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Knowledge Management in Asia: Experience and Lessons

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Report of the APO Survey on the Status of Knowledge Management in Member Countries (06-RP-GE-SUV-31-B)





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Report of the APO Survey on the Status of Knowledge Management in Member Countries (06-RP-GE-SUV-31-B)

Dr. Serafin D. Talisayon, Philippines, served as the volume editor.

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FOREWORD

With the intent of designing a more systematic, focused program on knowledge management (KM), in 2006 the Asian Productivity Organization (APO) initiated a survey on the status of KM in nine member countries and compiled about two dozen case studies of exemplary KM practices in the private sector, government, and nongovernmental organizations in Asia. This book is the result of that survey project. To complement the survey, the APO sent three factfinding missions to leading KM institutions and practitioners in Europe and the USA in 2007. Study meetings on formulating a KM framework, KM implementation, and KM measurement methodology were also convened by the APO to expand its research and planning function.

The survey of good KM practices described in this book validated earlier concepts and yielded useful new insights that can help the APO improve its program to assist NPOs in KM and to help member countries to move toward knowledge-based development (KBD). Because many individual member countries have unique or specific strengths in KM, collaborative or multilateral cooperation among NPOs would be mutually beneficial, especially for NPOs that have only recently begun the journey toward competitiveness and excellence through KM. The APO intends to improve its assistance to NPOs that need to accelerate the adoption of KM and KBD.

Many leading organizations in KM practice in Asia are shifting their focus from excellence in operational productivity and quality management to excellence in strategic innovation and learning through KM. Thus the APO will continue to encourage the replication or adaptation of the best practices in quality improvement, but more importantly it will increase efforts to stimulate the innovation of "next practices" to improve the global competitiveness of Asian enterprises.

The case studies in this volume provide evidence that success in the Asian organizations studied is viewed not only as stemming from intelligent management of knowledge assets but also from supportive relationships and caring leadership that motivate knowledge workers in Asia to perform at their best.

The APO is grateful to all contributors to this publication for conveying the importance of KM through their survey studies. Special thanks are due to Dr. Serafin D. Talisayon for his role as chief expert for the survey and review of the entire volume. It is our hope that the survey results will provide readers with further insights into KM and assist firms and policymakers in taking actions that will yield business excellence and higher productivity.

Shigeo Takenaka Secretary-General

Tokyo May 2008

Part I Overview

Dr. Serafin D. Talisayon Chief Expert

OBJECTIVES OF THIS BOOK

This book is the result of an APO project entitled "Survey on the Status of Knowledge Management in Member Countries." The objectives of the project:¹

- 1. To conduct in-depth studies to describe the most recent status of knowledge management (KM) applications and practices in the member countries participating in the survey.
- To analyze conditions, key determinants, and strategies enabling the acceptance and successful implementation of the KM concept by corporations and organizations in those countries.
- To undertake case studies and comparative analyses to explain how the pursuit of KM has enabled Asian corporations and organizations to reach a higher level of excellence and competitiveness.
- To identify recommendations and practical measures for other corporations and organizations in APO member countries to emulate the lessons and successful cases found in the survey.

The intent is to provide useful and actionable information for two audiences: (a) KM practitioners and executives of private or public sector organizations and (b) National Productivity Organizations (NPOs) of member countries of the Asian Productivity Organization (APO), the APO Secretariat and other national-level policy makers. This book aims to provide actionable information for these audiences in the following action areas:

- 1. Organizational level: implementing KM initiatives and KM applications and ensuring impacts on productivity and competitiveness.
- National level: promoting and disseminating KM and facilitating acceptance of KM in various organizations.

OUTLINE OF THIS OVERVIEW CHAPTER

This overview chapter will cover: (a) an overview of KM concepts and practices at the organizational level, (b) an overview of knowledge-based development at the national level, and (c) an overview of the case studies and national surveys in this book, including a summary of the interesting or unique features of each case study.

OVERVIEW OF KM THEORY AND PRACTICE

Objective of Knowledge Management: Value Creation

Among leading knowledge management practitioners,² "knowledge" is commonly understood as *capacity for effective action*, which includes information useful for effective action.³

¹ See Project Notification (project code 06-RP-GE-SUV-31-B) issued by APO on 26 April 2006.

² Here are definitions by some leading knowledge management practitioners: "Justified belief that increases an entity's capacity for effective action" (Nonaka, 1994). "I define knowledge as a capacity to act" (Sveiby, 1997). "Knowledge is information that changes something or somebody—either by becoming grounds for action, or by

An action is "effective" if the result is close to what is desired, whether by an individual or an organization. For private or business organizations, the desired result is creation of *market value*; for public and civil society organizations, it is creation of *social value*. Actions to create value are organized through *business processes* or *work processes*. Knowledge management is enabling and enhancing capabilities to perform such processes, including sourcing and deployment of the right knowledge assets, in order to achieve the desired results. Knowledge assets include embodied knowledge in people; embedded knowledge in technology, systems and processes; enculturated knowledge in work relationships, teams and networks; and actionable information and insights. The ultimate aim of knowledge management is to create value (Figure 1).





SOME PRACTICAL HINTS

- KM will matter most if applied to a *core* business process.
- KM to increase productivity of a business process is good operational KM, while KM to reinvent or redefine what is "core" is strategic KM.
- A company must first identify what its "core" business processes are before operational KM is undertaken; in other words, a business process audit must precede an operational KM audit. The question "Are we doing the right thing?" should be answered affirmatively before asking the KM question "How do we do it better?"
- Instead of the term "business process," use whatever term non-commercial organizations use, e.g., "work process."
- Alignment of KM to the project objectives is achieved through the logical framework of the project.

Knowledge creates value when it is used or applied for effective action. The measure of good KM is effectiveness and efficiency of action or achievement of valuable end results. Pro-

making an individual (or an institution) capable of different or more effective action" (Drucker, 1989). "Knowledge is information in action" (O'Dell and Grayson, 1998). The failure to distinguish between the specific meaning of the term "knowledge" as understood by KM practitioners and the broad varieties of meanings of the same word among laymen may be a cause of much confusion as to what KM is all about. ³ "Action" can mean making decisions, solving problems, or physical action.

ductivity, quality of output, rate of innovation, and revenues are measures of KM. This is the reason why productivity improvement and total quality management overlap with KM.

Various stages in the knowledge cycle (see Figure 2) constitute the knowledge value chain; it is at the last stage—use or reuse of knowledge—where value creation is realized.

Knowledge, like information, allows multiple consumption. Copying, sharing, or using it does not diminish the utility of the original. Therefore, knowledge-sharing and use can multiply value creation.



Figure 2. The Knowledge Cycle

SOME PRACTICAL HINTS

- Studying customer needs and complaints (part of external sensing) provides knowledge useful for product R&D, product re-design, or process innovation/improvement.
- Demand-driven KM: the use of knowledge specific to a work process and particular to an organizational context should drive how the rest of the knowledge cycle is designed and managed.
- Do not "jump" or push a KM solution; a KM assessment or audit (part of internal sensing) provides the empirical basis for selecting the most relevant KM solution.

Difference between Knowledge and Information

Knowledge overlaps with information; one way to distinguish between the two is to regard knowledge as *"know-how"* while information is "know what"; or that knowledge is *"what works"* while information is "what is." *Utility for action* is what distinguishes knowledge from

other information. Actionable information, e.g., content of a manual, is an example of knowledge, or more precisely, explicit knowledge (see Figure 3).

Intellectual Capital

Knowledge takes many forms. Ask yourself this question: "What helps me do my job well?" Answers to this question by knowledge workers and managers often tend to cluster into five groups:

- Group 1. Skills and experience, training, work attitudes, learning, health (or "embodied knowledge")
- Group 2. Policies, information and other support systems, work processes, manuals (or "embedded knowledge")
- Group 3. Knowledge invested in building external networks and support systems, customer loyalty, brand or reputation, trust of partners
- Group 4. Support and recognition from peers and superiors, incentives, personal drive, conducive work environment and other motivational factors
- Group 5. Technology, equipment, financial resources, supplies and materials.



Figure 3. Converting Information to Explicit Knowledge and Explicit Knowledge to Tacit Knowledge

SOME PRACTICAL HINTS

- After every action or project, ask "What worked well or better?" The answer is knowledge because it is useful to anyone who will repeat that action or project.
- After every mistake, ask "What did not work and why?" Share the answer across the organization. Repeating mistakes amounts to organizational amnesia, a sign that the organization needs KM.
- "Knowledge translation"—converting academic or scientific information into actionable information such as a prescription, a formula or a manual—is a form of knowledge creation.

The intellectual capital school of KM⁴ calls the first three groups *human capital, structural capital* (or process capital or internal capital), and *stakeholder capital* (or customer capital or external capital), respectively. These three forms of capital are collectively called *intellectual capital*, which is nearly synonymous with *knowledge assets*. Group 3, arguably, is not "knowledge" as the word is commonly understood by laymen. However, it clearly contributes to capacity for effective action and therefore among most KM practitioners it is part of intellectual capital or knowledge assets.

The intellectual capital framework is consistent with the value creation perspective of KM because, in general, "capital" is anything that can yield regular income. For example:

- Natural capital: fruit tree, topsoil, grazing land, ocean fish stock.
- Social capital: informal networks and roles, patrons, trust of the community.
- Financial capital: savings account, investment papers, stocks.
- Intellectual capital: know-how, manuals, directories.

Groups 1–4 can be called *intangible assets*. Group 5 is properly called *tangible assets* because in this group belong items that are entered into the accounting system. The global trend in the last few decades shows that intangible assets are contributing more than tangible assets to market values of corporations.⁵

Group 4 is interesting. Although this group is not related to knowledge, I often find it essential for the success and sustainability of KM initiatives. For example, company-wide KM initiatives often need accompanying change management interventions. Another example is the common observation that technology alone does not assure an increase in knowledge-sharing behavior. Managing Group 4 involves tools that have been developed in the fields of human resource development, change management, and organizational development (see "Motivating Knowledge Workers" below).

SOME PRACTICAL HINTS

- A good way to start KM is by assessing the adequacy of various intangible and tangible assets most needed as inputs for a business process.
- A knowledge taxonomy specific to an organization provides a common basis for classifying documents, expertise, best practices, and other knowledge objects.
- The Balanced Scorecard is a good way to track intangible assets, e.g., customer indicators track stakeholder capital, business process indicators track structural capital, and learning indicators track human capital.

Effective action stems from the right mix of—and interactions among—human capital, structural capital, and stakeholder capital. Here are some examples to illustrate this principle:

• A chest x-ray plate is a useful input for effective action to a radiologist, but not to an engineer; a boiler manual is useful for effective action to an engineer, but not to a radiologist. What is knowledge to one is only information to the other.

⁴ For example, see Sullivan (2000), Stewart (1997), and Sveiby (1997).

⁵ For example, see Blair and Wallman (2001).

- The usefulness of a laptop is nil in a remote rural village without electricity, Internet access, repair services, spare parts, or skillful users. Context affects the utility of technology.
- Reading a documentation of a best farm practice is not as useful for effective action as learning through face-to-face demonstration and mentoring by a best farmer practitioner on his own farm. Learning from a document (an example of disembodied knowledge or a knowledge object) is inferior to learning directly from an expert within a work context.
- After workers are trained outside the workplace, they go back to work contexts that may not be supportive of their new training (necessary policies are absent and co-workers do not understand or appreciate the training and new knowledge that the trainee obtained) and thus they are unable to use their training for more effective action.

In short, KM includes designing a mix of appropriate skills, relevant information, support systems, and relational context which can produce better results (Figure 4).⁶



Figure 4. Effective Mix and Interaction of Skills, System, and Relationships

An effective mix is needed whether the action is performed by a solitary knowledge worker or by a team. In the case of the latter, the relational context ("ba" of Nonaka⁷) and the ICT-enabled⁸ information support system become even more important for ensuring coordinated and effective performance of an action.

Explicit Knowledge and Tacit Knowledge

Tacit knowledge is undocumented knowledge.⁹ Tacit knowledge is often individual, private, difficult to access by other people, and specific to particular work contexts. Examples:

- Expertise.
- Informal work processes.
- Informal network of co-workers /professionals.

⁶ Interestingly, this triangular mix reappears in other fields. A basic premise in Ken Wilber's (1998) integrative epistemology is the fundamental distinction between I, we, and it: personal/experiential knowledge, group/phenomenological knowledge, and empirical/objective knowledge, respectively. The Three Jewels in Buddhism are *buddha, sanga,* and *dharma*: personal enlightenment, membership within a community of practitioners, and the teachings of the Buddha (or scripture, in Christian language), respectively.

⁷ Von Krogh, Ichijo, and Nonaka (2000).

⁸ ICT is information and communication technologies.

⁹ I prefer to define "tacit knowledge" operationally and very simply in this manner and thus escape the argumentations and confusions that result from epistemological definitions.

- "Work-arounds."
- Past experiences of what works.
- Relationship with a loyal customer.

Explicit knowledge is knowledge documented or encoded in print, electronic, or audiovisual formats or embedded in prototype, equipment, or technology. Examples:

- Manuals, documentation of best practice.
- Process tools, formulas.
- Portal or intranet, database.
- Technology: hard, soft or "wet" (biotechnology).
- Library.
- Directories of supplies, customers, etc.

Explicit knowledge, or *knowledge objects*, can be easily reproduced and distributed to many; they can be removed from their original work contexts and transferred elsewhere. While tacit knowledge is "sticky" (dependent on the practitioner), explicit knowledge is "leaky" (easily copied or stolen). Pure explicit knowledge probably does not exist because a human being is always needed to apply knowledge; even a completely automated or robotic factory needs a human being to turn it on and off and to monitor it. Figure 3 shows more clearly the distinctions between information, explicit knowledge, and tacit knowledge. Converting descriptive information (e.g., academic studies) to actionable information (e.g., practical guidelines), which is an example of explicit knowledge, is called *knowledge translation*. Practice converts explicit knowledge.

Managing explicit knowledge is mainly the domain of ICT, the technology side of KM. Managing tacit knowledge is mainly in the domain of human resources management, organizational development, change management, and related behavioral professions, the people side of KM.

Tacit knowledge is the highest stage of knowledge, when an action has become "second nature" to the practitioner (see Figure 5). While explicit knowledge is gained through copying, reading, or listening, tacit knowledge is gained through practice or "learning by doing."



Figure 5. Tacit Knowledge: the Highest Stage of Knowledge

Ask yourself approximately what percentage of what you know have you written down? Very likely your answer will be "much less than 50%," unless you are an e-learning or textbook writer by profession.

In general, there exists much more tacit than explicit knowledge in an organization. Among the reasons:

- Not all tacit knowledge is recognized as such, and not all recognized tacit knowledge is articulated or documented.
- Even given the willingness to articulate, many forms of tacit knowledge are difficult to articulate or document; "we know more than we can tell" and "we can show-and-tell more than we can write."
- People tend to hoard valuable tacit knowledge.

ICT can be used to assist face-to-face human interactions (e.g., video conferencing, document editing by a virtual group and other similar means of transferring or combining tacit knowledge), but ICT can process only explicit knowledge. What tend to be managed more are the visible and tangible knowledge objects, usually through ICT. KM can enhance advantages from ICT by paying attention to both tacit and explicit knowledge processes, optimizing both people-topeople and people-to-information interfaces and ensuring the productive interplay of all these.

SOME PRACTICAL HINTS

- Tacit knowledge, once documented, can be more easily shared with many people.
- Storytelling and show-and-tell are also useful KM tools for tacit-to-tacit transfer of knowledge.
- Mentoring an understudy, coaching, and peer assist are useful KM tools to transfer tacit knowledge that is difficult to document or articulate.
- You need KM if a business process is too dependent on only one employee or if many of your senior or specialist employees are about to retire.

Organizational Learning

Ask yourself another question: What percentage of what you know now came from your formal schooling? The more years of experience you have, the more likely your answer will be "much less than 50%." In most cases, we gain much more knowledge from doing than from schooling.

We devote a great deal of personal time and money and public planning, resources, and institutions to learning from schooling, but we do not devote as much for learning from doing. We should. The set of tools for planned and systematic learning from doing can be found in an area of practice closely related to KM: *organizational learning*.

Stanford professors Jeffrey Pfeffer and Robert Sutton noted that despite 1,700 business books published yearly (1996 data), USD60 billion spent on training, an estimated USD43 billion spent on management consultants, and 80,000 MBAs doing business studies, the change in actual management practice is, correspondingly, disappointingly small.¹⁰ After four years of studying this "knowing-doing gap," they concluded: "One of the most important insights from our research is that knowledge that is actually implemented is much more likely to be acquired from learning by doing than from learning by reading, listening, or even thinking." In other

¹⁰ This is the finding of a four-year study reported by Pfeffer and Sutton (1999).

words, the *acquisition of knowledge* must take place as close as possible to the work context where *application of that knowledge* is intended.

SOME PRACTICAL HINTS

- Mentoring in workplace application of KM tools has advantages over classroom training in KM.
- Short "lessons-learned meetings" (LLM) after any activity can capture what was learned from doing which might otherwise fail to be recognized, be forgotten, or lead to a repetition of mistakes.

