aware of the potential value of its knowledge assets, however, lack the organizational attributes necessary to effectively utilize these assets. Often there is no system in place to coordinate knowledge activities across departments and secure sharing of existing knowledge as well as re(combination) and creation of new knowledge and the intranet is mostly used for one-way directional communication from headquarter management. For instance, the top management of Fluke Corporation¹², the world leader in the electronic test tools and software business, is concerned about keeping strict control with subsidiaries around the world in

order to secure quality and compatibility of products world-wide. Subsidiaries of this company have little or no independence and very limited budgets. Fluke flies in managers from around the world to brainstorm about new products, however, all key decisions are made at HQs and knowledge is only shared with subsidiaries when HQs has agreed upon its global value. Recently, Fluke has realized the need to change their business model and traditional approach to one-way information management in relation to their venture in China. Recognizing the need for local adaptation, Fluke has granted the Chinese JV more autonomy to innovate and adapt products to local market demands without HQs direct involvement.

Cultural/human issues

Strategizing and organizing for effective utilization of knowledge does not assure successful management of knowledge. Knowledge management essentially depends on the willingness of individuals to signal possession of knowledge and share it when requested. The enormous value potential of knowledge-sharing among members of an organization has long been recognized in many boardrooms, however, while KM technologies are providing companies with more sophisticated and easier ways to break down barriers, knowledge-sharing still depends on people. Knowledge is asymmetrically distributed in any organization and systematic knowledge-sharing relies on individuals' behavior. According to some studies, firms and individuals in firms are inherently hostile to knowledge-sharing¹³. Therefore, management needs to intentionally and carefully create conditions and stimulate the behavior needed for efficient knowledge-sharing among employees and across functions and hierarchies. Thus, for knowledge-sharing to flourish, management must provide the right incentives, goals and technologies. The goal is systematic management of knowledge with a strong focus on creating benefits for the organization rather than mere benefits for individuals in the organization.

In the awareness stage top management starts realizing that managing knowledge relies heavily upon social patterns, practices and processes and goes far beyond computer-based technologies and infrastructures. At the same time, however, management in this phase has not yet recognized fully that behavioral and cultural factors tend to be the strongest inhibitors to knowledge sharing. A careful diagnosis in this stage would probably prove that the syndrome ‘knowledge is power’ predominates and the relevance of ‘knowledge sharing is power’ is not yet recognized and/or applied in practice. Associated with this, firms at the awareness stage lack systematic and relevant knowledge-related human resources (HR) policies concerning training, motivation, reward systems, promotions, etc. The lack of such policies, initiated, supported and communicated by top management, helps create a hostile knowledge-sharing culture. For instance, at Cell Networks AB, a Swedish-based IT MNC, individuals and subunits often protect knowledge because it is seen as vital for their survival within the corporation. The lack of a clear and consistent policy regarding rewards and possible negative effects of knowledge-sharing reinforces this behavior. Employees are often expected to share knowledge in the interest of the company, as mentioned in the vision statements of Coloplast A/S above, however, top management neglect to develop formal HR initiatives to support this and motivate people to comply. Rather, many firms create knowledge-sharing hostile environments by punishing mistakes/failures and/or unintentional knowledge spillover. For the leadership of an organization to remain unclear or to vacillate regarding ends, strategy, tactics and means is to not know their own minds. The accompanying loss of motivation is enormous.

Take-off stage

In the take-off stage, firms have recognized the importance of their knowledge assets *and* have begun to develop a formal system for managing these assets across two or more value-chain

activities. Businesses in this phase have developed a sense of direction for their knowledge management activities and begin to see the interaction between different value-creating activities, both locally and internationally, and seek to design *organized* efforts to leverage knowledge globally among units (see table 1). Hence, in the take-off phase, MNCs are preoccupied with designing—often centralized—systems for the efficient transfer of customized know-how among its subunits with limited attention to creation and utilization of knowledge.

Strategy/policy issues

Contrary to the awareness stage, this phase is characterized by its increased attention to operational issues pertaining to not only the capture and storage but also the transfer of knowledge between subunits and value-creating activities. Businesses in this phase focus on capturing and reallocating information gathered centrally at headquarters and often stored in large databases allowing (limited) retrieval. Strategically, however, the MNC now faces the task of designing adequate policies for entry, retrieval, storage, sharing, and utilization of this information. Questions like: (1) *how* should information be captured, stored, and protected?, (2) *who* should be allowed access to certain information?, (3) *which* mechanisms should be utilized to share information?, and (4) *what* measures of performance evaluation should be used to capture the value-added of the system? are typically addressed at this stage. Answers to these (and other) questions have implications for the implementation of the knowledge management strategy as part of the overall corporate strategy of the firm. Consequently, top management need to address these issues by allocating the necessary financial and human resources to develop an effective KMS.

When Siemens AG decided to develop ShareNet¹⁴, their company-wide KMS, one of the first steps was to develop corporate-level policies for membership of virtual communities and to develop a 'handbook' for knowledge management, including guidelines for how employees should enter

information into the system as well as technical considerations related to the updating and security of the system. In addition, Siemens AG developed operational strategies for how to implement the system, including roll-out, motivational schemes, and educational programs. Computer Sciences Corporation, CSC, a global leader in IT services, began the operationalization of their knowledge management strategy by appointing Chief Knowledge Officers with responsibility for developing and implementing policies and guidelines for a company-wide KMS. The real sources of advantage lie in management's ability to transform corporate-level policies into operational tasks that empower local units and individuals to implement flexible and coherent solutions.