Yet another reason why organizational learning is essential is the finding from a Royal Dutch Shell study that the average lifetime of Fortune 500 corporations is 40 to 50 years. Long-lived corporations, the study found, have the following common characteristics (de Geus, 1997):

- Ability to sense, learn, and adapt to changes in the environment.
- Cohesiveness, strong sense of identity, sense of belonging.
- · Avoidance of centralized control, tolerance of eccentricities and experimentations.
- Financially conservative, avoids debts or careful about borrowing.

According to Peter Senge, the guru of organizational learning, the study showed that "most corporations die prematurely—the vast majority before their fiftieth birthday—... from learning disabilities."

Organizational learning requires capacities for recognizing useful tacit knowledge in individuals and converting them into group explicit knowledge (Arrow 1 in Figure 6) for storage in and easy retrieval from a knowledge repository, which can be a simple operations manual or an organization-wide intranet. Examples of KM tools for this conversion are mind-mapping, causal flow diagramming, and the lessons-learned meeting or session (LLM or LLS). The Malampaya MMT case study illustrates how LLMs are used to capture and codify institutional memory among members of high-turnover teams.

These knowledge repositories residing in company intranets accumulate the growing learning, innovation, and knowledge of the organization and make it widely available for users across the entire organization; in effect, they serve as the "organizational brain." As more users practice what they access from the intranet, group explicit knowledge is converted into their own individual tacit knowledge (Arrow 1 in reverse).



Figure 6. Knowledge Transfer and Conversion Processes within a Learning Organization

Converting useful tacit knowledge into explicit form that is accessible and reusable by more knowledge workers in the organization is illustrated by the following case studies:

(a) retrospect, Unilever Indonesia's method of capturing tacit knowledge gained from projects, (b) documenting of innovations by Wika in Indonesia, (c) manualization of work processes into a Learning-Oriented Systems Manual and Lessons Learned Meeting to capture tacit knowledge of staff by Malampaya MMT in the Philippines, (d) the Dynamic Workspace by JTC Corporation of Singapore, and (e) the Three-Tier Knowledge Process of SK Energy in the Republic of Korea. In the tacit-to-explicit conversion processes of the last two examples, there is systematic attention to screening, validation, refinement, or improvement to generate high-value knowledge.

Tacit knowledge can be cross-validated, combined or synergized, and shared or multiplied among members of a community of practice or CoP, or transferred through storytelling, mentoring, or coaching (Arrow 2), and when the receivers practice what they hear or read, it becomes their own tacit knowledge (Arrow 2 in reverse). Group tacit knowledge can be codified and stored in the corporate knowledge repository (Arrow 5). This learning process among CoPs is illustrated by the KM model in the SK Energy case study, "Leisure Talk" or story telling in Bank Indonesia, the Patent Expo of Samsung Advanced Institute of Technology in the Republic of Korea, and the CoPs for continuous clinical quality improvement in Siriraj Hospital in Thailand.

Documentation of good or best practices, blogging, drawing a chart or mind map, manualization and knowledge transfer from retiring staff are KM tools to convert individual tacit knowledge into individual explicit knowledge (Arrow 3), which can then be easily shared, contributed to, or copied from the "organizational brain" (Arrow 4).

When readers of a manual or best-practice document practice what they read, it becomes part of their tacit knowledge (Arrow 3 in reverse). There are group processes which capture enculturated tacit knowledge in a group and convert them into explicit group knowledge; some of these processes are documentation of a business process, group formulation of their organization's SWOT table, visioning exercise, and wiki-style writing of the history of an organization (Arrow 5). In addition to these internal knowledge flows, there are knowledge flows to and from outside the organization.

Organizational learning is a long journey that requires individual members to grow in awareness and self-responsibility as learners. It requires teams to learn to collaborate effectively by learning how to suspend judgment to truly listen and engage in generative dialogue; to bring to the surface much that is normally left unsaid so that the group can examine hitherto implicit assumptions, blindfolds, and mindsets, and to decide together using explicit rules and protocols of thinking. It also requires systemic changes in the way individual tacit knowledge is screened, validated, and converted to group explicit knowledge—the "organizational brain"—to be made available to more users to learn and practice and to create value for the organization as well as to be multiplied into individual tacit knowledge among more members. Managing these behavioral and organizational processes is perhaps more akin to a gardener nurturing a living plant (Theory O) than to a mechanic trying to fix a machine (Theory E).¹¹

SOME PRACTICAL HINTS

- Official support or sponsorship and personal example from top leaders is essential.
- Mistakes are OK if they are used as learning opportunities; repeating mistakes is not OK.
- Make it a habit to document learning and what works.

¹¹ Beer and Nohria (2000).

- Incorporate knowledge-sharing and other desirable behaviors in the performance appraisal system, in job descriptions, and in employment or consultancy contracts.
- Unlearning requires the skill of recognizing and revising your own limiting assumptions or mental models.

Motivating Knowledge Workers

A knowledge worker may know how to do a job well and may be provided adequate inputs, support systems, and enablers, but is he willing to do the job? Does he want to perform well or better? An intranet may have the latest functionalities for knowledge-sharing, but these do not guarantee that the knowledge worker will begin sharing. Many answers to the question "What helps me do my job well?" fall along Group 4 (see "Intellectual Capital" above). Successful KM is not only about information and knowledge ("head" and "hands"); it is also about the presence of many internal and external motivating factors ("heart" and "guts"). By paying attention to Group 4 variables, the KM practitioner may be able to reduce the many human and systemic unknowns in the practice of KM and increase the predictability of KM interventions.

Many examples of awards and recognition are discussed in the case studies: (a) "champions" in Module Teams and "knowledge owners" in SCG Paper in Thailand, (b) "begawans" or senior experts in Bank Indonesia and Wika, (c) the "Knowledge Activist" award in JTC Corporation in Singapore, and (d) the "Enterprise Award" in Unilever Indonesia. Samsung Advanced Institute of Technology's Praise Ground is a notable example of publicly-announced peer-to-peer recognition (see last chapter, "Concluding Observations").

SOME PRACTICAL HINTS

Here is a checklist of motivational factors to harness:

- Personal talents, interests and ambitions.
- Sense of ownership or officially designated ownership over a process.
- Moral support and recognition from superiors, peers, and family.
- Incentives, awards and titles of honor.
- Teamwork in a group and morale in the organization.
- Quality of leadership.
- Policies and physical environments that encourage openness, interaction, taking responsibility, collaboration and innovation.

KNOWLEDGE-BASED DEVELOPMENT

National promotion of KM, organizational learning, management of intangible assets, and similar approaches and tools are greatly facilitated if the government and important institutional KM champions have formally recognized the value of a knowledge-based economy (KBE) and society or a knowledge-based development (KBD). The adoption by the government of a national strategy or plan for a KBE or KBD is an indicator of this recognition. In Asia, some examples are:

- e-Korea Vision 2006.
- Malaysia's KBE Master Plan (2002).

- Thailand's IT 2010 (2001).
- Singapore 21 (1997), ICT 21 Master Plan (2000).
- India Vision 2020 (2002).
- e-Japan Strategy (2001).

The World Bank introduced the Knowledge-Based Economy or KBE model and identified its "four pillars:" (a) education for a skilled workforce, (b) science, technology, and innovation, (c) ICT infrastructure, and (d) policy and regulatory environment. The first three have been found to significantly influence national factor productivities (Chen and Dahlman, 2004). The similarities between the KBE pillars at the national level and the components of intellectual capital at the organizational level are noticeable. The World Bank also developed a Knowledge Assessment Methodology (KAM) consisting of national indicators along each of the four pillars (Chen and Dahlman, 2005).

In practice, many Asian governments' KBE strategies also encompass social and developmental goals:

- e-Korea Vision 2006 aims to "... focus on qualitative accomplishments ... throughout society rather than quantitative expansion of the Internet."
- Thailand's IT2010 refers to a "Knowledge-Based Society and Economy (KBE/KBS)" where "development is ... not on focusing on 'technology' per se, but rather on the good use of ICT that would drive overall national economic and social development."
- The goal of e-Japan is to create a "knowledge-emergent society."

Accordingly, the Asian Development Bank (2007) expanded the KBE concept into "knowledge-based development," or KBD, where the three categories of intellectual capital are applied to the three value domains of sustainable development: economy, society, and natural environment. The development of the three categories of intellectual capital can be reframed for application at the national level as follows:

- 1. Education and training (development of human capital).
- Innovation (development of structural capital): R&D or development of technology, whether hardware, software, wetware,¹² or humanware¹³, and the establishment of supportive new policy and regulatory regimes.
- 3. Building physical and human networks (development of stakeholder capital and social capital): ubiquitous networks and communities of practice.

Other factors facilitate the national promotion of KM: institutional and individual KM champions, a government-supported KM promotion, R&D, and training institution such as the KM Institute in Thailand, KM and IT service providers, and the presence of professional associations in KM such as iKMS in Singapore and KMAP in the Philippines. The APO, through the National Productivity Organizations, does play a leading role in promoting KM, for example in Vietnam, the Philippines, and Malaysia.

The introduction of MAKE (Most Admired Knowledge Enterprise) Indonesia was found to greatly stimulate awareness and appreciation of KM in Indonesia. MAKE is a well-known global award scheme for recognizing organizations that are the best practitioners of KM and intellectual capital management. It is run by Teleos, a UK-based company.

¹² Biotechnology can be called "wetware."

¹³ The range of behavioral, institutional, and social technologies can be labeled "humanware."

Overview

SOME PRACTICAL HINTS

National promotion of KM is facilitated by:

- A formal government strategy or road map towards a knowledge-based economy (KBE) or knowledge-based development (KBD).
- KM champions, both personal and institutional, e.g., NPOs, KM professional associations, KM/IT service providers.
- An award program for best KM practitioner organizations.

OVERVIEW OF THIS BOOK

After this overview chapter, the next chapters are case studies. The subsequent chapters are national surveys¹⁴ on the status of KM in nine APO member countries. The last chapter makes concluding observations and some indicative directions or recommendations on what are the next steps NPOs and the APO Secretariat may take for the further development of KM in APO member countries.

Some interesting or unique features in the case studies are noteworthy.

Dabbawalas (India)	 Non-technical but precise (Six Sigma certified) business process. Informal but effective KM among 5,000+ illiterate <i>dabbawalas</i>. 		
Airtel (India)	 Procedures and templates for best practice sharing, knowledge-sharing sessions (KSS) between source and replicator, best practice approval, and best practice replication. Best practice replication funnel. Incentive scheme: the Knowledge Dollar (K\$) and Joint President's and CEO's Knowledge Management Awards. 		
Infosys (India)	 Broad range of IT-based KM solutions and tools. Multi-dimensional corporate knowledge taxonomy. KM integrated into corporate information systems. 		
Bank Indonesia (Indonesia)	 IMOVATION: competition in innovations to business processes. Leisure Talk: informal, relaxed discussions and storytelling within CoP framework. Begawanship: system where retiring senior experts share their skills. Dr. Know: functionality whereby any employee can ask a question. 		
Unilever (Indonesia)	 Senior managers as coaches. Retrospect: retrieving tacit knowledge from projects and disseminating them in the Knowledge Club website. 3C's: listening to consumers, customers and community for product improvement insights. Various CoPs: K-Club shows (business sharing), GLAD (group learning and development), Book Club, SOLAR (sharing of learning and discussions), video café session, Cinemania. Internal expertise locator. Enterprise award: for innovative ideas that are tested or implemented. 		

¹⁴ By "survey" is meant a broad scan and review of what has been happening in KM in an APO member country, which may or may not include the administration and analysis of a survey questionnaire.

Wika (Indonesia)	 Wika Scorecard: modified Balanced Scorecard. Various awards: Innovation award, Adi Komersial Award (contributing to the company's incremental profits), Knowledge Award (for knowledge-sharing), Inspirator Award (for making an inspiring breakthrough). Managing tacit knowledge by: cMc program (coaching, mentoring, counseling), Begawans (well-seasoned executives or staff), externalization (documenting innovations), sharing sessions.
Samsung Advanced Institute of Technology (Republic of Korea)	 Integration of KM with Six Sigma applied to work processes Over 140 CoPs: internal, across Samsung Group, and with outside. Patent Expo: cross-disciplinal synergy of expertise to improve R&D ideas. Cyber Research Center. Praise Ground: informal recognition of valued KM behaviora.
SK Energy (Republic of Korea)	 Praise Ground: Informal recognition of valued KM behaviors. Three-Tier Knowledge Process: filtering and refining of tacit knowl- edge and experiences into proven "solution packs" or Core Knowl- edge Packages for operational excellence or new business creation. Working Room (first Tier): physical as well as virtual space where CoP members can propose, discuss and screen initial ideas.
Bank Negara Malaysia (Malaysia)	 Corporate knowledge taxonomy. Redesigning office spaces to encourage interaction. KM Fair.
Tun Abdul Razak Library, UiTM (Malaysia)	 KM Roadmap: aligning KM to organizational strategy, KM audit, KM Team, design of KM system, implementation and measure- ments. Managing change, culture and reward structures.
Department of Health (Philippines)	 Harnessing potential in-house KM champions into a KM Team. Measures to develop "buy-in" across a big organization. Demand-driven KM audit. Development of web-based KM toolkits for productivity by the KM Team: "Learning KM by doing KM."
Malampaya Multipartite Monitoring Team (Philippines)	 K-Loop: development of a Learning-Oriented Systems Manual. Team learning processes: intrapersonal learning and interpersonal learning tools. Lessons-learned meeting to capture tacit knowledge of staff in a high-turnover organization.
Philippine TQM Foundation (Philippines)	 Knowledge-sharing mechanisms across small and medium-scale in- dustries (SMEs): documentation of best practices, manualization of procedures, training, knowledge-sharing website, development of local certification system. KM assessment of SME members .
Qian Hu (Singapore)	 Variety of communication platforms: among employees, and with customers, suppliers and investors. Enabling HRM practices: employee involvement, teamwork and intrapreneurship, awards. CoPs for R&D.

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JTC Corporation (Singapore)	 Corporate-wide taxonomy and metadatabase. Common contribution template to standardize knowledge capturing. CoPs and online forums for specific issues. Various "Knowledge Activist" awards. Dynamic Workspace: thematic repository of lessons and knowledge generated from previous projects, communication medium among staff experienced or performing similar projects, "Knowledge Discovery Points" to focus attention on areas where further learning is needed.
Sunon (Republic of China)	 Product Data Management: KM for managing R&D covering project document management, better patent and other knowledge search. Apprenticeship and mentoring. e-Learning.
CAPCO (Republic of China)	 Initiation through a KM Promotions Committee. PTA Knowledge Hall, followed by Share Knowledge Portal. Multimedia Cyber College: e-learning program. Promoting KM through: Business Unit Performance Review Meeting, Certification Program and Motion Award.
ASE (Republic of China)	KM Center.Instructive history of evolutionary growth of KM: policy, systems, organization, and people.
SCG Paper (Thailand)	 Training modules and corresponding "knowledge owners" in eleven knowledge areas across four key business processes. PPB Knowledge System: intranet for knowledge repository and sharing, KM working groups, module teams, champions and mentors in module teams, CoPs. Technology management thru Technology Roadmap, R&D program, and Intellectual Property Center.
Siriraj Hospital (Thailand)	 CoPs for continuous clinical quality improvement: best practice identification and sharing in patient care. KM Committee, Chief Knowledge Officer and CoP Roadmap. R2R program (routine-to-research): systematic research of daily work routines to generate quality improvement, best practices and innovations. IT support system.
Techcombank (Vietnam)	Integration of KM with other business excellence initiatives.Development and sharing of knowledge products.
Goldsun (Vietnam)	 KM system design and plan aligned with business goals, and selection of three pilot projects based on priorities and feasibilities. Internal KM Team. Click-2-K (or click to knowledge): the internal knowledge portal.

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Part II Case Studies

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COMPANY PROFILE

Sunonwealth¹ Electric Machine Industry Co., Ltd was established in 1980 with an initial capitalization of USD25,000. The company's major products are high-density mini-motors and micro-radiators. After two decades, revenues in 2005 were USD160 million, and there are now more than 4,000 employees. Table 1 shows the company's revenue and net profit from 2001 to 2005.

			(I II D mous	ana)	
	2001	2002	2003	2004	2005
Revenue	2,699,938	3,194,700	3,436,951	4,207,018	4,554,673
Net Profit	188,655	114,304	64,414	126,345	100,316

Table 1. Sunon's Annual Revenue and Net Profit² (TWD thousand)³

Entrepreneur Mr. Hong has been the CEO since the company started. He emphasizes that the philosophy behind the company's operations is "brand, innovation, value." Hong has insisted on building the international brand name of Sunon for the company, registered in more than 30 countries. It has the meaning "sunrise from the east that will never set."

Sunon's principal products are axial AC and DC fans, blowers, and coolers widely applied in the information technology, network communications, and optoelectronics industries embedded in various electronic products or equipment. Many leading international manufacturers have requested that Sunon products be used in their products.

Figure 1 shows the organizational framework of Sunon. There are factories and branches in various countries, but the headquarters in the Republic of China is the center of the company. In addition, the R&D center that enables the company to be the industry pioneer and leader is located in Kaohsiung, the second-largest city in the Republic of China. They set the standards for their products: light, thin, short, small. Each year Sunon invests over 2% of its revenues on R&D, and there are more than 200 R&D engineers.

Hong underscores the importance of the company being the global technology leader in the cooler and fan industry. Sunon owns nearly 1,000 patents, and 400 patent applications were in the process of official authorization by the end of the year 2006. Because R&D and patents are the most important factors in maintaining the company's leading position in the industry, Sunon has developed a management system to manage the intellectual properties, project documents, and knowledge transfers from the senior to the junior employees. Before the year 2000, the implementation depended more on organizational culture and management regulations than on the platform of a knowledge management system. Thus, KM initiatives before the year 2000 are referred to as "traditional" KM, since Sunon had implemented systematic management of R&D knowledge that was not based on the information technology system.

¹ In this report, "Sunon" will be used to refer to the company.

² 2005 annual report, http://www.sunon.com.tw/wealth/index.htm.

³ One USD is about 32 to 33 TWD.

In 2000, the company began implementation of product data management (PDM), designed to to integrate a number of functions of the information system, including R&D, collaborative design, knowledge management, etc. This period is called the knowledge management system (KMS) because the PDM projects allowed Sunon to transfer the traditional KM into digitalized form (KMS). In addition, the upstream and downstream external cooperative companies can also join in the utilization of KMS to arrive at the cross-organizational synergy of the design value chain.



Figure 1. Organizational Framework of Sunon

TRADITIONAL KNOWLEDGE MANAGEMENT WITHOUT AN IS PLATFORM

There are three critical factors in the establishment of the traditional KM:

- 1) Patent and intellectual property (IP) management.
- 2) Project document management.
- 3) The apprenticeship learning culture.

Patents and Intellectual Property Management

Patents and intellectual property (IP) are Sunon's most precious assets in keeping its leading position in the industry. Sunon spends millions of TWD—4% to 6% of annual revenues—on patent application and protection. Not all patents can be developed into commercial products, but numerous patents can form a strategic protective umbrella to prevent competitors from developing similar products. Hong has said that

Sunon invests ample resources for R&D for product innovations. Having the patents contributes to two business aspects: aggressive IP protection, so that if rivals or competitors infringe on the company's IP, they can be sued, and passive protection: in the event that the company itself is accused of IP infringement, its patents are the best defensive weapon to show Sunon's technology capability.

Project Document Management

Sunon has developed a sound management system for project reports and knowledge documents, similar to a library system for storing or searching for any printed documents generated from daily operations (Figure 2). In order to document valuable knowledge and experience, Sunon has established official guidelines on how to archive documents generated during the R&D process. Each document has assigned categories and identification. In addition, employees or users are assigned different levels of authorization to access the archived documents.



Figure 2. The Sunon Library System

Apprenticeship and Mentorship

Sunon has implemented a long-term apprenticeship system, especially in its R&D center, as best way to teach new employees required technologies and skills. In particular, the valuable experience and expertise acquired by senior engineers comprise implicit knowledge that can be transferred to other engineers only through learning by doing in an apprenticeship environment. A new engineer entering the R&D center is assigned to a mentor who becomes responsible for teaching job skills as well as the company culture and requirements. To qualify as a mentor, an engineer must be trained and must pass a test. The mentor must have have a history of excellence as an engineer and be able to give oral explanations, demonstrate standard operations, and receive feedback from the apprentice. At the end of the apprenticeship period, department heads or directors administer qualifying exams to trainees. The examination not only tests the trainees' capabilities and skills but also evaluates the mentors' capabilities.

PRODUCT DATA MANAGEMENT (PDM) PROJECT

In 2001 the Ministry of Economics hosted an industry project called "E-plan" (an abbreviation for e-collaborative design) designed to promote the manufacturing pattern from original equipment manufacturing (OEM) to original design manufacturing (ODM). Sunon, as one of the Republic of China's leading manufacturers, was chosen to implement the E-plan by proposing

the PDM project that is a collaborative design platform across the design chain with upstream and downstream companies. In addition, knowledge management (KM) was one of the major aims for the PDM, which provides a platform to integrate all documents, standards, tools, and engineers from the various companies in the collaborative design coalition. The following sections discuss the functions and effectiveness of KM.

Project Document Management

There are four steps in the new product development process (NPDP) in Sunon:

- 1. Product concept formation.
- 2. Product design.
- 3. Product development and prototype production.
- 4. Assessment of the new product.

During the NDPD, reports, figures, invoices, etc. are generated and need systematic management. Some will be kept in the company archive as important references and others will be discarded after the project ends. Before the year 2000, Sunon had already developed a library system for document management. However, the library kept only paper files that could be borrowed or read by someone physically in the company library.

After Sunon participated in the E-plan and after implementing PDM, one major result was to change the way engineers produced their project reports. The documents generated during NPDP were now all digitalized, with two advantages:

- 1. The digital documents can be shared with engineers at other companies who participate in the collaborative design platform. This improves communication efficiency and quality among engineers in the various companies.
- The digital documents can be easily accessed by users without time or location restrictions.

Improvements in Knowledge Search

Before the E-plan, engineers researched patents or related IP knowledge from the IP knowledge database, which was maintained on PCs. As the company grew and established branches and factories abroad, the PC version was transformed into the web database system so that all engineers in different locations can share the same knowledge database. However, the search engine did not work satisfactorily; users would need a great deal of effort to find the right documents. During implemention of PDM, the search engine was upgraded with more options: keywords, product numbers, document editions, etc. Combining these search criteria results in a suggested list of search results, including many different kinds of documents and figures.

KM Effectiveness after Implementing PDM

Although the Sunon library (Figure 2) ha managed hard copies of documents for decades, the transformation of paper documents into digital documents was not its difficulties. With a clear goal of implementing the e-collaborative design in order to enhance company competitiveness, the engineers soon modified their method of submitting reports. Digital files were now uploaded onto the PDM system. In addition to the integration of the IP knowledge database and an enhanced search engine, engineers or users in the various factories or company branches can now access the system, under various levels of authorization. Furthermore, the design chain containing upstream and downstream design partners can communicate through the same platform and share project documents immediately. One high-level manager commented,⁴ "Many different kinds of knowledge resources can be shared through the PDM; it has significantly reduced the time of NPDP, also resulting in reduced cost and time for engineers."

APPRENTICESHIP AND E-LEARNING

To retain knowledge and expertise in the company has been a great challenge to Sunon, which relies on R&D to continue being an industry leader. Engineers' knowledge and experience are essential assets for new product innovations, but excellent engineers can easily get job offers from other companies. With engineers coming and going, Sunon needed a KM system to retain and diffuse valuable know-how. The apprenticeship and mentorship system was a major way for Sunon to retain company knowledge and transfer it to new recruits. From the beginning, the apprenticeship system was intended to enable senior engineers to coach new entrants. Senior engineers would pass on their experience and expertise, and the new entrants would learn implicit knowledge from their mentors. With the advance of information technology, Sunon initiated the e-learning program in 2003 to speed up the learning process and reduce its dependence on the human factor. By integrating the document management system and the IP database, users or engineers can search the e-learning platform for specific domain knowledge or documents. E-learning also has special programs such as Business Planning Information-Gathering,⁵ Overseas Resources, R&D Resources, etc.

But apprenticeship is still the major training policy at Sunon. It has become part of company culture that senior engineers are responsible for teaching their skills to and sharing their knowledge with new recruits. As a positive driving force of KM, this mentorship has made it easier to host activities to promote knowledge-sharing behavior and to build knowledge communities. Engineers are used to coaching and explaining their implicit thinking to others; therefore, they should have positive attitudes towards such activities and actively participate in them.

CONCLUSIONS

Sunon is a public company; however, its emphasis on IP knowledge management and the apprenticeship tradition have been formed gradually from the time it was just a small start-up company without the so-called KM platform or information system. The library shown in Figure 2 is the repository of important documents and references coupled with a form for systematic management. After the implementation of PDM, it was not difficult for Sunon to build a digitalized knowledge database, since guidelines for engineers to generate project reports and access needed documents from the library already existed. The implementation of PDM simply generated an information platform so that engineers from various locations can conveniently access the digital archive. The result is satisfactory because KM efficiency and effectiveness within the company have been greatly improved.

Furthermore, the integration of the IP knowledge database and the library through PDM has enriched the content of the e-learning platform. Although mentorship and apprenticeship have fostered a strong company culture, implicit knowledge retention and innovation was completely dependent on human intervention. The initiation of the e-learning platform is expected to gradually transfer implicit knowledge into explicit knowledge. It will not only reduce reliance on mentor coaching but also accelerate learning efficacy.

 $^{^{4}}$ R&D director Mr. Huang commended the PDM's effectiveness in an interview with the author at the end of 2006.

⁵ The term "information gathering" is an old-fashioned way of saying "information." The pronunciation is "*chinbao*," from the Japanese word for "information."

As a systematic approach to managing knowledge with the aid of an information system, KM implementation has not been strongly emphasized or promoted by high-level managers. However, the library and the apprenticeship system have played an important role in knowledge management. Sunon implemented PDM that integrates their good tradition and management system with information technology. Therefore, as with other manufacturers in the Republic of China with a strong spirit of entrepreneurship and innovation, Sunon keeps on improving on its systems and procedures and trying to create greater synergy in order to further strengthen their competitiveness.

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COMPANY PROFILE

The China American Petrochemical Co., Ltd (CAPCO)² was founded in 1976 as a joint venture by two companies, the purified terephthalic acid (PTA) process technology developers BP³ and the CPC Corporation, Republic of China.⁴ After having been in business for 30 years, CAPCO's capitalization now stands at TWD7.072 billion. PTA is the raw material of polyester fibers and chips that are in many products used in daily life. Table 1 lists CAPCO's products and some examples of their use.

Table 1. CAPCO's Products

Use	
Polyester fabrics, non-woven cloths, etc.	
PET bottles, videotapes, audiotapes, electrical wires, medical X-ray films, films, resins, etc.	
Polishers, binders, paints, tire linings, conveyor belts,	

In 1979, CAPCO established the first PTA manufacturing plant in the Republic of China, with an annual capacity of 150 thousand tons. After two decades of continuous growth and expansion, CAPCO has become the largest PTA producer in Asia, with five plants and an annual production capacity of 2.12 million tons. The sales volumes and revenues from 1995 to 2002 are summarized in Table 2.

Voor	Sales Volume	Revenues		
I Cal	(thousand metric tons)	(USD million)		
1995	1,183	1,233		
1996	1,224	861		
1997	1,316	758		
1998	1,329	539		
1999	1,178	478		
2000	1,190	600		
2001	1,101	506		
2002	1,226	597		

Table 2. CAPCO's Sales Volume and Revenues 1995–2002

¹ The author wishes to acknowledge the assistance of Gin-Fang Liang, Chiao-Chu Huang, Yen-Hsiu Hsu, Yu-Fan Hung, and Yu-Chieh Hung in the research and preparation of this case study.

² The company website is http://www.cpaco.com.tw/eng-default.asp.

³ http://www.bo.com.

⁴ http://www.cpc.com.tw/english/home/index.asp.

Key Drivers for the Adoption of Knowledge Management (KM)

CAPCO obtained a 10-year patent on PTA when its first plant was constructed in the Republic of China in 1979, which enabled it to dominate the PTA market and grow steadily for a decade. After this good start, executive managers, continuously enhanced company operations and management. In order to maintain its industry leader position and improve competitiveness even after the patent expired, the company re-engineered its business processes and adopted the enterprise resource planning (ERP) system from SAP. From 1998 to 1999, under pressure from the economic depression and from competitors entering the PTA industry, CAPCO continuously worked at lowering costs, advancing employee capability, and increasing productivity.

Quality, integrity, and people have been the three most important ingredients for CAPCO since its inception, and its people are of the highest concern for the company:

We train and develop our people to reach their full potential for mutual benefit, and recognize individual contribution to the team effort, measured by productivity, performance, and teamwork.⁵

The employee is an essential asset at CAPCO. Factory director Lin Gin-Chen⁶: "For the past decades, CAPCO has considered the synergy generated from our employees' expertise and knowledge to be the main driver for the company's ability to continuously grow, advance technology and productivity, and surpass the competition." He further explained that knowledge exchange and innovation and the use of knowledge as a tool are two major factors that enhance employee knowledge. Moreover, knowledge that encompasses R&D, manufacturing technology, management skills, and business culture is embedded within CAPCO and its operations.

During the first decade of its start-up, having a market monopoly nurtured the company's stable growth. The company could develop a sound management system and recruit fine engineers while offering satisfactory employee compensation and bonuses. Employee turnover was quite low in the company's early years. However, as CAPCO advanced its technological capability, there was an increase in the rate of employee turnover due to cost-cutting to keep up with industry competition. CAPCO executives and managers perceived the need for a knowledge management system. They needed to archive scattered documents or project reports located in various departments or divisions. Moreover, it was realized that the precious experiences and knowledge of excellent employees or engineers should be kept, reused, and expanded on by others in the company, especially after these employees had left. CAPCO has thus developed a sophisticated KM applications system in its various information system (IS) functions over the past 10 years. It is not limited to a specific IS called a "knowledge management system" but rather embedded in five information system applications: the SAP ERP system, the PTA knowledge hall, the share knowledge portal, the management of change, and the training system. Each system contributes to the overall KM practice, including knowledge storage, research, reuse, and innovation.

KM TOOLS

The time frame and characteristics of these five systems are summarized in Table 3. Through various experiences in tge adoption and application of IS, the KM concept has evolved over time to be a common working principle embedded in daily management routines. The following section describes the five systems in terms of functions and utilizations.

⁵ The vision and value statements are on the company website: http://www.capco.com.tw/eng-default.htm.

⁶ The author interviewed CAPCO factory director Lin Gin-Chen in November 2006. Portions of this case study have been rewritten from the tape of the interview.
Tuese et mit i ipplieue		
KM System (Implementation Year)	System Characteristics or Functions	KM Practice Results
ERP system by SAP	Enterprise resource planning	There are some tools for KM applications;
(1998)	system,	however, it is not designed for KM.
PTA Knowledge Hall	Customized KM system by a	Search engine is not satisfactory.
(2000)	software vendor.	KM practice has been an extra workload
		for employees.
Share Knowledge	Meeting arrangement system	Although it was designed for meeting
Portal	that provides functions such as	arrangements, the ease and convenience in
(2004)	schedule arrangement details,	its use made employees use it naturally.
	document storage, and full text	
	searching.	
Management of	Change management system,	The implementation time has been brief.
Change	containing functions of planning,	There are no significant results yet.
(2006)	processing, and document	
	archiving.	
Education training	Education, training, and	Training and certification have been a job
system	certification system; continuously	requirement for employees. The system is
(2000)	increasing knowledge contents	more convenient, with abundant learning
	since established in 2000.	materials for employees. It performs
		satisfactorily.

Table 3. KM Applications and Results

Enterprise Resource Planning (ERP) of SAP

In order to advance in the industry and to solve the potential catastrophe of Y2K, CAPCO formed an ERP project team to assess the ERP system with the goal of implementing the SAP ERP by the end of 1996. After 13 months of planning and installation, the ERP system was implemented online in 1998. Director Lin is satisfied with the effectiveness of the ERP system. It has significantly improved the company's performance in, for example, e-procurement, workflow, manufacturing automation, transaction process, and online information access.

At the start of ERP implementation, business information had to be digitalized as much as possible. Paper documents that were stored in different departments or divisions were collected and transformed into electronic files that could be processed under the new ERP system. In addition, some departments or divisions—R&D, manufacturing, administration, marketing, etc.— had to develop their own information system so that their electronic documents (e-documents) could be shared or accessed through a central database. CAPCO's KM practice followed naturally from its ERP implementation.

PTA Knowledge Hall

In 2000, CAPCO organized a knowledge management promotion committee to plan for the KM implementation. The had two missions: to clarify the primary knowledge categories for PTA manufacturing and to assemble engineers and workers in the manufacturing and maintenance departments to form a knowledge community. This committee surveyed the KM requirements of the two departments. Taking into consideration how KM functions and its userfriendly interface, they implemented a KM system called the PTA knowledge hall that supports five categories in PTA manufacturing: operations, maintenance, quality, technical and control, and TPM. A document template was provided with key words, an abstract, and a description so that future KM documents would have a uniform format.

After months of implementing the PTA knowledge hall, the KM system was not perceived to be as effective as CAPCO had expected. Only a few KM documents and articles were submitted, and engineers did not access the PTA knowledge hall when they needed expertise or knowledge to solve problems. After several reviews and discussions among the executive managers, some conclusions were arrived at:

- 1. The KM system needed more promotion among engineers and staff.
- 2. The PTA knowledge hall might not be a good tool for CAPCO in implementing KM. Were there other possible ways for knowledge to be recorded, stored, diffused, and innovated?

Because of these concerns, the MIS department began to implement a new system, the share knowledge portal.

Share Knowledge Portal

The PTA knowledge hall was designed specifically for KM, but it was not embedded in the employees' daily work routines. The ERP system provided complete support for digitalizing and categorizing documents. For most employees or engineers, the PTA knowledge hall was more like an extra workload in addition to their regular duties.

While searching for better solutions for KM implementation, the executive managers found that job meetings always had the heaviest documentation requirements for members as they exchanged experiences and expertise and later generated new solutions or knowledge for each specific meeting purpose. As a consequence, the MIS department planned the share knowledge portal that facilitated meeting scheduling while fulfilling the KM function of document storage and diffusion. The system was developed using a Microsoft package and implemented in 2004. Figure 1 shows a typical web page on the system. Any authorized employee can initiate a meeting. All meeting-related information is listed.