Organizational/structural issues

MNCs in the take-off stage realize the need to develop new organizational structures to support the effective leverage of knowledge across strategic business units (SBUs), divisions, and regions. Development of a knowledge management infrastructure typically takes place at corporate headquarters as firms seek to control and coordinate flows of information. Headquarters serve as an information hub where all relevant information is gathered, stored, organized, and distributed throughout the organization. For example, in 1996 Coloplast started the development of a centralized, structured intranet (*InSite*) enabling information to be captured, stored and shared across departments, divisions and SBUs. A couple of years later, in 1998, the company began reporting the value-creating effect of knowledge management in the form of an Intellectual Capital Statement.

The focus is often clouded by large investments in IT and policies at the take-off stage often stipulate that all entries and sharing of knowledge has to be approved by a centrally located responsible knowledge management person or department in order to increase quality, reduce misuse and spillover, and improve exploitation. For instance, at Siemens AG, ShareNet was

developed and managed from headquarters in Munich. A Global Editor oversaw the quality of content and was responsible for ensuring the 'global' synthesis of knowledge, although the system in this phase only linked certain parts of the value-chain, predominantly sales, marketing, and product developers pertaining to two main divisions within the Information and Communications business segment of Siemens AG. A committee, headed by top management, was also created to oversee the future strategic development of ShareNet and ensure its alignment with overall corporate strategy at Siemens AG. These and other vital functions, such as user hotline and technical support, were all located in Munich as Siemens went through the take-off stage of their KMS.

Cultural/human issues

As effective management of knowledge becomes part of the strategic agenda in MNCs and they develop formal mechanisms for sharing knowledge across institutional and national borders, a new set of cultural issues emerge. A knowledge management infrastructure is much more than simply investing in IT and management needs to allocate adequate resources to the management of people. For instance, at CSC 'Knowledge Brokers' are responsible for knowledge management activities, however, no additional training, resources or even time have been allocated for this purpose. The system is only as good as the quality of the input and the degree to which people understand and use its application. At Siemens, ShareNet coaches and consultants conducted seminars and workshops on the practical use of the system as well as ensured that the system was compatible with existing software and had a familiar graphical user interface to ease its use.

People are naturally resistant toward knowledge sharing due to a fear of becoming superfluous if they share personal knowledge. Moreover, in times of business restructuring, people tend to protect their knowledge even more and knowledge-sharing hostility arises as a consequence of

increased uncertainty. In addition, as the KMS spreads along the value-chain and across the organization at large, cultural differences in terms of knowledge sharing become evident. Although most people appreciate the potential value of global knowledge sharing in theory, in reality they tend to be more comfortable with the language/jargon and social embeddedness of the national, professional or organizational subculture they belong to. For Siemens this became evident as entries into ShareNet had to be made in English, something that met much resistance among its initial primary users, of whom the majority were Germans operating in Germany. Moreover, the often highly technical entries made by engineers at Siemens had to be translated into common language more suitable for sales and marketing staff. Hence, employees need to be encouraged to share knowledge with not only each other locally but also with individuals outside their own department, SBU or country. A formal incentive system needs to be developed and tied directly to the objectives of the KMS. For instance, Siemens' ShareNet implemented a flexible incentive system, which was initially designed to create a critical mass of content by making users aware of the KMS and encourage contributions. This was accomplished through a competitive reward structure, where the top 50 ShareNet contributors were rewarded with an invitation to the first, global ShareNet knowledge-sharing conference in New York.

Development stage

As the MNC improves its strategic, organizational, and cultural capabilities, it moves toward the stage of development of a global KMS (figure 1). The focus shifts from transfer of existing information and know-how toward creation of new knowledge and innovation as the firm engages in higher levels of knowledge utilization and involve more aspects of the value system in the knowledge management activities. As complexity of the KMS increases, so too do the managerial issues pertaining to this phase of development (see table 1). Firms at this stage engage in full-

fledged *active* management of knowledge assets as learning organizations. Focus is simultaneously on external knowledge development and internal knowledge leverage in the pursuit of continuous competitive advantage.

Strategy/policy issues

MNCs at the stage of KMS development are seeking to leverage not only internal knowledge but also knowledge from external sources. Two main sources of external knowledge development can be identified; (1) network-based knowledge originating from long-lasting interaction with specific external parties, notably customers or suppliers, and (2) cluster-based knowledge based upon knowledge inputs from local knowledge institutions, such as technical universities, interaction with local regulatory authorities etc.¹⁵. For example, the Japanese automaker Toyota is well-known for its ability to tap into the knowledge of its suppliers and their networks. The company's management has introduced norms in order to deal with both protecting or hiding valuable knowledge and free riding in its network and developed various processes that facilitate knowledge transfer not only internally in the organization but very much also with its suppliers¹⁶. Toyota's extended supplier network is based on mutual learning and knowledge sharing throughout the entire value system, facilitated in part by Toyota obtaining, on average, 20-30% ownership in its suppliers.

Knowledge with different characteristics needs different organizational mechanisms to facilitate the transfer and utilization of that knowledge. Thus, for a differentiated MNC engaged in global knowledge sourcing the task is to develop a large spectrum of different organizational mechanisms. In some instances, like with subsidiaries tapping into local cluster knowledge (for instance knowledge from universities and/or local authorities), the autonomy of the subsidiary may be important for knowledge transfer and utilization, while interdependence between the subsidiary and the other MNC units is very important for knowledge transfer and utilization in the case of internal

production of subsidiary knowledge. Hence, as the focus shifts from internal leverage of knowledge activities along the value-chain to simultaneous knowledge creation and utilization across the entire value system, firms in the development phase of a KMS need to develop specific policies for the level of autonomy of different subsidiaries and/or units of the globally networked MNC. Subsidiaries and subunits need to be recognized as centers of excellence with different strategic roles *vis-à-vis* knowledge flow patterns. Thus, some subsidiaries may become *global innovators*, serving as knowledge creator for the entire corporation. For instance, L.M. Ericsson's Italian subsidiary serves as the company's global center for the development of transmission systems whereas the Finnish subsidiary has the leading global role for mobile telephones. Other subsidiaries may take on the role as *integrated player*, responsible for both creation of knowledge that can be utilized by other units and relying on knowledge inflows from other subunits. IBM's Japanese subsidiary, responsible for high levels of both knowledge inflow and knowledge outflow, represents an example of a subsidiary with such a role¹⁷. Consequently, strategic management of knowledge across the value system requires careful attention to policy issues pertaining to interdependence, autonomy, and coordination as differentiated strategies for performance evaluation, organizational structure, and human resource management need to be designed.

Organizational/structural

Firms in the development phase seek to become learning organizations by global networking of knowledge across the value system. Headquarters no longer serve as the information hub as knowledge creation activities and responsibility is decentralized in an effort to capture and utilize external sources of knowledge. Organizational and IT infrastructures enable firms at this stage to fully tap into and take advantage of the local knowledge repositories. For instance, as Siemens ShareNet grew more complex and spread throughout the organization, more communities became

members as virtually all countries and markets were included. The intranet platform was expanded to include close to all activities of the value-chain as well as up- and downstream activities, such as allowing suppliers and customers access to knowledge sharing pertaining to certain projects. In addition, knowledge sharing has become project- and team-based rather than unit- or department-based, allowing for flexibility and innovativeness in replication and application of knowledge.

Firm-wide global initiatives help to exploit the scale of business and promise 'knowledge synergies' arising from knowledge sharing across multiple units, functional areas and cultural settings. This synergy of knowledge, however, often remains an illusion because more specialized, focused initiatives are easier to measure and thus tend to be better supported by managers who are responsible for a unit's financial performance. Thus, at Siemens, for instance, several units may at times be in direct or indirect competition with each other regarding a large project, which tends to add to the tension between the potential long-term value-added of company-wide knowledge sharing versus easier to measure, short-term value-added at the business unit level. As mentioned above, this is even more critical in times where financial resources are scarce due to a poor economic climate. Hence, from a top management perspective, global, company-wide knowledge-sharing is desirable in order to create economies of knowledge as well as synergies of knowledge and innovation. However, this may collide with individual objectives of knowledge protection as part of maintaining country, business unit or individual competitiveness. The added focus on value-adding activities across the entire organization may help strike a balance between global and local knowledge management needs, particularly if the aforementioned policies for dealing with coordination, interdependency, and autonomy issues are implemented.

Cultural/human issues

In the development phase, new mechanisms must be developed in order to motivate employees and ensure effective and efficient management of knowledge across the entire value system. Internal competition needs to be replaced with collaboration. At Siemens ShareNet, a non-competitive reward system was implemented to replace the initial competitive reward system. The ShareNet Incentive System is a flexible incentive system, which can be adjusted according to the current need of motivation and guidance in the community. It works like a 'frequent-flyer-miles' system, where users earn shares for contributions (knowledge/experiences logged) and reuse feedback (feedback about reuse of knowledge/experiences). Contributors earn ShareNet shares, relative to the quality and reusability of the contribution, assessed through a peer rating system. These shares could be collected, accumulated and turned into tangible rewards like cell phones, DVD players or vacations. The focus shifted from creating critical mass to enhancing the quality of the content in order to foster reuse of existing knowledge and development of new knowledge. At the operational level, the focus shifted from simply logging data to closely reviewing the data for quality and reusability, based on a rating by the re-user of the perceived value (1-10) the reuse of a contribution created. In order to encourage reuse and ensure feedback, the re-user also earned shares (typically 4) for giving reuse feedback. Although the Global Editor screens contributions for reliability and redundancy, the objective is to create a self-monitoring system, where users are encouraged only to share valuable knowledge as this leads to rewards and positive feedback from colleagues.

Unfavorable external environmental factors often have significant impact on the development of KMS', which often quickly translates into negative cultural and human effects. For instance, in late 2002 Siemens top management decided to reduce the ShareNet budget and as a result cut all rewards earned through the ShareNet Incentive System as well as reduced the ShareNet staff members significantly. This decision was a direct consequence of the decline in both the German

economy and the IT industry. As in many IT firms, Siemens had to restructure their business and focus on short-term cash flows rather than long-term strategic initiatives, such as ShareNet. Similarly, both Cell Network and L.M. Ericsson have also gone through a strategic reorganization during the past couple of years, leading to less investment in knowledge- and competency enhancing activities as attention has shifted toward cost-reducing actions. For these organizations, the resulting decreased focus on knowledge management activities has led to a severe decline in motivation and a setback to the development of a knowledge-sharing culture with potentially devastating consequences for the long-term development of effective, value-creating enterprise-wide KMS'.

Advanced stage

In order for firms to move into the advanced stage of KMS' they will need to refocus their strategic and organizational value-creating activities toward becoming true 'e-companies'. The future is likely to hold an entirely new set of rules of competition in which innovation and particularly the capability of continuous innovativeness becomes the key asset. As 3M's 'eleventh commandment' states: 'Thou shall never kill a new idea.' 3M furthermore subscribe to the '15% rule', which requires that every scientist spend 15% of his/her time on research they want to do but is not currently assigned to. As more and more work becomes automated and outsourced, the key employee becomes the knowledge worker and the firm becomes a fluid, boundary-less bundle of virtual communities of practice across institutional and national borders. The value system becomes truly integrated as firms seek to create new markets for new inventive products in collaboration across functions, industries, etc. The main vehicle for this kind of dynamic collaborative innovation is likely to be the Internet, as knowledge workers develop temporary communities of practice to solve complex problems and provide individual solutions. MNCs maneuvering in a truly global,

hyperdynamic and integrated business environment face a completely different set of issues as they seek to leverage their knowledge assets symbiotically (see table 1).