Figure 1. CAPCO's Microsoft Share Knowledge Portal

The system contributes to KM in the following ways:

- 1. The initiator can see the availability of meeting participants and locations and can arrange the best schedule. Coordinating schedules for all participants improves efficiency.
- 2. Before the meeting, all the required documents are uploaded into the system. Participants read the documents before the meeting and are well prepared. This significantly reduces the length and enhances the quality of the meeting.
- 3. The documents can be retrieved after the meeting for follow-ups. The system also becomes a knowledge repository where others can access documents through full-text searching.

Management of Change (MOC)

Even a small change can cause sensitive reactions in a complex manufacturing process such as that of the chemical industry. Each change in the manufacturing process should be well evaluated before and well documented after implementation. Since change management is critical to safety, CAPCO applied the KM approach to a new information system, the Management of Change (MOC).

Change management as defined in CAPCO envisions 14 stages from initiating a change to after-performance discussion. All the documents pertaining to MOC are to be kept for five years. The MOC supervises and assesses the project's progress. In case of a schedule delay or if a mistake occurs, the system emails an alarm to higher managers. By implementing the MOC, all change activities, including facility purchase or risk evaluation, are planned, processed, and recorded in the system. There are three main functions of the MOC:

- 1. *Risk evaluation*. When a change project is initiated, the project manager or engineer evaluates and discusses the associated risk through the MOC system. The discussion process and all related information are recorded.
- 2. Change project design. The change project is planned and designed.
- 3. *Safety confirmation*. Safety examinations and employee training must be confirmed before the project is carried out.

The Multimedia Cyber College

PTA manufacturing is a capital- and technology-intensive industry. CAPCO has developed a job training and evaluation program so its employees can continue learning and advance their job-related skills and knowledge. In 1998, CAPCO started a plan to convert the training program into an online education system. Employees can read and learn through computers and take online examinations as a part of the certification requirements.

The Multimedia Cyber College (MCC) was implemented in 2000. There are more than 100 subjects, all developed with the company by CAPCO employees. Except for PTA manufacturing knowledge and technology-related contents, managers and experienced engineers were asked to share their expertise; their contributions were then edited into teaching materials in the form of articles, tables, figures, and computer animations that have been adopted to explain difficult and complex subjects.

The online courses are categorized as employee skill authentication, core knowledge training, e-safety (safety health and environmental protection), etc. In order to promote system usage, the online training program has incorporated license certification and job promotion. Employees or workers must generally pass through the following stages to pass the certification:

1. *Lecture*. Each department is divided into several study groups. After an online or inperson lecture, each study group learns and discusses together. Questions can be resolved by moving to the field for a demonstration by supervisors.

- 2. Written examinations. Examinations are either written by hand or taken on the computer.
- 3. *Oral examinations*. In addition to the written examinations, employees are required to take an oral examination. Managers and senior engineers are the examiners.

It has been proven that the incorporation of online training and certification as part of the promotion process significantly motivates employees to use the MCC. It is also a more cost-effective way of upgrading employee skills and knowledge.

EXECUTION OF KM PROMOTION

The introduction of KM practice in CAPCO occurred around same the time as ERP implementation. Since then, CAPCO has developed a company strategy to promote KM.

Centralized Database

Before the implementation of the ERP, CAPCO had different databases used by various departments for their on-the-job functions. ERP required that the databases be centralized. In addition, scattered paper documents had to be digitalized and stored. The search engine had to be improved. The webpage interface had have a user-friendly design so that even employees with no programming skills could access the information. These actions paved the way KM practice.

Knowledge Identification

In 2000, CAPCO assigned a knowledge management promotion committee to identify core knowledge and build a knowledge community. After a year of planning, the PTA knowledge hall was implemented, as described in the foregoing section. The limited use of the PTA knowledge hall did not deliver the expected KM effectiveness. While the system was somewhat lacking in terms of the KM function, KM promotional activities were successful in educating the employees to recognize the importance of KM.

Knowledge Communities

CAPCO encouraged its employees to form teams for specific learning purposes but primarily for knowledge exchange and innovation. Through frequent interactions among team members by way of meetings, discussions, training, or sharing, tacit knowledge can be converted into explicit knowledge and thus lead to the formation of a KM culture. There are various teams in CAPCO: the reliability improvement team, the process technology network team, the safety team, etc. Employees are also encouraged to participate in knowledge communities with interdepartment members.

Promotional Activities

Promotional activities are catalysts that accelerate employee reactions to the KM practice. There are two main promotion programs at CAPCO.

- 1. Business Unit Performance Review Meeting (BUPRM). The CAPCO Kaohsiung factory has five business units that hold meetings once a month. Each unit must report on its performance as well as its execution of improvement programs. Engineers and managers in various business units gather to share their experiences and exchange expertise.
- 2. Certification Program. This program is intended to measure the awareness of employees, especially operators in the field, of all the regulations pertaining to their work. Operators must comply with specific standard operating procedures (SOPs) as required for safety. In addition, as long as employees continue working on further certification, advances in their skills and knowledge will enhance company productivity. Because the

certification program is embedded in the human resource (HR) management system for work evaluation and employee promotion, operators and employees are required to use the established MCC.

In addition, there are other less central activities associated with KM promotion. For example, the Motion Award is intended to encourage employees to propose any improvements in the motions associated with their work. Employees receive various forms of rewards for their suggestions and creativity.

CONCLUSIONS

PTA manufacturing is a capital-and-technology-intensive industry, but the speed and dynamics of its technology evolution is relatively slow when compared with that of information technology. Over the past decade, the effects of globalization expanded industry competition. In order to maintain its position as the industry leader, CAPCO must continue to improve its productivity and lower operating costs. The company has developed an organizational culture of continuously improving and searching for better solutions. As seen above, implementation of ERP has built a foundation for the inculcation of KM practice. CAPCO executives and managers have realized the importance of embedding KM within the company and encouraging new IS to apply KM in work applications. After years of practical experiences, it was seen that not every application is successful in terms of KM functions and utilization. However, CAPCO has formed a KM culture that underlies continuing KM practice in new fields or other possible aspects.

The KM Myth

The PTA knowledge hall was the first formal KM system implemented in CAPCO, developed through a prudent plan that considered internal requirements and incorporated the experiences of KM functions in BP. The KM system provided typical knowledge document management functions and security regulations. But after months of online implementation, the results were disappointing, perhaps because it was an isolated task, apart from the workflow of an employee's daily routine, and KM became an extra workload instead of an aid to performance. When KM is not embedded in the work routine, engineers or employees can still work well in the natural sense of KM without an information system as a platform for the following reasons:

- CAPCO has been dedicated to establishing a sound management system and a safe work environment. As an industry leader, the company pursues the best practices of both manufacturing and management. After implementing the ERP of SAP, CAPCO applied for ISO9000, ISO140000 and ISO180000 and passed the certification requirements. These ISO certification procedures generated significant numbers of documents for its daily operations. CAPCO has developed several information subsystems under the ERP system to support ISO document management.
- 2. CAPCO is an industry leader that attracts the best people. Most of its employees have stayed with the company for more than a decade. They know each other well. It is not difficult for employees to reach out to colleagues for problem-solving or sharing experiences. On the other hand, although CAPCO expended a great deal of effort in promoting the PTA knowledge hall, most employees did not upload their knowledge documents or use the system. This might be out of a fear of the consequences of giving up personal knowledge or expertise, but it might also be that because of the limited content in the PTA knowledge hall, few knowledge searches were carried out by employees.

Although the PTA knowledge hall failed to turn into a general KM practice, it was still beneficial for CAPCO because it can be accessed from the company's intranet portal. CAPCO decided to maintain the system so that employees can use it freely. The reflection on this failed experience demonstrates a KM myth. The KM system, carefully planned and then developed by an excellent software vendor, provided complete KM functions. The company itself had performed a sequence of promotional activities and associated KM usage with employee performance evaluation, as suggested by IS consultants. They followed the standard procedures of KM implementation, but this standard implementation procedure associated with the KM system is not sufficient to ensure the success of KM implementation. An isolated system that does not directly assist employees in their job or task will not be accepted or utilized, since it will just be perceived as extra work.

The Spirit of Continuously Searching for a Better KM Application: Share Knowledge Portal (SKP) and Multimedia Cyber College (MCC)

Director Lin affirmed that the SKP and the MCC are the two most successful KM initiatives at CAPCO in recent years. SKP is for arranging meetings and MCC is for employee training and certification, both similar practices. The two functions are part of employees' daily routines or job requirements. The two information systems enhance convenience and efficiency, and employees like to use them.

From the point of view of KM, the SKP retains all the meeting documents that are related to any decisions made during meetings. The documents can be accessed later for execution, follow-up, or examination. Most of the managers are satisfied with the SKP, for two reasons: first, the effectiveness of meetings because of the ease of arrangements and the support for preparing for the meeting. Participants can read the pertinent documents available on the system; therefore, everyone comes well prepared. The quality of the discussions and the decisions arrived at are much higher than before. The second reason is the success of a KM practice that is performed with a low-cost information application.

The MCC system provides a convenient channel for employees to use in studying for required operational knowledge and skills. As long as they can use a computer, they can get into the company intranet portal and access learning objectives or certification examinations on their own schedule. The system contains a great deal of operational information and PTA manufacturing knowledge: training materials, certification exams, rating criteria, promotion requirements, etc. Although the knowledge contained in the system is coordinated and edited by only a small group of engineers and senior managers, it is a knowledge depository that is still growing, and knowledge collection is expanding. Employees can also obtain specific knowledge from the MCC. Knowledge is disseminated, and certification exam results confirm that employees have internalized it.

Building a KM Culture in the Organization

As an industry leader, CAPCO looks for the best practices in both manufacturing and management. The successful adoption of the SAP ERP enhanced internal confidence in information utilization; as a result, the company has reached a consensus to pursue better plant management. Although the performance of the first KM system, the PTA knowledge hall, was not satisfactory, promotional activities and knowledge community-building have generated lasting effects. Engineers and employees are now accustomed to sharing experiences and exchanging knowledge by forming discussion groups or forums for specific subjects either within departments or across departments. Employees have understood the importance of KM and have experienced that knowledge-sharing can do no harm. While the culture of KM has been initiated, the issue now is whether to consider new IS applications.

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COMPANY PROFILE

Advanced Semiconductor Engineering, Inc. (ASE Inc.) was founded by Jason Chang and Richard Chang in Nantze, Republic of China in March 1984. Today ASE owns factories in countries across Asia: Japan, Republic of Korea, Malaysia, China, and the Republic of China (in Chungli and in Kaohsiung). ASE has IC manufacturing capabilities that cover the production value chain, involving IC manufacturing, assembling, processing, testing, and sales services. Their products—semiconductors—are widely applied not only in household electronic appliances but also as technological components in aviation and aerospace. ASE is particularly known for its capabilities in semiconductor packaging and testing and in manufacturing process development. According to a 2005 research report prepared by Gartner Dataquest, ASE is the largest IC packaging company in the world. Its revenues in 2006 amounted to TWD100 billion,¹ and its total market value is more than TWD130 billion. It has about 34,000 employees. Table 1 gives data on ASE's operations from 2001 to 2006.

Tuble 1. Hole operations Data 2001 00						
	2001	2002	2003	2004	2005	2006
Net revenues*	38,368	45,586	55,728	75,238	84,036	100,424
Total assets*	106,326	104,869	114,324	133,951	131,255	137,04
Employees	15,681	20,401	24,443	34,649	29,039	26,98
Total market value*	105,781	66,398	124,952	98,416	137,373	170,61

Table 1. ASE Operations Data 2001-06

*TWD million, except employee data

In the IC packaging industry, manufacturing capability and speed are the crucial factors that enable a company to compete globally. Speed in particular has been a competitive advantage for ASE. In order to maintain its industry position, ASE has emphasized continuous improvement of its manufacturing processes and development of production skills. After its managers were made aware of the usefulness of the knowledge management (KM) system, they began to implement it. In the beginning, it was intended primarily to enhance the problem-solving efficiency of engineers and to retain organizational experience and skills. When KM applications became more sophisticated and employees became better acquainted with the system, the purpose for KM implementation became even more distinctly divided into two aspects:

- 1. Managing knowledge assets—conserving, classifying, storing, protecting, and disseminating organizational knowledge.
- 2. Enhancing product competitiveness—KM is expected to improve employees' problemsolving efficiency so that the company can provide better products and services. It is also expected to shorten both the product development cycle and the learning curve and thus reduce production costs.

¹ TWD is New Taiwanese Dollars. Its current exchange rate with the American dollar is about 33/1.

Introduction of a KM Center

The KM Center at ASE was established in January 2001. It was originally under the research and development (R&D) department.² In July 2005, the KM Center became an independent office. Its duties were to develop, promote, and maintain the KM system, establish regulations on KM applications, design employee training programs, and publish a KM operations manual for employees. Although managers had been aware of the importance of KM, the implementation and utilization progressed through a process of trial and error. Table 2 lists the time frames of the three phases associated with the movement of the KM center within the organization.

Phases	Time	KM Center Level	Supporting Departments
Phase I (KM I)	2001-03	Subordinate to R&D de-	R&D department of
		partment of engineering	engineering division
Phase II (KM II)	2003-05	division	R&D and PE depart-
			ments of engineering
	2005-06	An independent divi-	division
		sion directly subor-	
Phase III (KM III)	2006-07	dinate to the general	Engineering division
		manager	5 5

Table 2. KM Implementation Phases and KM Center Movement within the Organization

The Three Phases of KM Implementation

These three phases occurred simultaneously with the company's expansion, and the organization was transformed as the company grew. Despite the rapid growth, ASE was able to keep adjusting its company strategies so that its resource distribution and development emphasis changed along with the expansion in company operations. During the period 2002–05, ASE acquired several factories in Asia, and the company doubled in size. Whenever ASE acquired a factory abroad, there would be a reorganization in the ASE group. New employees were entering ASE in almost the same numbers as employees were leaving to join other companies. Under these conditions, managers began to take a serious look at implementing KM. This was the beginning of the KM journey for ASE, a company learning by trial and error.

In those years of KM implementation, the first two phases were initiated by volunteer engineers searching for programming tools and setting up KM system platforms. However, in the absence of a strong management system to regulate users and ensure its promotion, the KM system had become simply a repository of free-form reports and documents. It contained many things, but it took a great deal of effort to find the right documents.

In 2006, the head of the engineering division decided to invest in the establishment of a centralized KM system planned by the KM Center and developed by an outsourced software vendor, at a cost of TWD6 million, staffed by six full-time KM engineers from ASE. This is the third phase of the KM implementation that was projected to go online in 2007. Table 3 summarizes the functions and characteristics of the three phases, referred to as KM I, KM II, and KM III, in time sequence.

² The research and development department is under the engineering division.

	KM I	KM II	KM III
Knowledge documents	Excursion manage- ment reports. QC project report. Job training materials.	Excursion management reports. QC project report. Job training materials.	Exception management reports. QC project report. Job training materials. Outside. External ancillary materials. Personal knowledge documents.
Document categories	None	None	Yes
Document format	None	None	Yes
Experts	None	None	Yes
System automati- cally uses tem- plate	None	None	Yes
Account man- agement	Loose: account can be assigned to who- ever applies.	Little control: account is opened for employ- ees who apply. Ac- count numbers are not limited for each em- ployee.	Strict: account is syn- chronized with HR data. Non-employees are not allowed to access KM system. One person can own only one account.

Table 3. Growth of KM Functions through the Three Phases

KM I (2001-03)

The Beginning of the KM System

Before the KM system was implemented, ASE employees used their personal computers to save their knowledge documents. The ASE company intranet is a database for public files that did not have a file administration system. Engineers knew where to find the right documents, but it would take a long time and a great deal of effort to search for the things that they needed. When an employee left the company, it was difficult for new employees to adapt the work routines and become skillful on the job. The time series reports, such as excursion management and project management reports, were helpful references for solving similar problems. But managers and engineers discovered that they had to deal with the same problems again and again due to the lack of a knowledge document management system. Another problem was security, since files or documents on the intranet could be opened by any individual with an account. This lack of security control had come to the attention of managers. It became imperative that ASE begin KM implementation.

The first department to implement KM was R&D, whose engineers were often subject to customers' stressful delivery deadlines, not just for customizing IC design but also for developing production technology. KM implementation was expected to shorten the development cycle by accelerating the learning curve and saving time and money for R&D. Shortening the waiting time would increase customer satisfaction to further strengthen market competitiveness.

The first phase, KM I, began in January 2001 as a bottom-up approach. In the beginning, divisions subordinate to the engineering division voluntarily listed their KM requirements. Engineers from the various subordinate divisions then formed a project team to develop the KM system. They utilized the client software "notes" to develop the KM system associated with web server technology. In setting up the KM promotion plan, the KM project team decided to begin

with the R&D department because IC design and production technology development are the most important functions.

KM Functions

The KM system would provide support for saving documents, searching documents, and account management. All the subdivisions of the engineering center determined the knowledge requirements that would be kept in the KM system and accessed by the other engineers. The format of the knowledge reports and documents was regulated for work progress or task subjects. The department heads or supervisors were responsible for reviewing the KM reports.

Knowledge Documents: Contents, Process, and Management

Three kinds of documents were considered to be knowledge documents: the excursion management report (EMR), the QC project report, and on-the-job training materials. These were most valuable for customers and most practical for the manufacturing process management group. Their characteristics are:

- 1. *Excursion management report (EMR)*. A report of excursions that occur during the manufacturing process. An excursion occurs when batch products' quality deviates from the mean quality for three standard deviations. The report contains the excursion event, the temporary control solution, the cause analysis, and any improvement actions taken. The main purpose of the report is to locate the problem so as to prevent repetition of the errors.
- 2. QC project report. When a project ends, reports generated during the project period must be managed efficiently so that the experiences can be transferred to others. The project leader is responsible for writing a QC project report that must be approved by the associated supervisors, and then the project is formally closed. The project report is an important knowledge asset that saves information about the project and disseminates knowledge about the manufacturing and production processes.
- 3. *Job training materials*. Engineers are required to continue learning in various professional fields. Training materials are developed internally by company employees. They contain the class purposes, class outlines, basic classes, advanced classes, and assignments for practice.

Knowledge documents are generated primarily by the engineers, who then upload these documents onto the KM platform. After the supervisors or directors have approved reports based on quality, those documents become official knowledge documents.

In order to promote knowledge report writing, ASE has established a reward policy. Engineers' knowledge document outputs are reviewed every six months. Documents they have uploaded are counted and included in their performance appraisal. For KM utilization, account management is quite loose; there is no authority in charge of accessing documents.

Temporary Results of KM Applications

General awareness and acceptance of KM applications. Integrating KM into employee job routines is probably one of the most difficult tasks in implementing KM. During the KM I phase, engineers in the R&D department were willing to initiate KM system development, and thus utilizing the KM system became part of their routine.

Improvement of problem-solving skills and customer satisfaction. The integration of knowledge documents into employee job routines enhanced the effectiveness of engineers in performing their jobs and solving problems. Not only can engineers search for needed documents more

efficiently, but they can also avoid repeating errors. The reduced waiting time for project development also increases customer satisfaction.

Account management. Before KM I, ASE had no controls on the public hard disk used for saving general reports. Any individual who could access the company computers could download files. After the KM system was implemented, an intranet account was required for access to the KM system, buta it was still a loose control system. Since engineers had become used to the lack of security controls and no incidents had ever occurred, the addition of the minimally intrusive measures of applying for an account and user identification were generally acceptable to employees.

KM II (2003-06)

There were challenges in the implementation of KM I. Engineers were hesitant to upload their knowledge documents. The inadequate document management system discouraged others from using the system. The lack of security controls also caused concerns on the part of the engineers, especially on the issue of intellectual property. In 2003, ASE carried out an organizational reform. The project members of KM I either were transferred to other departments or left the company. Since KM had become a permanent function, Candle Chung was assigned to take charge of the KM system and related affairs. He summarized the two main problems: 1) lack of a document maintenance plan, and 2) security and protection issues needed.

The two-year implementation of KM I did not generate satisfactory results. In 2003, Chung and the project team determined that the KM system functions were too limited to expand its utilization, and Chung implemented a new KM plan with were more tools and exemplary systems. Chung believed that a new KM system would be more suitable for existing requirements, and in the process he addressed the problems encountered in phase I.

In the interests of time efficiency, and also to limit costs, the team adopted the open source code PHPBB to develop the new KM system (KM II), beginning in July 2003. It was implemented primarily in the R&D and PE departments in the engineering division, which included about 10 factories.

KM System Functions

KM II had many additional functions to supplement the basic KM functions which KM I had already adopted. The system was designed around a website. Each division had its own web pages associated with its knowledge community. Each division could also generate and collect its own knowledge documents to be shared with other divisions with appropriate levels of security. Encryption functions were applied with a trust-view mechanism. Use of the KM system increased. However, because the various divisions had their own web pages and web spaces for knowledge storage and exchange, they determined their own format and requirements for knowledge documents and reports. In addition, employees could not access knowledge web pages of other divisions without obtaining permission from division heads or supervisors.

Knowledge Documents: Contents, Process, and Management

The documents were the same as in KM I: excursion management reports, QC project reports, and job training materials. Except for a public website where every employee could access the needed knowledge documents, each division had a private website to interact on, so that the knowledge community was formed in cyberspace. A document protection system was implemented.

In 2003, ASE instituted a series of organizational reforms. Employees associated with job duties changed from time to time. The review and screening of knowledge documents were done

by division heads or directors, who determined the formats and set the standards for document quality.

KM use was included in engineers' performance and achievement assessment. However, division heads or directors had the primary decision-making authority on performance evaluations. When they considered KM to be important and emphasized its use, engineers would use KM more often and generate more knowledge documents. In addressing the security issue, an encryption function was added and a trust-view mechanism was introduced. Without access authorization, the contents of a file cannot be read even if its location is known.

Temporary Results of KM Implementation

- 1. Establishment of a knowledge community. The KM system in this phase provided each division with the ability to perform internal knowledge interactions on its own web space. The knowledge community was naturally formed and employees became accustomed to saving knowledge documents and exchanging ideas and knowledge within their communities.
- Flexibility of knowledge document management. During these years, ASE instituted a series of organizational reforms. Employees and job-specific duties changed from time to time. This flexible management, which allowed division directors take charge of the contents of knowledge documents, corresponded to the company's requirements during the organizational reform period.
- 3. *Security*. In KM II, employees could apply for accounts but could only read documents within their own division. Without access permission, documents from other divisions were not accessible. The system also had encryption functions.

KM III (2006–07)

The implementation of KM II was more satisfactory to engineers, especially when compared with KM I. However, there were complaints from users, and managers in the engineering division began to review its effectiveness. In KM II, the KM platform was more like a collection of discussion boards for each division. Engineers or employees could upload documents or reports with any type of format. Division heads or directors were the only ones with the authority to evaluate the quality of a document and determine whether it should be retained. The quality of the knowledge documents was not stable, for two reasons:

- 1. The division head or director was the only authority able to decide on the acceptance of a knowledge document. There was no other official evaluation procedure. This created questions regarding impartiality and resulted in unstable document quality.
- 2. The free format resulted in unevenly written reports, which increased the difficulty for engineers in writing reports, especially for junior employees who might have missed important points that should be included. In addition, documents were not saved according to categories or attributes. The free format also resulted in inefficient document searches. Users could not search for articles by desired attributes, and search accuracy was low.

Even if the managers agreed to allocate more resources to improve the KM platform and resolve these issues, the costs would be too high to implement the improvements. Open source software was being developed by programmers around world with the same interest. Open source software did not provide program-modified services like commercial software vendors because of its nonprofit nature. Since the KM system in KM II had been developed using the open source software program PHPBB, the only way for ASE to modify the KM system was to

assign IT engineers to work on it. This cost was too high, and managers decided to invest in a totally new KM system. In light of all the problems that they had experienced up to this point, the new KM system was to be outsourced to a prestigious vendor capable of future maintenance and upgrading.

In 2006, at about the time the organizational reform had been completed and when both the organizational structure and employee levels had become stable, the managers of the engineering division agreed to implement a new KM system in conjunction with a new management approach. Programming outsourced to a software vendor, and the KM center, under the engineering division, was put in charge of the management functions of the internal KM requirements and promotional strategies.

During this time ASE experienced rapid growth. The company's value increased 1.5 times. In addition to its facilities in the Republic of China, new factories were acquired in Japan, the Republic of Korea, Malaysia, and China that were accustomed to having their own administration systems and work flow processes. An urgent issue confronting ASE was how to integrate the management systems in use in these new factories. In addition, engineers in the widespread factories needed a common KM platform in order to communicate and exchange knowledge and expertise. And ASE needed a KM system of job training and education for its new employees.

The new KM system is the third phase in implementing KM practices at ASE, with the whole group of ASE factories as its scope. The KM center was redesigned; six engineers were assigned to take charge of KM-related activities. Programming was outsourced to UniPattern. The project cost was about USD200,000.

Development Process

The KM III project began in 2006. KM requirements were collected from all divisions through June, and then UniPattern began the system analysis (SA). The complete system was expected to be online in November. The KM center was the first department to test the new system. After the system became stable, it would then be introduced to the whole ASE group. The development process can be divided into two stages according to the priority of KM functions:

Stage 1: June 2006–March 2007. The main task was to complete document management functions, including uploading procedures, document sorting, and the establishment of enterprise knowledge and industry domain knowledge.

Stage 2. This is an ongoing project to expand the supplementary functions of KM: the knowledge expert board, the knowledge forum, reporting and printout, etc.

In outsourcing the system, there was a general concern around maintenance. The KM center adopted a two-step approach: when the KM center first signed the maintenance contract with Unipattern in the early years, they made sure that the vendor would fulfill the KM requirements in terms of program and system stability. During that time, the MIS department would assign IS engineers who will be involved in system development and maintenance. After they gained confidence working on the KM system, the second step for the KM center was to end the maintenance contract and let the MIS department take charge.

KM System Functions

1. *Individual home page*. Employees can upload their job-related knowledge here, for example, personal subscribed knowledge, reading assignments from directors, in-process statements of knowledge reports, and questionnaires required by the company.

- 2. *Enterprise knowledge*. Primarily provides knowledge documents that can be accessed by group members. Listed documents that have been approved by company experts contain knowledge of value to all company employees. All documents have been encrypted.
- 3. *Division board.* Each division has its own board to serve as a knowledge document depot. Only division employees or engineers can be on the board; knowledge documents are secure, since only people with the division have access.
- 4. *Individual knowledge*. Users can develop personal knowledge and share excellent work here. The KM system will post good articles following rules developeded by the KM center.
- 5. Knowledge-sharing. An open site where all employees can share knowledge.
- 6. *Knowledge experts*. A forum where employees can discuss problems with experts from various domains and departments.
- 7. Knowledge forums. An open forum for employee discussion and exchange of opinions.
- 8. *Reports and printout.* Employees can choose authorized data or reports and obtain a printout in different formats.
- 9. *Knowledge map.* Statistics on knowledge documents among various offices or departments in ASE are set out here.

Knowledge Documents: Contents, Process, and Management

Besides those types of knowledge documents already included in KM I and KM II excursion management reports, QC project reports, and job training materials—other sorts of documents—for instance, external supplementary documents and knowledge references provided by employees—were made part of the knowledge depot of KM III. The document management system has been improved in the following ways:

- 1. *Automatic sorting*. The system provides a template function through which users can choose a suitable format. After a user uploads the document, it is sorted automatically by words and attributes.
- 2. *Document encryption*. The system can set the encrypting level and range so that documents can be accessed by authorized IDs or management ranks. The encrypting levels specify various degrees of use: browse, print, or download.
- 3. *Format specification*. The format of knowledge documents is regulated. The KM center has designed standard formats for writing or uploading reports.

The knowledge map added in KM III provides monthly statistics on KM implementation. Such information allows managers to follow knowledge document distribution and use among organizational units and review KM promotion policies in order to develop follow-up promotion plans.

KM III adds an evaluation process for uploaded documents that can be performed by three agents:

- 1. Uploaded documents approved by experts and division directors can be saved in the KM system.
- 2. Experts, directors, or readers can assess knowledge documents by rating them and adding comments that will help other readers understand more about a documents in terms of accuracy or accountability.
- 3. Different departments can perform their own evaluations of knowledge documents.

The management system can be characterized in three ways:

- 1. *KM implementation and employee performance evaluation*. Because departments or divisions have their own job requirements and evaluation standards, merging KM implementation into employee performance evaluation requires a plan that can be applied by all groups at ASE. The KM center and the human resources (HR) department cooperated in designing performance evaluation rules in order to set up a system that is fair and flexible.
- 2. Account management. KM user IDs are synchronized with HR employee records to ensure accountability and security control. One user can have only one account and is strictly forbidden from applying for more. All knowledge documents are labeled with various levels of authorized usage: read, print out, or download. Employees can only access documents in the public domain or public documents within their department. Permission from the department head is required to obtain the documents from other departments.
- Training. KM III provides e-learning. Department heads can upload training materials and post the reading assignments. Managers can administer a questionnaire survey or a written test. The KM system records all online usage and activities associated each user and accumulates performance statistics for managers.

Temporary Results of KM Implementation

At press time, KM III had just begun online testing of stage 1. The R&D and PE departments will be the first divisions to implement and test the system. There are almost 600 employees and 10 factories involved at this stage. Approximately 210 new messages or articles are added weekly. Ten thousand users have accumulated about 1,600 articles in the KM database. The subsequent stage will involve promoting the KM system to other ASE departments and divisions.

Some managers and engineers have said that they have seen significant results from KM III on the training and documents management functions. Subscribing to new knowledge articles and reading assignments enables employees to obtain new knowledge through self-study. In addition, the records provided by the system allow supervisors to keep track of the learning progress of employees. The system now has classification by chosen attributes and templates for document management, which has significantly enhanced searching efficiency and effectiveness.

Activities for the Promotion of KM Implementation

BKM (Best Known Method) Sharing Activities

The KM center hosts a regular activity called Best Known Method (BKM). Teams are formed according to function. Each team holds a meeting every week or every other week. The KM center invites expert speakers, and there are also follow-up activities associated with the team meetings or speakers' presentations. Through sharing and communicating in BKM activities, employees and departments can benchmark each other's performance and improve on them. The BKM is a meant to deepen the knowledge and skills of engineers.

Training for Engineering Capabilities

Engineers are always on the front lines, either talking to customers or working on the factory floor. In 2004, ASE initiated a training program designed especially for engineers that zeroes in on their problem-solving skills, with an introduction to various skills or tools, engineering logic training, and workflow management. Report writing is also an important aspect of the program, since reports serve as their medium of communication. Writing had not been emphasized previously; engineers focused solely on their customers. As long as the customer

understood and was satisfied with their work, they had carried out their job duties. Customers would also request different types of reports, which resulted in free-format report writing. This is not acceptable in KM; uneven document quality results in inefficient searching and time wasted by engineers in writing reports. This training program was designed to enhance the general skills of engineers, including their writing skills.

CONCLUSION

ASE began KM implementation in 2001. By 2007, it had gone through three phases associated with different system platforms. As a result of the problems encountered in KM I and KM II (2001–06), ASE learned from its experiences and decided to invest in a centralized KM system. From the records of the previous sessions, ASE analyzed the situation and outsourced the system to a prestigious software vendor. The management issue is more complicated, comprised of training, document management, performance evaluation, knowledge community building, and other aspects. This summary of valuable ASE experiences may be useful for other companies.

Myth of KM System

A common myth of KM is that it is like the "dream syndrome": if you build it, they will come. Many companies or managers might think, "If we build the KM system, employees will start to use it and then we will see results." They are willing to invest money and resources to build the system and platform, yet most of them do not anticipate the many problems that can follow. For an international company such as ASE, with factories located in several countries in Asia, setting a uniform standard for knowledge documentation has been a difficult task. A great deal of effort was needed to reach a consensus and to generate the necessary level of integration and coordination among factories and departments. Moreover, integrating KM use into performance appraisal with fairness is also an issue for managers.

Support from High-level Managers

When the KM center implemented the KM system, the difficulty that occurred most often was that other divisions were not willing to cooperate. Some division heads might accept it only perfunctorily or be unwilling to cooperate with KM policy. Because the division head has the authority to access the knowledge documents and to evaluate employee performance, KM implementation would encounter resistance without heartfelt support from division heads.

Voluntary Utilization by Employees

In the early stages of KM implementation, requiring employees to produce knowledge documents is usually the first task assigned. KM implementation thus becomes an additional burden, and employees are hesitant to fully support KM activities. The usual solution is to align KM use or contribution with employee performance appraisal. But here again, employees will only behave perfunctorily to meet the minimum requirement if they do not see the meaning of KM. Thus encouraging employees to voluntarily get involved in KM implementation is an important issue for KM acceptance. In other words, if employees understand the usefulness of KM—that it will improve their work efficiency coupled with the satisfaction of using it—they can be expected to generate high-quality knowledge documents and use the system more often. Finally, the purpose of all these efforts is to create a positive movement in knowledge management for the company in terms of continuous improvement in knowledge and innovation.

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COMPANY PROFILE

A *dabbawala*, sometimes spelled *dabbawalla* or *dabbawallah*, is a person in Mumbai (Bombay), India, whose job is preparing lunch for and then carrying and delivering the lunch boxes to office workers. The word "*dabbawala*" is literally translated as "one who carries a box"; *dabba* means a box, while *wala* is a term that refers to the preceding word (literally translated, the closest meaning would be "tiffin-man"). Although the profession seems to be simple, it is actually a highly specialized trade that is over a century old and has become integral to Mumbai's culture. The dabbawala started when India was still under British rule. Many of the British people who came to the colony did not like the local food; thus a service was set up to bring lunch to these people in their workplaces straight from their homes. Nowadays, Indian businessmen are the main customers of the dabbawalas. However, today the services provided include cooking as well as delivery.

The system came into existence in 1890 out of sheer necessity. At that time, the distance between residential areas and the business district made it very difficult for workers or employees to go home for lunch. A Parsi² banker finally found a solution: he employed a carrier to fetch his lunch from home every afternoon and bring it to his office. The idea caught on, and this inspired many people to become dabba carriers. Soon each dabbawala had a handful of customers; dabbas were differentiated by colored strings tied to the boxes.