Strategy/policy issues

Although it is widely accepted in the literature that the MNC owes its existence to its superior ability (relative to markets) to exchange knowledge and that this superior ability may at the same time be the source of competitive advantage (relative to purely domestic firms)¹⁸, it is also widely recognized that the resource costs of knowledge exchange are likely to be substantial¹⁹. Two sets of motivational problems are often cited; one pertaining to the costs of coordinating the knowledge exchange and determining who should bear these and how parties are to be compensated and the other pertaining to bargaining power arising from knowledge monopolies, since transferring knowledge is tantamount to giving up power. The challenge at the advanced stage is therefore to design the KMS in such a way as to limit this tension. Through the implementation of flexible structural arrangements and effective policies for knowledge exchange, a KMS can be devised in which subsidiaries gain power by exchanging knowledge. For instance, if corporate policies and incentive systems are designed to reward knowledge creation and innovation, influence and power is likely to flow to the subsidiary that is able to develop a dynamic capability to produce and transfer new knowledge to other subsidiaries²⁰. In similar fashion, policies governing intellectual capital rights at the individual, departmental, and SBU unit level must be designed as a systematically coordinated effort. Thus, knowledge management should not become isolated into functional departments or areas but rather it needs to be high on the agenda for top management as corporate strategies are developed and executed. This means that in times of economic hardship, like those faced by the IT industry lately, funding for KMS' should not be haphazardly cut without attention to the true value-adding of these processes across the entire value system. Strategic

performance management tools, such as Balanced Scorecard, may offer a more complete analysis of key performance indicators. Today, however, only few firms are pursuing the measurement of intellectual capital actively²¹.

Organizational/structural issues

MNCs aspiring to enter the advanced stage of knowledge management must organize their efforts around virtual centers of excellence, manifested by its codifying element: the systems, tools and methods that the virtual community has developed (and continuously develops) over its lifetime. It is not, however, the system *per se* that constitutes the virtual center; rather it is the collective knowledge of the individual members (knowledge workers) coupled with the codified part of their knowledge in the system that constitutes the virtual center of excellence. As knowledge workers work together company- and industry-wide, the size and complexity of the virtual teams enable more flexibility and innovativeness than would otherwise be possible. Devonian, a large British telecommunications multinational, for example, utilizes flexible virtual teams to create new knowledge and retain relevant knowledge in the system when bidding for global projects. Hence, while local specialists are brought in as key parts of each bid team, key members of past teams are used in order to retain relevant knowledge under the management of 'the major bids department'. The composition of these teams is complex and local membership varies depending on the need for local political, cultural, social and business practice understanding. Thus, the use of virtual teams enables local elements to be integrated and reconfigured as the particular situation requires²².

Some of the knowledge created will eventually become institutionalized and part of the firm's standard operating routines and procedures. Accenture talk about the shift from competence to capability, where competence refers to a group of 15-20 people with a certain skill, and capability to a group of 300-500.²³

The IT infrastructure must be designed to support both codification of massive amounts of tacit knowledge and facilitate exchange of this knowledge through the web in order to ensure the creation of knowledge synergies. As the focus of the future MNC shifts toward plasticity and continuous innovativeness, KMS structures must be designed in such a way as to ensure instant access to all relevant knowledge along the entire value system regardless of time and location. At present, it seems that only the Internet can offer this kind of flexibility and thus a web-based business model is likely to develop as multinational corporations increasingly compete on time, whether it be time of innovation, time-to-market, or time of adaptation to environmental changes. Siemens' establishment of Centers of E-Excellence, the first of which was established in October of 2000 in Munich, is an example of attempts to build an e-business model with the Internet as the central platform for knowledge exchange. Siemens is putting its entire business on a new foundation; an e-business infrastructural base, thereby transforming itself into a company whose entire value chain will be characterized by e-business. Thus, all aspects of Siemens' global value chain - from purchasing, sales, and after-sales service, to internal business and production processes, from research and development to training, and the worldwide management of knowledge and expertise - will be networked and handled electronically via web-based technologies. In similar fashion, Cisco Systems has become a globally, integrated web-based 'e-company'. Cisco pioneered e-business during the 1990s and, as a result, grew by 50% or more a year, leaving competitors behind. The basic philosophy at Cisco is that the speed and ease with which customers can do business with the company determines its competitive advantage. The management applies the same principle to the employees. Hence, within Cisco, all functions between employees are web-enabled. Moreover, there is a direct flow of information and knowledge between the company, its customers and its partners. Orders by customers are placed online, which automatically triggers orders from suppliers, adding to speed and eliminating the need

for infrastructure. According to William H. Weber, GM of Cisco sub-Saharan Africa, Internet enabling saved Cisco \$825 million on 1999 revenue of more than \$12 billion.