The system developed in the 1890s has continues until today, with only a few modifications to facilitate the identification and delivery of dabbas. There are presently over 5,000 dabbawalas drawn from rural Maharashtra operating in Mumbai, delivering over two hundred thousand dabbas at a reasonable price (the service charges vary depending on the customer's location and the distance covered; the average cost is around INR400, approximately USD9) from homes spread over far-flung areas to the south of Mumbai, the hub of commercial activities in the metropolis and back.

The dabbawalas are typically descendants of soldiers of the legendary Maharashtrian warrior-king Shivaji. The first informal attempt to unionize them was undertaken by Mahadev Havji Bacche in 1930. In 1956 a charitable trust was registered under the name of "Nutan Mumbai Tiffin Box Suppliers Trust." The commercial arm was registered in 1968 as the "Mumbai Tiffin Box Carriers Association."

This is how the dabba is delivered:

1. The first dabbawala picks up the tiffin from home and takes it to the nearest railway station.

¹ The author would like to express his gratitude to Mumbai Tiffin Box Carriers Association (MTBSA) and thank Mr. Manish Tripathi, the honorary CIO of the Mumbai Dabbawala Association, for providing information and support in preparing the case study on Mumbai Dabbawalas. He also wishes to express his personal appreciation for the valuable assistance provided by MTSBA CIO's Mr. Mahesh Tripathi in guiding him through the knowledge management processes at MTSBA.

² A Parsi is a member of the closely-knit Zoroastrian community based in the Indian subcontinent. Parsis are descended from Persian Zoroastrians who immigrated to the Indian subcontinent over 1,000 years ago to escape religious persecution after the Islamic conquest.

- 2. The second dabbawala sorts the dabbas at the railway station according to destination and puts them in the luggage carriage.
- 3. The third one travels with the dabbas to the railway station nearest to the destination.
- 4. The fourth one picks up the dabbas from the railway station and drops them off at the offices.
- 5. The process is reversed in the evenings.

KEY DRIVERS FOR ADOPTION OF KM

Formally, there is no knowledge management (KM) unit in the association, but further investigation reveals that the KM concept is intrinsic to the working of the system, which is Six Sigma certified. The process automatically manages any natural calamities, untoward accidents, delays, etc. The approach to managing knowledge, disseminating information, and passing on this information is the key to the success of the association, which supplies around 200,000 dabbas every day. The increase in the number of customers compelled the dabbawalas to evolve an informal method of adopting KM practices.

A unique feature of this system is that although most of the tiffin-carriers are illiterate, they are the ultimate practitioners of logistics management, natural followers of strategies like just-intime deliveries and supply chain management, which they have never learned in any formal school of management. In addition, this hundred-year-old organization has not experienced any labor problems and has survived even the onslaught of five-star hotels, the fast food frenzy, and the over-the-counter culture.

STRATEGIES USED AND WHY. CONNECTING KM TO ORGANIZATIONAL GOALS/VALUE CREATION. CUSTOMER TESTIMONIALS

The Mumbai Tiffin Box Carriers Association (MTBSA) is a remarkably flat organization with just three tiers: the governing council (president, vice president, general secretary, treasurer and nine directors), the *mukadams* (group leader), and the dabbawalas (Figure 1). Its first office was at Grant Road. Today it has offices near most railway stations of the Bombay metropolis.



Figure 1. Organization of the Mumbai Tiffin Box Carriers Association

Here, no one is an employer or an employee. Each dabbawala considers himself a shareholder and an entrepreneur.

IMPLEMENTATION STEPS

Milestones and Measures

- 1. A Six Sigma quality certification³ endorsed by *Forbes*, a fan club that includes Prince Charles and Richard Branson (owner of the Virgin Empire).
- 2. Documentaries have been made by BBC, TV Tokyo, CNN, Sony TV, and MTV and by popular TV channels in India like UTV, ZEE TV, AAJ TAK, TV Today, Sahara Samay, Star TV, CNBC TV 18, NDTV, etc.
- 3. Invitations to talk about the system have been received from the Confederation of Indian Industry (CII) for a conference held in Bangalore, the Indian Institute of Management Lucknow (IIM-L), the Indian Institute of Management–Ahmedabad (IIM-A), the Confederation of Indian Industry–Cochin, the Confederation of Indian Industry–Delhi, Dr. Reddy's Lab Foundation–Hyderabad, the Symbiosis Centre for Management and Human Resource Development–Pune, and the Symbiosis Centre for Management and Human Resource Development–Nasik.
- 4. It has been included as a subject at the Graduate School of Journalism, University of California, Berkeley.
- 5. It has achieved a world record in best time management.
- 6. It was named in the Guiness Book of World Records.
- 7. It is registered with "Ripley's Believe it or Not."

CHANGES, CUSTOMIZATION, AND ADAPTATION

The organization has not documented any of the process, nor are the transactions recorded by any member or employee within the organization. Adopting information technology or modern tools for a competitive edge or in managing the operations was not readily accepted. Manish Tripathi, the honorary CIO of the Mumbai Dabbawala Association, is an independent software consultant who has brought this community closer to IT. He envisions three main purposes being served by this move: to harness the Internet's reach for generating revenue, to be a single point of contact between the community and the world, and to garner more contributions from companies and society.

"The initial response of these dabbawalas to information technology was lukewarm. In fact, their first brush with information technology was only when Bharat Petroleum [a large Indian public sector company] donated two computers to them," recalls Tripathi. A website is in place, available to dabbawalas at no cost, and it is beginning to show promise. "Around 1,000 new customers have come in through the website," Tripathi says. The dabbawalas have also signed up with a number of restaurants after these companies contacted them through the website. The dabawallas have now developed applications for the web portal to automate tiffin service requests through the Internet or a mobile SMS service.

PROBLEMS ENCOUNTERED AND CORRECTIVE ACTIONS TAKEN

The dabbawalas initially had only a few customers and operated within the Mumbai suburbs only. As the number of customers and the geographical spread of the city grew, it became evident that corrective measures had to be adopted to address the complexity of identification and delivery of the dabbas and also to make the process simpler so it could be understood by the

³ The International Quality Federation established the Six Sigma quality certification in 1986 to evaluate the quality standards of an organization. According to an article published in *Forbes* in 1998, one mistake in every eight million deliveries meets Six Sigma quality standards.

dabbawalas. Colored strings were introduced to distinguish between one dabba and another. However as the population being catered to increased, it became difficult to separate one lunchbox from another by using the colored strings alone, and a set of rules evolved.

Each dabba lid is now marked with a particular code denoting the dabbawala's number, the building where the tiffin-box is to be delivered, the floor number of that building, and the rail-way station where the tiffin-box is to be off-loaded, followed by an letter indicating the pick-up station. With this intriguing color-coding scheme, the dabbawalas can service the length and breadth of the city, seldom faltering. The tiffins are collected, sorted, coded, and delivered to their destinations. Every station has a numerical code, and each destination has an alphabetical code. The tiffin carries the codes for the source and the destination to help identify each tiffin owner.



Figure 2. Color Coding of Dabbas

Here, the codes for the collection point are: VP for Vile Parle, C for Cooper Hospital. The red color denotes the station and the dabbawala team at the collection and delivery points. Destination markings are the 10 (Nariman Point), 9 is the dabbawala handling the destination area, M is Mittal Tower, and 16 refers to the 16th floor.

To better understand the complex sorting process, let's take an example. At Vile Parle Station, there are four groups of dabbawalas, each with 20 members. Each member services 40 customers. That makes 3,200 tiffins in all. These 3,200 tiffins are collected by 9:00 AM, reach the station, and are sorted according to their destinations by 10:00 AM when the "Dabbawala Special" train arrives. The railway provides sorting areas on platforms as well as special compartments on trains travelling south between 10:00 AM and 11.30 AM.

During the journey, these 80 dabbawalas regroup according to the number of tiffins to be delivered in a particular area, and not according to the groups they actually belong to. If 150 tiffins are to be delivered in the Grant Road Station area, then four people are assigned to that station; one person can carry no more than 35 to 40 tiffins.

During the earlier sorting process, each dabbawala concentrates on locating only those 40 tiffins under his charge, wherever they come from, and this specialization makes the entire system efficient and error-free. Typically, it takes about 10 to 15 minutes to search, assemble, and arrange 40 tiffins onto a crate, and by 12:30 PM they are all delivered to the respective offices.

In a way, the Mumbai Tiffin Box Carriers Association system is like the Internet, as the Internet relies on a concept called packet-switching. In packet-switched networks, voice or data files are sliced into tiny sachets, each with its own coded address that directs its routing. These packets are then ferried in bursts, independent of other packets and possibly taking different routes, across the country or the world, and reassembled at their destination. Packet-switching maximizes network density, but there is a down side: packets intermingle with other packets,

and if the network is overburdened, packets can collide with others, even get misdirected or lost in cyberspace.

In the dabbawalas' elegant logistics system, using 25 kilometers of public transport and 10 kilometers of foot travel and involving multiple transfer points, mistakes rarely happen. According to a 1998 *Forbes* article, one mistake for every eight million deliveries is the norm. How do they achieve virtual Six Sigma quality with zero documentation? For one, the system limits the routing and sorting to a few central points. Secondly, a simple color code determines not only packet routing but also packet prioritizing as lunches transfer from train to bicycle to foot.

In the event of a dabbawala meeting with an accident en route, alternative arrangements are made to deliver the lunch boxes. For example, in a group of 30 dabbawalas catering to an area, five people act as redundant members who take on the responsibility of delivering the dabbas in case of any untoward events.

CULTURAL CHANGES AND CULTURAL BARRIERS BEFORE AND AFTER IMPLEMENTATION

The dabbawalas are extremely disciplined. Consuming alcohol while on duty means a fine of INR1,000 (USD22). Unwarranted absenteeism is not tolerated and is treated with a similar fine. The Gandhi cap serves as a striking symbol of identification in the crowded railway stations. Not wearing the cap attracts a fine of INR25. Every dabbawala gets one day a week off, usually on a Sunday. There are no specific selection criteria as to age, sex, or religion; however, there are only four female dabbawalas. The family background of the candidates is thoroughly checked, and a new employee is taken on only after a six-month probation period, regularized with a salary of INR5,000 a month. It is interesting to note that there is no retirement age. Any person can continue to work for as long as he is fit enough to carry out the required tasks.

SELECTION AND ADAPTATION OF TOOLS AND TECHNIQUES

The dabbawalas—who have been commended across the world for their non-technical but precise business delivery model—are now becoming technologically savvy. Keeping in tune with the fast-paced life of Mumbai, the dabbawalas are now just a click away, as they can be reached through the website and a simple SMS service. The dabbawalas have now adopted mobile services, SMS, and the Internet as tools to manage and promote their business.

Integration of KM with Other Existing Systems and Tools

With the advent of a better communication network, the dabbawalas have become more technologically savvy. Most senior dabbawalas now supervise work through the use of mobile phones and the Internet. Most of the dabbawalas have no formal classroom education but they believe in hands-on training through fieldwork guided by *mukadams* (group leaders).

To provide better services, the dabbawalas have started using computers to manage the records of customers and have launched a website, which provides a single point of contact for people to interact with the dabbawalas, provides a facility to order dabba online, and provides important information about dabbawalas.

Knowledge Processes

The entire knowledge process is represented in Figure 3. One dabbawala can collect 40 tiffins in the same amount of time that it takes another to collect 30. From their earnings of between INR5,000 to INR6,000, every dabbawala contributes INR15 per month to the association, to be used for community improvements, loans, and marriage halls at concessional rates. Association officials, whose decisions are binding, usually resolve all problems. Education up to standard seven is a minimum prerequisite. This system accommodates those who did not or could not finish their studies. It is obvious that those who score good marks go for higher education and do not do this job, but there are people who have studied up to standard twelve who cannot find any respectable jobs and who have joined the business. As mentioned above, there are only four women dabbawalas.



Figure 3. Knowledge Processes

Enablers

The enabler that underlies their success is the twin process that combines competitive collaboration among team members with a high level of technical efficiency in logistics management.

Internal and External Sensing

Each group is financially independent but coordinates with others for deliveries; the service cannot exist otherwise. Their attitude of competitive collaboration is equally unusual, particularly in India. The operation process is competitive at the customers' end but united at the delivery end, ensuring their survival for over a century.

Each group is also responsible for day-to-day operations. More importantly, there is no organizational structure, no managerial layers or explicit control mechanisms. The rationale behind the business model is to push internal competitiveness, which means that the four Vile Parle groups compete with each other in acquiring new customers.

Sharing Knowledge

The students of the Indian Institute of Management–Lucknow invited representatives of the Nutan Mumbai Tiffin Carriers Association Raghunath Medge and the Gangarao Talekar to Manfest–2004, their annual festival. The theme of the festival was "The Complete CEO Workout." During their interaction with the dabbawalas, students from 50 management institutes across the country learned how they have survived in a competitive market and expanded their business over the years.

Taking the lead from the success of dabbawalas, a company called Annadaata makes lunch and dinner boxes for clients in the San Francisco Bay area. This lunchtime scene is being played out each weekday in American metropolitan areas with large South Asian populations. They

depend on delivery workers to bring them the home-cooked foods of their upbringing, often prepared by cooks working from home. In Mumbai, the tiffin, or lunch, is prepared by the wife, mother, or servant of the intended partaker of the meal. In the U.S., because of a lack of time (and of domestic staff), outsiders prepare many of these lunches, but the underlying principle is the same. With the spread of these services, Punjabis can have their *saag paneer* and meat curries, Gujaratis can have their *dal, bhat, saag,* and *rotis,* and south Indians their *rasam.* As the demand for home-cooked food on the job has increased, so has the number of outlets providing tiffins. Annadaata, which began as a home-based operation in 2002, has grown into a business with several delivery people distributing meals each weekday across San Francisco. Kavita Srivathsan, 29, the chief executive of Annadaata, got her start by cooking meals for her husband and his friends.

Using Knowledge

The range of customers of dabbawalas includes students (at both colleges and secondary schools); entrepreneurs of small businesses; managers, especially bank staff; and mill workers. They generally tend to be middle-class citizens who for reasons of economy, hygiene, caste, or dietary restrictions, or simply because they prefer wholesome food from their kitchen, rely on the dabbawalas to deliver a home-cooked midday meal.

New customers are generally acquired through referrals. Some are solicited by dabbawalas on railway platforms. Addresses are passed on to the dabbawala operating in the specific area, who then visits the customer to finalize arrangements. Today customers can also log onto the website to access the service. Service charges vary from INR150 to INR300 per tiffin per month, depending on location and collection time. Money is collected in the first week of every month and remitted to the *mukadams* (group leaders) on the first Sunday. They then divide the money equally among members of that group. It is assumed that one dabbawala can handle no more than 30–35 customers, given that each tiffin weighs around 2 kg. This is the benchmark that every group tries to achieve.

Typically, a 20-member group has 675 customers and earns INR100,000 per month which is divided equally, even if one dabbawala has 40 customers while another has 30. Groups compete with each other, but members within a group do not. This is common sense, points out one dabbawala.

Tracking and Measuring Results, Ensuring Impact on Productivity and Innovation

The concept of self-assessment by communities is a central ingredient of the systems developed in determining the quality of knowledge. Meetings are held in the office on the 15th of every month at the Dadar (Mumbai). During these meetings, particular emphasis is placed on customer service. If a tiffin is lost or stolen, it is promptly investigated. Customers are allowed to deduct costs from any dabbawala found guilty of such a charge. If a customer complains of poor service, the association can shift the customer's account to another dabbawala. No dabbawala is allowed to undercut another. Before looking into internal disputes, the association charges a token INR100 to ensure that only genuinely aggrieved members interested in a solution come to it with their problems and the officials' time is not wasted on petty bickering.

LESSONS LEARNED

The concept of multi-level coding (color-coding on the lunch boxes for identification) and reverse logistics can be implemented in industries as diverse as soft drinks (where logistics is important in transporting the filled bottles to retailers and collecting empty bottles to be returned to the plants), pharmaceuticals, and other fast-moving consumer goods areas. Moreover, dependence on technology can be drastically reduced. Based on Porter's theory, the dabbawalas can be better understood as follows:

- 1. Threat of new entrants: According to Porter, the threat from new entrants is dangerous to any organization, as it can take away the organization's market share. Begun in 1880, the experience curve of the 125-year-old dabbawala service serves as a huge entry barrier for potential competitors. In addition, it would be difficult to replicate this supply chain network that uses Mumbai's jam-packed local trains as its backbone.
- 2. Current competition: Porter's five forces theory states that strategy is determined by a unique combination of activities that deliver a different value proposition than competitors or the same value proposition in a better way. The dabbawalas do face competition from fast food joints as well as office canteens. However, since neither of these serves home food, the dabbawalas' core offering remains unchallenged. They have also joined up with catering services and hotels to cater to the large number of office workers.