Cultural/human issues

As knowledge workers become increasingly independent, they become gradually more distanced from any one organizational culture and organizational identity. Additionally, knowledge creation increasingly depends on the combination of knowledge from different fields and disciplines and this faces management with the challenge of employing a highly diverse workforce in terms not only of knowledge, skills and expertise, but also religion, race, national culture, age, etc. Moreover, as the value system becomes increasingly integrated, even customers are viewed as knowledge workers and companies may create advisory councils made up solely of clients. Southwest Airlines, for example, utilizes the knowledge of its frequent flier customers to assist in hiring new flight attendants. Sharing knowledge with advanced users (also known as 'lead users') in the process of firms' product development has been employed extensively by firms for developing both radically and incrementally new products and has proven capable of overcoming some of the important knowledge asymmetries between users and product developers required to build new successful products²⁴. Hence, the challenge of the future will be to effectively manage highly skilled, independent knowledge workers, often located worldwide. Successful e-business requires what Heinrich v. Pierer of Siemens calls an 'e-mindset' throughout the organization.

At least two issues become of importance for HR management in MNCs in relation to knowledge management at this stage: hiring/turnover of skilled employees and individualized motivation/incentive systems. These elements of the HR strategy cannot (and should not) be separated, as it is the systematic combination of these, which constitutes an effective knowledge related HR strategy at this stage of the KMS development process. Competitive advantage is

derived from the ease with which customers can do business with a company. Cisco applies the same principle to its 'internal customers,' its employees. For example, Cisco's 16,000 employees in the US do their expense claims online, which brings about tremendous speed and efficiency. Only two auditors are needed to oversee all claims. Combined with an incentive structure that encourages knowledge sharing and innovation, Cisco has created an 'e-mindset' or 'e-culture', which together with a reputation as being an industry leader and a 'good place to work' has translated into the industry's lowest voluntary employee turnover rate at 3%. Moreover, this mindset also affects the hiring process at Cisco and other MNCs, where the average age of new employees is continually decreasing as they increasingly look for young talents with excellent learning skills rather than industry experience. Consequently, many MNCs have developed corporate universities in order to ensure relevant and specific education as well as to build a certain corporate attachment in order to lower the turnover rates²⁵.

In order to reduce the risk of turnover and encourage innovation, incentive systems need to stimulate knowledge sharing and creation. At Bain & Company, for instance, the partners are evaluated each year on a variety of dimensions, including how much direct help they have given colleagues. The degree of high-quality person-to-person dialogue a partner has had with others can account for as much as one-quarter of his or her annual compensation. Similarly, at Siemens, Cisco and IBM knowledge creation and sharing is part of the employee performance reviews and directly linked to professional advancement within the organization. However, according to Ted Graham, worldwide director of Knowledge Management Services for IBM, performance reviews and annual compensation is too far down the road and do not give employees immediate market-based gratification. The economics of knowledge products –intellectual property- has very large upfront costs. The marginal costs, however, are much lower and, in the case of some products like software, approach zero. Realizing this economic reality, IBM Global Services has broken down knowledge-

for-compensation into three broad categories; 1) actions taken to win in the market place; 2) actions taken for flawless execution internally and externally; and 3) actions taken to encourage collaboration outside the employee's department, division or IBM itself. According to Scott Smith, director of knowledge management services at IBM Global Services in Somers, N.Y., this reward system recognizes both the person who creates content and the one who uses it to create value elsewhere in the company, and together with other knowledge metrics it has increased cross-pollination of ideas and abstract thinking across the company.

CONCLUSIONS

Innovation drives organizational success and knowledge management must harness the processes that deliver innovation. It may be difficult to change the characteristics of knowledge by managerial action, but managerial action may change the mode of knowledge acquisition, exchange and utilization. Thus, whereas it may not be of much help to managers to learn that competitive advantage is best sustained if the rent-yielding knowledge asset conforms to certain criteria (like tacitness, inimitability, etc.), it may be very helpful to learn that certain characteristics of the management of knowledge are more likely to lead to sustainable advantages. This article has argued that MNCs go through different phases of development of their KMS', each characterized by specific issues and challenges and, therefore, requiring a different set of managerial actions. As the focus shifts from management of information via management of knowledge to a preoccupation with management of innovation (as illustrated by the vertical axe in figure 1), so too must MNC strategic management in its KMS-related efforts and activities.

This article offers a framework for managers to aid them in their pursuit of a coherent and effective KMS. The phase-model, aided by the examples, clearly illustrates how MNCs simultaneously must pay attention to strategic, organizational and human issues when designing and

executing their KMS. This process, although difficult, is by no means impossible, however, it requires a fundamental understanding of the different elements and dimensions of the KMS. Although the phase-model presented in the article suffers from weaknesses common for all phase models; namely not being able to reflect the possible variety and complexity of processes and tendencies taking place in reality, the model can assist managers in MNCs and in knowledge-intensive industries in general in identifying and diagnosing the KMS for their company bearing in mind the clusters of strategic issues typical for the different stages. This can be a helpful tool in navigating each stage of the KMS life cycle. As such, the model also has implications for knowledge management strategy as a whole. Two major lessons from this research stand out.

First, although the suggested phase model is inspired by examples from large MNCs, it can be applied by a much wider range of organizations that seriously focus on active knowledge management. KMS', as discussed in this paper, typically require large investments over time and may not be feasible or indeed necessary for smaller, less knowledge-intensive firms. In general, a good starting point is to conduct an analysis of current and future needs in terms of KMS' before embarking on this journey. Such an analysis is likely to benefit from attention to the main elements outlined in the phase-model.

The second lesson is a direct consequence of implementing a KMS without paying due attention to critical elements pertaining to strategic, organizational and human issues. The phases are not static and movement in both directions is possible, as the Siemens example clearly illustrates, particularly if advancement is pursued too quickly in a dynamic environment. Attempting to move into a more advanced stage without commitment of the necessary financial, organizational and human resources is unlikely to lead to success. Additionally, moving to subsequent stages of the KMS development does not exclude the option of returning back to previous stages in the future or, sometimes, entirely removing the very idea of having a KMS from the management agenda.

Correctly identifying what stage the firm and its KMS is at, paying due attention to the issues involved in this particular stage and careful management interventions may reduce negative effects of changing economic conditions and thus enhance the likelihood of success.

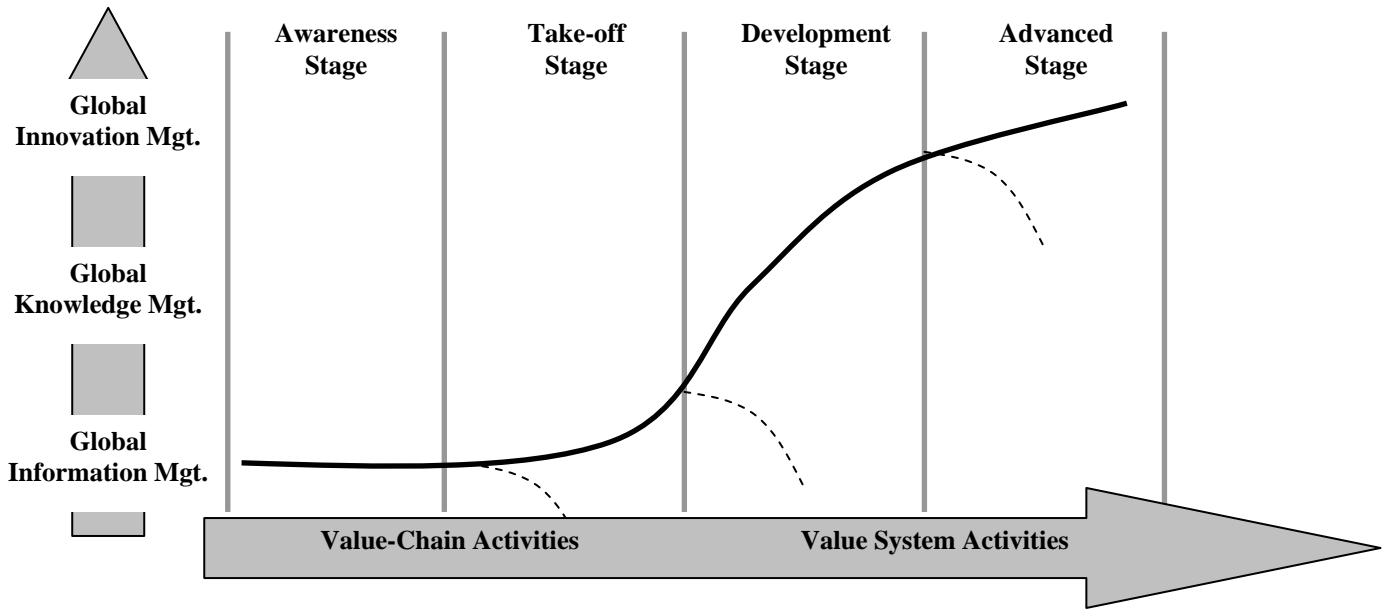
Not all firms need to go through all four stages. The very existence of organizations that have been centered around knowledge and expertise from the very beginning and where the knowledge worker has traditionally been a key figure, proves that there was awareness of the importance of knowledge assets, as for instance in the consulting, pharmaceutical, IT and other knowledge-intensive industries. Having said this, however, it is worth emphasizing that being aware of the existence and the importance of knowledge assets does not necessarily lead to their effective management. Moreover, industries still exist, in which physical labor and/or knowledge low-intensity remains decisive, despite the enormous IT progress. In these types of businesses it would be costly and inefficient to try to move the particular company to the later stages of the KMS development process, such as the developed or advanced stage. In these cases firms need to consciously decide to keep the KMS at an earlier developmental stage rather than engaging in expensive efforts to force the organization into becoming knowledge-driven.

The main strength of the proposed phase model is that it a) identifies the key features typical for each phase and b) explicitly links the defining characteristics of the particular phase with the respective appropriate management instruments. As is the case with phase models in general, a careful diagnosis of the particular situation and company is required in order to be able to apply this model as an analytical and action-oriented management tool. Such a diagnosis would allow top management to assess the optimal duration of each phase and when the internal and the external conditions are conducive to transit to the next stage. Hence, while it is impossible to predict the optimal duration of each single phase, it is clear that a pre-mature transition to the subsequent stage may compromise the entire KMS development project and have longer-term negative consequences

on both the attitudes and actual behaviors of organizational members in relation to knowledge creation and sharing. This implies the need for management's continuous (re)assessment and (re)action rather than isolated, discrete and informal management initiatives.

Acknowledgment: The authors wish to thank the MANDI research project at Copenhagen Business School for its financial support. We are thankful for the helpful comments by Thomas Roehl and Siah Hwee Ang on an earlier version of this paper.