Figure 4. Forces Governing Competition in an Industry

- 3. Bargaining power of buyers: The delivery rates of the dabbawalas are so low (about INR300 per month) that one simply cannot bargain any further. Also, their current monopoly negates any scope of bargaining on the part of their customers. Thus, we encounter a perfect win-win combination for the customers as well as the dabbawalas.
- 4. Bargaining power of sellers: The dabbawalas use minimum infrastructure and practically no technology, hence they are not dependent on suppliers. Since they are a service-oriented organization, sellers do not assume any prominence, as would be the case in a product-oriented company. The strategy map framework in Porter's theory allows companies to identify and link together the critical internal processes and human, information, and organization capital that delivers the value proposition differently or better. Human capital is the greatest driving force in the dabbawala community; as a result, they are not dependent on suppliers or technology, thus negating the seller's power in the equation.
- 5. Threat of a new substitute product or service: As substitutes for home-cooked food are not seen as a viable alternative in the Indian scenario, the threat to the dabbawala service is not an issue, at least in the foreseeable future. This gives them a leeway to

expand their already existing network into other cities as demand increases in these places, as well.

The use of the website is part of a strategy to harness the Internet's reach for generating revenues and to be a single point of contact for the community to the world, in addition to garnering more contributions from companies and society. Modern communication tools like mobile SMS services help to reach out to all customer bases in a timely manner and to facilitate an efficient supply chain management system.

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COMPANY PROFILE

Bharti Airtel, Limited, a part of Bharti Enterprises, is one of India's leading private sector providers of telecommunication services, with an aggregate of 30.27 million customers. As of the end of October 2006, it had 28.61 million mobile telephone customers. Bharti Airtel has been rated among the top ten best-performing companies in the world in *Business Week*'s top 100 IT companies list.

Bharti Airtel has three strategic business units: mobile telephone services, broadband and telephone (B&T) services, and enterprise services. The mobile telephone business provides mobile and fixed wireless services using GSM technology across 23 telecom circles. The B&T business provides broadband and telephone services in 94 cities. The enterprise services provide end-to-end telecom solutions to corporate customers and national and international long-distance services to carriers. All these services are provided under the Airtel brand. Airtel's high-speed fiber optic network currently spans over 36,000 km, covering all the major cities in India. The company has two international landing stations in Chennai that connect two submarine cable systems: i2i to Singapore and SEA-ME-WE-4 to Europe.

Airtel's focus on telecommunications enables it to anticipate industry trends more accurately and to capitalize on emerging telecommunication business opportunities. Today, Airtel has earned the reputation of providing high-quality services to its customers and is well respected by its competitors as well. Another asset is its high-quality management team with a shared vision and proven execution skills.

STRATEGIES USED AND WHY; LINKING KM TO ORGANIZATIONAL GOALS/VALUE CREATION; CUSTOMER TESTIMONIALS

Airtel's strategic objective is to capitalize on the growth opportunities that the company believes are available in the Indian telecommunication market and to consolidate its position to become the leading integrated telecommunication services provider in key markets in India, with a strong focus on providing mobile telephone services. In order to achieve this objective, the company has developed the following strategies:

- Focus on maximizing revenues and margins. Maximize reach and expand product offerings to emerge as a "one-stop shop" solution provider for customers.
- Focus on enhancing customer satisfaction through timely high-quality delivery, thus reducing customer loss churn-out.
- Build a sustainable competitive advantage through human resource development to achieve operational efficiency.

¹ The author is grateful to Airtel Services Pvt. Ltd. for allowing him to study the knowledge management practices adopted at Airtel. He sincerely thanks Ms. Ritu Induria, Assistant Manager–Knowledge Management, for providing comprehensive information on knowledge management practices at Airtel and supporting the development of the case study.

 Leverage on the strengths of strategic and financial partners, i.e., SingTel, Vodafone, International Finance Corporation, Asian Infrastructure Fund Group, and New York Life Insurance.

CHALLENGES

The Indian telecom industry is complex. There are a large number of service providers but not enough trained manpower to handle telecom operations. There are local and regional variations and an ever-changing regulatory environment. All these present challenges that service providers need to address at various levels. In 2001, the business issue for top-level management was how to provide consistency in customer experience across all locations. Management wanted to provide a superior and a consistent service experience to all customers regardless of location. Knowledge management was identified as a strategy that can help resolve these issues.

KEY DRIVERS FOR ADOPTING KM; STRATEGIC FOCUS OF KM

KM at Airtel is used primarily as a tool to achieve strategic business objectives through an integrated set of initiatives, systems, and behavioral interventions. Broadly speaking, KM seeks to eliminate the reinvention of the wheel anywhere in the organization. The KM vision at Airtel was to completely eliminate reinvention without losing time in bringing about consistency in outputs across processes. There was a need to first completely exploit all available internal knowledge. Airtel's knowledge management (KM) program, called Insights@Airtel, was launched based on the same set of guiding principles.

Through documentation and publication of best practices and through knowledge-sharing sessions, best practice implementers shared their success stories. Key performance indicators, process audits, and Six Sigma projects were the major sources of shared best practices. The strategy and architecture of KM at Airtel use Airtel's business strategy as their foundation.

KM IMPLEMENTATION: LINKING KM OBJECTIVES TO BUSINESS OBJECTIVES

Having provided the broad strategic inputs, it was critical that these be broken down into bite-sized chunks which people can identify with. There was a need to go back to basics by asking the question, "What problem are we solving?" It was believed that KM services and tools must exist to help their users. The business needed to increase customer satisfaction and to provide a consistent customer experience.

The process was initiated with a detailed discussion among functional owners of their vision of customer satisfaction and experience. This was a crucial step that would create buy-in at the operational level, without which KM could not be successful. These detailed discussions led to a decision on what was to be reused and replicated. Hence, the deliverables for KM were very closely identified as the deliverables for the business. This ensured that KM was supporting the business and was not being done only for its own sake.

A problems that often occurs early in the process is that KM does not receive the necessary resources (people, money, etc.). If KM expectations were low, it would be even more difficult to get the resources. The key was finding a way to link it with the deliverables and hence create higher expectations, and then to deliver them. The KM team had to prove that KM was not just a fad but a business tool that can deliver results. Once this alignment happened, KM became part of the company culture, but there were still a good number of people who questioned KM's validity. In such a situation, the importance of regular and focused communications and a visible demonstration of top management's seriousness regarding KM helped to provide the initiative with momentum.

KM Goals: Alignment with Business Objectives

KM promotes customer satisfaction (C-SAT) and consistent customer experience by measuring consistent customer experience, gauging performance variations in critical customer impact parameters and seeking to reduce these variations through a quick replication of best practices, and by structuring all KM initiatives around business practices that affect customers, thus empowering every individual employee to take full advantage of the collective knowledge of the entire organization in serving customers. It enables speed in business results through replication of proven good practices from within or outside the organization, which is always faster, typically taking only one-third to one-fourth of the time to implement a new procedure when compared to starting from the beginning. And it enables institutionalization by converting individual knowledge into organizational knowledge, enabling it to be reused and replicated. This reduces dependence on individuals, which is critical considering the rapid turnover of high-performing employees.

KM Architecture and Processes: The KM Cycle

An informal sharing culture has always existed at Airtel. "It is a part of our DNA." But the quick growth that has been experienced within the company brought out the fact that there was a need to give the process a structure, to provide a robust and scalable infrastructure. Once the focus areas of KM had been identified, it was imperative to address all phases of the KM cycle (Figure 1).



Figure 1. KM Cycle in Airtel's Broadband and Telephone Services

The K-Map reflected Airtel's repository structure. Knowledge repositories were based on the business processes map. This was essential in order to keep all KM initiatives entirely relevant to the business. The aim was not to create a massive electronic library, but to keep every-

thing relevant. All KM initiatives, such as the creation of knowledge bases or repositories and communities of experts, sharing and replication of external and internal knowledge, etc. were built around the identified business processes (Figure 2).



Process Map – based on Customer Related Processes

Figure 2. Knowledge Map Based on Process Map

Internal and External Sensing

People were encouraged to add explicit content to the appropriate repositories, a free-for-all activity. Anyone can upload the content, with minimal review. While quality may be slightly compromised, this can be more than made up for by the resulting changes in company culture. People came forward to share knowledge and ideas. Many submissions, some good and some not so good, were received. The process of tightening the review procedure is ongoing, so that a higher percentage of submissions received will be useful.

Creating or Capturing Knowledge

Each repository has a K-champ and subject matter experts (SMEs) responsible for encouraging knowledge-sharing and replication in their domains and available to answer questions related to their domains. This ensures that tacit knowledge from the experts can be tapped to help solve business problems. The expert can be approached via the KM portal, email, or phone. The experts' database is available on the KM portal.

For explicit knowledge—a dashboard for all critical business parameters—a non-financial parameters (NFP) repository was created. The monthly performance of all circles/business units

is tracked and all top-performing units are ranked based on previously chosen criteria. Using this ranking, top-performing units will share the good practices that resulted in their good performance, while low-performing units are expected to quickly replicate the best practices shared and to measure their performance against them on a month-to-month basis. This was the beginning of a knowledge-sharing funnel, now in the process of being automated; its most useful feature is the close-looping methodology that has been created for all replicable best practices (Figure 3).



Best Practice Replication Funnel

Figure 3. Best Practice Replication Process

Organizing, Storing, and Sharing Knowledge

It was recognized that there is no single, pre-defined KM process. Each organization must proceed along its own learning curve and discover what is best suited. Process tips are available; their suitability must be evaluated prior to adoption according to, for example, the age of the organization, the average age of its employees, its geographical spread, the type of work people do, the company culture, etc. The process would be different for organizations where a large percentage of the employees are unwilling to share, replicate, and/or acknowledge replication than in a moderately sharing and trusting organization.

Keeping Airtel's work culture and the way people operate on the shop floor in mind, the KM process was designed, through several iterations, with the following key points:

- Simple, fast, user-friendly processes for sharing knowledge.
- Standard formats designed to maximize replication value.
- Powerful yet easy to use search and retrieval systems.
- · Virtual collaboration, team rooms, threaded discussions.
- "Ask an Expert" option.
- Knowledge-sharing sessions.

To ensure that knowledge-sharing and replication in areas critical to the business are not left to chance, a process of systematic documentation of best practices and replications with a clear demonstration of business results was institutionalized. A format for sharing was provided in the form of a Best Practice (BP) sharing template (see Appendix I). Process owners documented their best practice, specifying the identity of the source unit, the relevant process/function, the background/key business issues, the approach and solution, and the business results (in terms of impact on the processes, NFPs, C-SAT scores, E-SAT scores, and financial savings/ revenue generation). The sharing template also mandated provision of contact details (names, job title/designation, mobile phone number, email address) of the person who implemented it, the head of the department, and the Quality and KM head. Documentation of best practice was to be kept to two pages.

The knowledge-sharing template was kept short to ensure that it is objective and to encourage every potential replicator to personally interact with the person who shared the knowledge to ensure the transfer of tacit knowledge. Such interactions are known as knowledge-sharing sessions (KSS); they can be conducted through email, a conference calls, or physical visits. The need for a KSS can also be identified in a review meeting where both the sharer and the potential replicator are present. They are documented and shared across the company. All business units that replicated a best practice with demonstrated business results also had to document their replication in the form of a replication template (see Appendix II). Like the sharing template, it includes all the details of the source and replicating units, the background/key business issues, the approach/solution (how ideas from the source unit were replicated and developed further), the demonstrated business results (in terms of impact on the processes, NFPs, C-SAT scores, E-SAT scores, and financial savings/revenue generation), and the contact details of all the replicators.

Integration of KM with Systems and Tools

Technology is an important input, since Airtel is spread across the length and the breadth of the country. Anyone familiar with India confirm that this is a large area. Although it is simply an enabler, KM helped Airtel to overcome this geographical drawback while also accelerating the KM assimilation process. In today's world, KM is as important as the knowledge itself, since knowledge is a perishable commodity that quickly becomes obsolete.

Insights@Airtel, the knowledge portal (Appendix III), is a common platform throughout Airtel. It contains knowledge repositories around customer-impacting process buckets, support processes, and external knowledge relevant to the business and provides classification and taxonomy schemes to organize content. It has powerful search and retrieval capabilities. In addition, it puts into action several knowledge objects-related workflows.

Cultural Changes and Barriers Before and After Implementation

Changes in culture require strong leadership and visible commitment at the senior level. Top management at Airtel has identified KM as one of the top ten strategies on the strategy matrix. It was communicated to all employees that this initiative would be one of the drivers for continued leadership. This commitment has yielded the desired results.

To develop a sharing culture, it was important to underscore the benefits of operating as a learning organization. It was critical for the people to appreciate why this was being done and to address the WIIFM ("What's in it for me?") angle. Unless people believe that an initiative will benefit them, they are unlikely to participate wholeheartedly.

Various rewards and recognition schemes were designed to motivate employees. Most notable were the Knowledge Dollar (K\$) scheme and the Joint President's and CEO's Knowl-edge Management Awards that were initiated in the year 2002–03, which provided incentives

for both knowledge-sharing and replication. The K\$ earned by the HOD and the circles that were established became the basis for awards and recognition at the company and group levels. The K\$ scheme provided significant incentives for replication: for every replication, the team/ unit that shared the knowledge got five times the K\$ for every sharing. KM awards recognized best knowledge leaders and knowledge workers; the knowledge champions and subject matter experts were rewarded based on their reviews and approvals; numerous awards and spot recognition schemes at the circle/unit levels promoted knowledge or replicated knowledge is eligible. There are sufficient reward categories that every employee can aspire to at least one; this approach addressed the problem of "invisible employees."

The R&R mechanism was supported with the introduction of performance measures to assess contributions and reuse available knowledge. KRA's were aligned beginning with the leadership team. This was a difficult measure to introduce, but the commitment of top leadership ensured that the scheme could be implemented.

Enablers

For the KM initiative to work, however, there was a need to create a support infrastructure, including new roles and specific responsibilities. Everyone's responsibility is no one's responsibility. Facilitating roles were created. The KM responsibilities in Airtel are shared among:

- Knowledge champions encourage and promote knowledge-sharing and replication in their domain and lead the group of subject matter experts for a knowledge repository or sub-repository across the business.
- Subject matter experts collaborate to form a pool of talent in their respective areas of expertise and are available to the entire group. They promote knowledge-sharing and replication in their areas and review and approve content contributed by employees for publication on the portal.
- Knowledge management heads and KM coordinators are the local faces of KM. They interact with, encourage, and influence employees in their specific domains. They also have KM SPOC's in each critical area at each circle.

This is followed by a strict review process across all levels of the corporate hierarchy, demonstrating that this program is as important as a sales program (Figure 4).



Figure 4. Best Practice Approval Process

Knowledge creation and the development of a sharing culture at Airtel has been a top-down process. The basic tenets are deeply rooted in motivational theories which apply to growth-oriented individuals and foster desirable organizational behavior. The belief that the intellect of an individual, if properly harnessed, can be transformed into an organizational asset for long-term advantage has helped in achieving a sustaining buy-in among the company's top leadership.

On the operations front, all managers and above must share a specified number of knowledge submissions and replicate key best practices every year as part of their Key Result Areas (KRAs). In Airtel, for all the top management executives (HODs, CEOs, vice presidents, and president), KM has become part of their KRAs. The KM parameters include performance in terms of business results and key performance indicators, reduction in variations, people engagement, etc. depending on their role and levels.

Selection and Adaptation of Tools and Techniques

KM as an initiative was identified and popularized across the organization both by the KM teams at the central office as well as by the various circles/units. In addition, critical best practices and useful external knowledge pieces were shared by the KM teams at the central office by email. The KM teams organized training programs and conducted awareness campaigns about KM. In addition, branding was done through banners, posters, and danglers and other such materials (Appendix IV).

Milestones and Measurement Criteria

Measurement criteria used in any KM system are related to the objectives of the KM program. For example, the objectives of a consulting services company will not be the same as those of a manufacturing company. The KM measurement system at Airtel needed to reflect what Airtel was doing. The problem with defining different measures on the basis of KM success across the industry was that there are no benchmarks: one cannot identify any leaders or laggards. Linking KM objectives to business objectives ensured that there was a measurable outcome. A reduction in performance variation across circles is the "outcome" or "lagging" measure for KM. The other measures that were established to evaluate business units/circles performance on the basis of KM were:

- People engagement and orientation.
- Extent of knowledge-sharing.
- Number of knowledge replications with results.
- Nurturing innovation: total number of ideas received and implemented.
- Unique visitors transacting on the portal.
- Total hits on the portal.

Knowledge Dollars (K\$) are not only a good way of motivating knowledge-sharing and replication, but they can also be used as a measure of culture, an "enabler" or "leading" measure.

Tracking and Measuring Results: Ensuring Impact on Productivity and Innovation

"KM and Quality at Airtel are not for fashion but purely for business results." This statement made by the Airtel leadership summarizes the culture at the company, be it adhering to process standardization, monitoring NFPs, implementing the Six Sigma, or KM. Every activity is linked with business results: improvement in customer satisfaction, employee satisfaction, customer satisfaction measurement metrics (CSMM) scores, and KPIs.

There are periodic reviews at every level, from executive to operational, that serve two purposes: performance monitoring and creating a sharing forum. Leadership at various levels plays

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a critical role in creating a culture of knowledge-sharing. The fact that functional heads are made the knowledge champions for their domain also contributes significantly to ensuring buy-in and promoting knowledge-sharing and replication. The creation of a community of experts was also instrumental in gaining the commitment across the organization to the KM program. Knowledge-sharing and replication were also integrated into employee performance appraisal.