Figure 1. Phases of global KMS development in MNCs



———— : expected KMS development trajectory (addressing the pertinent managerial issues)

----- : possible development trajectory (failing to address the pertinent managerial issues)

Table 1. Characteristic features and key issues in the four stages of the KMS development process in Multinational Corporations

| Stage | Characteristic features | Key issues | | |
|--------------------|---|--|---|---|
| | | Policy / strategy | Organization / structure | Culture / people |
| <i>Awareness</i> | Importance and manageability of knowledge assets is recognized; spontaneity | No explicit strategy; no allocation of resources; information management rather than knowledge management | Relying on existing configurations; no infrastructure for value creation from knowledge assets; no system for coordinating knowledge activities | No systematic knowledge-related HRM; |
| <i>Take-off</i> | Designing organized efforts to leverage knowledge; building up formal systems for managing knowledge assets | Designing policies for entry, retrieval, storage, sharing and utilization of information; focus on knowledge transfer among subunits | Developing new org. structures to support knowledge leverage across units; investments in IT; headquarters serve as information hub | Allocating knowledge-related positions, but no specific training; Barriers to knowledge sharing surface |
| <i>Development</i> | Move towards a global KMS; active knowledge management; shift to knowledge creation and innovation | Leveraging not only internal, but also external knowledge; recognizing subsidiaries as centers of excellence and global innovators | Becoming a learning organization by global networking of knowledge across the value system; taking advantage of local knowledge repositories | Collaboration replaces internal competition; well-elaborated motivation and reward systems related to knowledge creation and sharing |
| <i>Advanced</i> | Becoming a true e-company; true integration of the values system; continuous innovativeness is a key asset | Systematic design of intellectual capital rights; designing policies that allow subsidiaries to gain power by exchanging knowledge | Organizing virtual teams and centers of excellence based on collective knowledge; IT supports knowledge creation and exchange | Establishing 'e-mindset' throughout the organization; hiring/turnover of highly diverse knowledge workforce; individualized incentive systems |

REFERENCES

-
- ¹ See, for instance, G. Szulanski, Exploring Internal Stickiness: Impediments to the Transfer of Best Practices Within the Firm, *Strategic Management Journal*, **17**(Winter Special Issue 1996): 27-43 and M.M. Appleyard, How Does Knowledge Flow?, *Strategic Management Journal*, **17**(Winter Special Issue 1996): 137-154.
- ² See, for instance, D. J. Teece, Economics of scope and the scope of the enterprise, *Journal of Economic Behavior*, **1** (1980): 223-247.
- ³ See S. Hymer, *The international operations of national firms: A study of direct investment*, (1959), Ph.D. dissertation, Massachusetts Institute of Technology, Cambridge, MA. and R.E. Caves, International corporations: The industrial economics of foreign investment. *Economica*, (1971): 38: 1-27.
- ⁴ For a review of the evolution of knowledge management research and foci, see B.B. Nielsen, Strategic Knowledge Management Research: Tracing The Co-Evolution of Strategic Management and Knowledge Management Perspectives, *Competitiveness Review*, (2004): *Forthcoming*.
- ⁵ See C. A. Bartlett and S. Ghoshal, *Managing Across Borders: The Transnational Solution*, (1989), Boston: Harvard Business School Press.
- ⁶ Although several definitions of a KMS exist, most of these focus on the technical aspect of knowledge management, thereby neglecting the systemic interaction of information technology with political, organizational and human aspects of the enterprise. For example, Country Monitor, defines KMS as “networked systems that share information and leverage knowledge throughout the enterprise” and “provide Internet-based access to customers and suppliers worldwide”, Knowledge management: top IT issue for 21st century, *Country Monitor*, **6**(50) (1998).
- ⁷ See, for example, *Strategic Management Journal*, Special Issue on Knowledge and the Firm, **17** (1996) and *California Management Review*, Special Issue on Knowledge and the Firm, **40** (1998).
- ⁸ See G. Hamel and C. K. Prahalad, *Competing for the Future*, (1996): Harvard Business School Press.
- ⁹ See C. von Clausewitz, *On War*, (1968): Penguin Classics.
- ¹⁰ Coloplast A/S, a manufacturer of medical devices, was established in Denmark in 1957. Today, this multinational firm has operations in more than 15 countries worldwide and generates more than 98% of its revenues outside Denmark.
- ¹¹ Traditional MNC refers to divisional or matrix organizational structures with centralized customization of information dictated by headquarters. The objective is typically transfer of know-how to new segments/markets and scale economies.
- ¹² A wholly owned subsidiary of Danaher Corporation, Fluke is a multi-national corporation headquartered in Everett, Washington, USA. Manufacturing centers are located in the USA, the UK and The Netherlands. Sales and service subsidiaries are located in Europe, North America, South America Asia and Australia. Fluke Corporation has authorized distributor and manufacturer representative channels in over 100 countries and employs approximately 2,400 people worldwide.
- ¹³ See K. Husted and S. Michailova, Diagnosing and Fighting Knowledge-Sharing Hostility, *Organizational Dynamics*, **31**(1) (2002): 60-73 and S. Michailova and K. Husted, Knowledge-sharing Hostility in Russian Firms, *California Management Review* **45**(3) (2003): 59-77.
- ¹⁴ See B. B. Nielsen and F. Ciabuschi, Siemens ShareNet: Knowledge Management in Practice, *Business Strategy Review*, **14**(2) (2003): 33-40.
- ¹⁵ For a discussion of three sources of subsidiary knowledge (internal, network-based, and cluster-based) see N.J. Foss and T. Pedersen, Transferring Knowledge in MNCs: The Role of Sources of Subsidiary Knowledge an Organizational Context, *Journal of International Management*, **8**(1) (2002): 49-67.
- ¹⁶ J. H. Dyer and K. Nobeoka. Creating and managing a high-performance knowledge-sharing network: The Toyota case. *Strategic Management Journal*, **21** (2000): 345-367.
- ¹⁷ For a discussion of knowledge flow patterns and subsidiary strategic roles, see A.K. Gupta and V. Govindarajan, Organizing for Knowledge Flows within MNCs, *International Business Review*, **3**(4), (1995): 443-457.
- ¹⁸ A. K. Gupta and V. Govindarian. “Knowledge flows within multinational corporations”, *Strategic Management Journal*, **21** (2000): 473-496.
- ¹⁹ K. R. Conner and C. K. Prahalad, A resource-based theory of the firm: Knowledge versus opportunism. *Organization Science*, **7**(5) (1996): 477-501.
- ²⁰ Thus, the power-wielding asset becomes the dynamic capability to, continuously, produce and transfer new knowledge rather than possession of the knowledge *per se*. For further discussion of the determinants of subsidiary power in an MNC network, see, for example, M. Forsgren, T. Pedersen and N.J. Foss, Accounting for the Strengths of MNC Subsidiaries: the Case of Foreign-Owned Firms in Denmark, *International Business Review*, **8** (1999): 181-196.

²¹ See L. Edvinsson and M.S. Malone, *Intellectual Capital: Realizing Your Company's True Value by Finding Its Hidden Brainpower*, HarperCollins, New York (1997).

²² For a discussion of knowledge management practices at Devonian, see P.J. Buckley and M.J. Carter, Process and structure in knowledge management practices of British and US multinational enterprises, *Journal of International Management*, **8**(1) (2002): 29-48.

²³ K. Moore and J. Birkenshaw, Managing Knowledge in Global Service Firms: Centers of Excellence, *Academy of Management Executive*, **12** (1998): 81-92.

²⁴ G.Lilien, P. D. Morrison, K. Searls, M. Sonnack, and E. von Hippel, Performance assessment of the lead user generation process for new product development, *Management Science* **48**(8) (2002): 1042-1060 and G. Urban and E. von Hippel, Lead user analyses for the development of new industrial products, *Management Science* **35**(5) (1988): 569-582.

²⁵ The cost of hiring and training a new employee can vary greatly. Estimates of turnover costs may range from 25 percent to almost 200 percent of annual compensation. Costs that are more difficult to estimate include customer service disruption, emotional costs, loss of morale, burnout/absenteeism among remaining employees, loss of experience, continuity, and "corporate memory."

CKG - Working Papers

www.cbs.dk/ckg

2003

- 2003-1:** Nicolai J. Foss, Kenneth Husted, Snejina Michailova, and Torben Pedersen: Governing Knowledge Processes: Theoretical Foundations and Research Opportunities.
- 2003-2:** Yves Doz, Nicolai J. Foss, Stefanie Lenway, Marjorie Lyles, Silvia Massini, Thomas P. Murtha and Torben Pedersen: Future Frontiers in International Management Research: Innovation, Knowledge Creation, and Change in Multinational Companies.
- 2003-3:** Snejina Michailova and Kate Hutchings: The Impact of In-Groups and Out-Groups on Knowledge Sharing in Russia and China CKG Working Paper.
- 2003-4:** Nicolai J. Foss and Torben Pedersen : The MNC as a Knowledge Structure: The Roles of Knowledge Sources and Organizational Instruments in MNC Knowledge Management CKG Working Paper.
- 2003-5:** Kirsten Foss, Nicolai J. Foss and Xosé H. Vázquez-Vicente: "Tying the Manager's Hands": How Firms Can Make Credible Commitments That Make Opportunistic Managerial Intervention Less Likely CKG Working Paper.
- 2003-6:** Marjorie Lyles, Torben Pedersen and Bent Petersen: Knowledge Gaps: The Case of Knowledge about Foreign Entry.
- 2003-7:** Kirsten Foss and Nicolai J. Foss: The Limits to Designed Orders: Authority under "Distributed Knowledge" CKG Working Paper.
- 2003-8:** Jens Gammelgaard and Torben Pedersen: Internal versus External Knowledge Sourcing of Subsidiaries - An Organizational Trade-Off.
- 2003-9:** Kate Hutchings and Snejina Michailova: Facilitating Knowledge Sharing in Russian and Chinese Subsidiaries: The Importance of Groups and Personal Networks Accepted for publication in *Journal of Knowledge Management*.
- 2003-10:** Volker Mahnke, Torben Pedersen and Markus Verzin: The impact of knowledge management on MNC subsidiary performance: the role of absorptive capacity CKG Working Paper.

- 2003-11:** Tomas Hellström and Kenneth Husted: Mapping Knowledge and Intellectual Capital in Academic Environments: A Focus Group Study Accepted for publication in *Journal of Intellectual Capital* CKG Working Paper.
- 2003-12:** Nicolai J Foss: Cognition and Motivation in the Theory of the Firm: Interaction or “Never the Twain Shall Meet”? Accepted for publication in *Journal des Economistes et des Etudes Humaines* CKG Working Paper.
- 2003-13:** Dana Minbaeva and Snejina Michailova: Knowledge transfer and expatriation practices in MNCs: The role of disseminative capacity.
- 2003-14:** Christian Vintergaard and Kenneth Husted: Enhancing selective capacity through venture bases.

2004

- 2004-1:** Nicolai J. Foss: Knowledge and Organization in the Theory of the Multinational Corporation: Some Foundational Issues
- 2004-2:** Dana B. Minbaeva: HRM practices and MNC knowledge transfer
- 2004-3:** Bo Bernhard Nielsen and Snejina Michailova: Toward a phase-model of global knowledge management systems in multinational corporations
- 2004-4:** Kirsten Foss & Nicolai J Foss: The Next Step in the Evolution of the RBV: Integration with Transaction Cost Economics
- 2004-5:** Teppo Felin & Nicolai J. Foss: Methodological Individualism and the Organizational Capabilities Approach
- 2004-6:** Jens Gammelgaard, Kenneth Husted, Snejina Michailova: Knowledge-sharing Behavior and Post-acquisition Integration Failure