Over the last three years, over 14,000 knowledge submissions were made by employees from all over the country. Of these, about 51% were internally-generated knowledge from employees. Of this number, 26.7% are innovations in customer service delivery and about 12% address marketing and new products. These figures demonstrate the internal drive to contribute towards customer-oriented processes and systems. Over 38% of the submissions come from employees working in customer interfacing functions such as the call center, customer service delivery, product development, and market intelligence. In several cases employees have contributed ideas and feedback that helped create new processes and systems to minimize customer problem areas. These insights from front-line employees have contributed to bringing about the introduction of new products or better responses to competition in the marketplace, resulting in a significant positive impact on business outcomes. In addition, there have also been substantial savings from being able to avoid "reinvention," which can prove to be very expensive and can blunt the company's first mover advantage.

As an integral part of the KM processes at Airtel, it is mandatory for the contributor to post business results and impact, validated by the head of the department at the regional level and by SMEs at the national level. The impact is expressed either in terms of rupees, as incremental revenues or a reduction in cost, or in terms of customer satisfaction, measured using CSMM (Customer Satisfaction Measurement Metrics) by external agencies.

At Airtel has recognized the need to build on individual knowledge for organizational excellence and, in the process, also provide learning and growth opportunities to all employees. Investment in terms of people, processes, and systems for business objective-linked learning has been increasing ever since top management embraced KM as a tool for business excellence. The positive impact and early successes of KM have served to strengthen the case for further investments in the process. There are several individual excellence awards that reward innovative individuals who are necessarily leaders in the hierarchy who use knowledge as their key tool.

Airtel has an employee base of over 8,000 supported by over 40,000 associates who ineraact with customers in different roles. It was critical for the KM system to capture customer service insights and customer feedback in order to contribute effectively to the process and performance parameters. The aim of KM has been to provide top management with a 360° view of the entire fulfilment process across Airtel's value chain.

Rolling It Out: Addressing Challenges

- Knowledge management enabled Airtel to build a culture of sharing and reuse within the organization, but many employees did not contribute. There was a need to communicate the benefits of KM to these people. If users felt that the time spent exploring relevant areas would help them in the end, they would take an interest in the initiative.
- Getting the funds for the KM program was also a challenge. Educating individuals at the executive management level was crucial in obtaining sufficient financial resources. Once there was a buy-in and results became evident, executive commitment followed.
- Knowledge champions and SME's did not have time for their own knowledge roles. This prompted an initial motivation/incentive scheme. However, once they saw the benefits in their own area, buy-in happened automatically. Older employees were not very technologically knowledgeable, which posed a problem when they became knowledge champions or SMEs and had to interacte with the knowledge processes. A solution

has been worked out but has not yet been fully implemented, so it is not known whether it will be effective.

- One of the biggest misconceptions is that KM equals technology or IT. A considerable effort was spent in getting across the concept that KM is first about people, culture, and behavior. IT is merely an enabler.
- One question that was always asked is, "Does replication kill innovation or original thinking?" It does not. It only kills re-invention, which is not the same as innovation. In fact, KM breeds innovation!
- Another challenge was that people felt insecure about their future in a dynamic environment and thought that KM was a replacement for people. On the contrary, there is no substitute for tacit knowledge; expertise and insights accumulated over years of experience and specialization are not always documented. Also, people do the work, knowledge does not, but knowledge can enable a person to do work correctly, efficiently, and effectively.

LESSONS LEARNED

- The KM initiative should be highly relevant to the business objectives, with KM objectives being aligned with key business strategy.
- One should not be trapped with devising a best-fit KM solution, because there is no such thing. The key is to "Get started, be flexible, and make relevant changes on your KM journey."
- KM is about people and not IT—but it is also not only about people. The focus of KM at all times should be on business results, which means that the KM initiative must always remain relevant.

Given the dynamism of the telecom industry and KM evolution, the role of the KM program at Airtel is likely to evolve further. However, the overall objective of the initiative will remain the same: the achievement of faster business results through sharing and replication of all good practices emerging from the company's performance matrix.

GLOSSARY

KRA	Key result areas
HoD	Head of Department
E-SAT	Employee satisfaction
C-SAT	Customer satisfaction
R&R	Rewards and recognition
Danglers	Hanging brochure
SPOC	Single point of contact
NFPs	Non-financial parameters
CSMM	Customer satisfaction measurement matrix
Template	Model or form
Appendix I. Best Practice Sharing Template

BEST PRACTICE DOCUMENT

Name of business unit	
Best practice title	
Name of employee who has	
implemented the best practice	
Name of HoD	
Relevant process/function area	
(select one)* (see Note 1 below)	

Section 1. Background/Key Business Issues

Section 2. Approach/Solution

Section 3. Business Results

Mandatory fields (as applicable)

SN	Impact of BP Sharing/Replication	Results
1	(a) Which process is impacted?	
	(b) Which process step is impacted?	
2	(a) Impact on NFP-which NFP?	
	(b) What is the impact on the NFP?	
3	(a) Impact on the CSMM attributes–which attribute?	
	(b) What is the impact on the CSMM?	
4	(a) ESAT impact-which Gallup attribute?	
	(b) What is the impact on Gallup?	
5	Financial impact (savings, revenue generation, etc.)	

For further details please contact:

Employee Name:	HoD Name:	KM/Quality Head Name:
Job Title/Designation:	Job Title/Designation:	
Email ID:	Email ID:	Email ID:
Mobile No.:	Mobile No.:	Mobile No.:

Names and email IDs of team members involved in implementing the best practice:

Best practice documented by:

Date:

Note 1: Select one of the following: customer service delivery; marketing and sales; network; HR; finance; IT (specify).

Note 2: This document must not exceed two or a maximum of three A4 size pages. It is intended to be an executive summary only. Further details may be provided to interested parties, on request. The document must be clear, precise, objective and concise. Use short sentences. Explain all abbreviations. Check spelling and grammar; seek help, if required. Poorly written documents will not be published.

Appendix II. Replication Template

KNOWLEDGE REPLICATION DOCUMENT

Name of your business unit	
Replication title	
Name of employee who has implemented	
the replication	
Name of HoD	
Process/function to which the replication	
pertains (select one)*	

Details of source from which best practice has been replicated

Name of source business unit	
Best practice title or K-sharing session date	
Name of employee who has shared the	
knowledge	
Name of sharing HoD	

Section 1. Background/Key Business Issues

Section 2. Approach/Solution (how ideas from other units were replicated or developed further)

Section 3. Business Results

Mandatory fields (as applicable)

SN	Impact of BP Sharing/Replication	Results
1	(a) Which process is impacted?	
	(b) Which process step is impacted?	
2	(a) Impact on NFP-which NFP?	
	(b) What is the impact on the NFP?	
3	(a) Impact on the CSMM attributes–which attribute?	
	(b) What is the impact on the CSMM?	
4	(a) ESAT impact–which Gallup attribute?	
	(b) What is the impact on Gallup?	
5	Financial impact (savings, revenue generation, etc.)	

For further details please contact:

Employee Name:	HoD Name:	KM/Quality Head Name:
Job Title/Designation:	Job Title/Designation:	
Email ID:	Email ID:	Email ID:
Mobile No.:	Mobile No.:	Mobile No.:

Names and email IDs of team members involved in implementing the best practice:

Documented by:

Date:



Appendix III. Insights@Airtel: The KM Portal





Appendix IV. Posters, Banners, and Danglers Promoting KM

Dangler: "Did you KM today?"



Poster: "Want to know how?"

Siddharth Sharma¹ National Expert, India

COMPANY PROFILE

"Powered by Intellect, Driven by Values." This is the motto that Infosys, an Indian software services company with headquarters in Bangalore, India, displays proudly on its employees' business cards. Infosys was founded in 1981 when seven professionals collectively invested INR10,000. By 2007, Infosys had become the second-largest IT company in India, with a market capitalization of over INR1,15,307 crores and consolidated post-tax earnings for the March quarter of INR1,144 crores on revenues of INR3,772 crores. Growing consistently by nearly 70% annually, Infosys became a darling of the Indian stock market and was the first Indian company to be listed on the NASDAQ in 1999. Polls conducted periodically by the Indian financial and business press place Infosys among the most admired companies in India, commending it for its ability to be responsive to customer needs, deliver high-quality services, and thrive in a highly competitive environment.

One could easily dismiss Infosys's story as that of just another information technology services company in a developing country that was fortunate enough to exploit the Y2K opportunity at the end of the twentieth century. However, Infosys's story suggests that there is much more than serendipity at play here. It is the story of the systematic development of a postmodern, profitable enterprise for harnessing intellectual capital in the new information economy. Intellectual capital is evident everywhere at Infosys. It is embodied in the over 72,240-strong and growing workforce of "infoscions" and in the stock of knowledge that this workforce continually creates and replenishes. It is embedded in the continuously evolving software development practices that have earned it the highest level of certification—Level 5 of the Capability Maturity Model (CMM)—from the Software Engineering Institute (SEI) at Carnegie Mellon University, a distinction conferred on only a handful of companies around the world. Intellectual capital is also apparent in the impressive array of frameworks that guide Infosys' business operations, including the widely mimicked "global delivery model" that the company pioneered and perfected. Furthermore, it pervades the sprawling campus in Bangalore, India, that acts as a crucible for the creation and deployment of knowledge.

The organization's structure is divided into finance, planning, marketing, quality, HR, education and research, and information systems. The software delivery apparatus that focuses on individual global accounts consist of Geos (geographical units), IBUs (integrated business units), and ECUs (enterprise capability units). The quality processes in Infosys are the focus areas as the department defines and owns processes for execution of customer engagements. A network of quality managers is charged with deploying these processes in the software delivery units (Geos/IBUs/ECUs) and ensuring adherence to them. The process council keeps track of the entire process of definition and deployment.

¹ The author expresses his appreciation to Dr. J. K. Suresh, Associate Vice President and Principal Knowledge Manager of Infosys, for giving permission to conduct the case study in the first instance and to do the necessary research work. This case study represents the effort and support of Dr. Suresh, whose extensive study in the field of knowledge management, able guidance, and stimulating suggestions made its preparation possible. The author extends many thanks to Dr. J. K Suresh and Mr. K. Mahesh for their support and guidance. His sincere thanks go to Chandos Publishing (Oxford) Limited for permitting him to refer to the book *Ten Steps to Maturity in Knowledge Management: Lessons in Economy* by Dr. J K Suresh & Mr. K Mahesh.

The global locations and development centers are extensively networked via dedicated communication links, monitored from the network operation center in Bangalore and multiple network hubs located world-wide. Virtual private network (VPN) links connect the company's network to those of clients. Each employee at Infosys has a dedicated desktop computer, and those who travel extensively or who are based at a location other than a development center also have company-provided laptop computers and PDAs. Email, instant messaging, and video and audio conferencing are some of the common communication modes used by the employees. They can also access the Infosys network through secure connections from client locations as well as from their homes or in hotels anywhere in the world.

KEY DRIVERS FOR THE ADOPTION OF KM

Most of the work that the company performs is in the project mode for a number of customers. As such, the work is knowledge-intensive and at the same time involves various technologies, industries, and products. Each project has its own specifications and requirements based on what it delivers to the customer.

Over the years, in addition to IT services in banking, finance, securities, and insurance, several new areas of technology and business, such as e-commerce, telecom, and enterprise resource planning (ERP), have been included and developed internally to aid the business of its customers. In 1999, after growing at a rapid rate annually over the previous decade, the company already had around 4,000 employees working across the globe, with revenues of around USD120 million. Meanwhile, with the speedy development of the information and communication technology sector, a consequence of the critical role it played in enabling the rapid globalization of industry and services in the previous decade, a strong potential and expectation for even more rapid growth has been created for the coming years. There was a growing realization in the organization that in the face of increasing geographic dispersion, technological flux, and functional specialization, there would be significant difficulties in sustaining its competitiveness, high growth, and market leadership in the absence of strong practices to formally manage its knowledge supply chain. Accordingly, the top management of the company assigned to its education and research group (E&R) the responsibility for developing KM as a formal initiative.

STRATEGIES USED

The strategy used for KM deployment was on a top-down basis. Infosys started its KM initiative in 1999 by locating the KM team in the education and research department, outside the mainline business units. This choice naturally disempowered the team, since it was now clearly only a part of a support function. However, to compensate for its lack of sufficient power to enforce changes in the organization, the management bolstered the KM team by giving it a high-level steering committee that included many members of the board of directors and several other heads of business units.

The deployment of KM solutions in Infosys was made easier by an environment of continuous learning and knowledge exchange that had been consciously developed over the years by top management. With the average age of employees being only around 24 years at the time, the willingness to experiment with new ideas as well as the degree of volunteerism for participation was quite high, especially among the large number of software developers in the organization.

IMPLEMENTATION STEPS

The KM solution was built entirely in-house using run-of-the-mill software products. Over the years, specialized KM products have been considered for various functionalities, including suites from a single vendor with comprehensive KM solutions. Invariably, products have never been able to meet all the requirements, and in-house modules have had to be developed to meet these needs. A key requirement that has often tilted the decision towards in-house solutions is the need to integrate the KM solution with the large number of enterprise information systems that implement most of the business processes in the company.

The Infosys KM solution has four primary elements:

- 1. The KM portal: a central repository for content.
- 2. The People Knowledge Map: a directory service for locating experts.
- 3. The Knowledge Exchange: a set of online discussion forums.
- 4. K-Mail: an auto-response generator and work flow engine for answering questions.

The overall architecture of the KM solution at Infosys is shown in Figure 1. It is built around a central KM portal. The portal acts as the central repository for managed content and as a point of aggregation for content residing in local sites, called satellite repositories, that let departments and other communities manage their content locally. A piece of knowledge published on the portal is called a knowledge asset (K-Asset for short). Every K-Asset conforms to the metadata schema, which includes classification under one of several content types and into one or more K-nodes in the corporate taxonomy.



Figure 1. System Architecture of the Infosys Solution

The People Knowledge Map (P-knowledge management) is a yellow pages-type directory of who is an expert in what areas in the company, often called an Expertise Locator. Listing in this directory is voluntary and implies a commitment by the expert to share knowledge with others in the company. However, recently entries in P-knowledge management are being populated automatically by pulling data from the enterprise skill database.

For each expert, P-knowledge management identifies the K-nodes in the taxonomy about which the expert has knowledge and also carries the level of expertise and the expert's own comments about his expertise in the area. Each expert also has an aggregate rating score that can be used to rank multiple matches when a user queries P-knowledge management.

P-knowledge management is fundamentally different from an employee database or a telephone directory in that it can be searched in terms of knowledge areas. A person who needs knowledge but does not know whom to ask within the large company can easily identify the right person by using P-knowledge management. He can pinpoint a few experts anywhere in the

company who are likely to provide the right knowledge to satisfy his need. In other words, users can obtain information about the right people even if they know only the type of knowledge they are seeking. To use an employee database or a telephone directory, one must already have some information about the person one is looking for.

The Knowledge Exchange is a set of online discussion forums accessible either through the KM portal or directly in everyone's email client, organized hierarchically based on the corporate taxonomy. Each forum serves two main purposes: it provides a platform for anyone in the company to ask a question and get answers from any one of a large number of employees who are interested in the topic, and it serves as a medium for discussions, collaboration, and nurturing of knowledge in a given area. Most forums also have an anchor who has volunteered to monitor the discussion forums are very much a part of the Infosys culture, where people use a similar set of forums for personal, social, recreational, and other "extra-curricular" discussions.

Processes

A few of the KM processes in operation at Infosys are outlined here to illustrate the kind of processes that are typical of a KM solution.

Publication Process

Each K-asset that is submitted to the repository undergoes a publication process that checks for compliance with the metadata schema, intellectual property rights requirements, and minimum readability standards. Only assets that meet these criteria are published with an initial default score in the quality ranking system. The process includes a workflow for contacting the author in cases where the content is not uploaded properly to the portal and for notifying the author upon publication. The process carries with it a service level agreement (SLA) from the KM team to publish the asset within a specified number of business days. The publication process also carries workflow branches for handling rejected assets, for revising submitted or published assets in minor ways, and for publishing a major revision of a published asset as a new version.

Review Process

Assets of most content types published on the central KM portal undergo a review process to ascribe a proper quality rating to the asset. The KM team, with the help of a taxonomy-based application, selects reviewers whose expertise matches the asset and initiates a workflow requesting them to review the asset. The workflow handles any necessary communications between the authors and the reviewers, with a content editor from the KM team acting as a coordinator. Each reviewer assigns a rating to the asset, which gets aggregated to determine its composite quality score. Reviewers also provide both publicly visible comments on the asset and comments sent privately to the authors.

Rating Process

Any employee may rate any asset published on the KM portal. The rating process collects and aggregates the ratings once a day to update the composite rating of assets. Other factors, such as the frequency and regency of use of the asset, are also taken into account in the composite rating. Users may revise their ratings at any time. When the rating of an asset falls below a certain level for its content type, it becomes a candidate for retirement, at which time it may be removed from the KM repository and archived.

The primary difference between the review and the rating processes lies in who does the assessment. A person who was selected as an expert in the area does a review, whereas any user

can rate an asset. Also, the review process runs only once, at the time the asset is published, while the rating process runs throughout the published life of the asset.

Subscription and Personalization Process

Any user can create one or more subscriptions to personalize the content they see on the KM portal. Subscriptions can also be used to receive notifications from the portal about the addition of new content relevant to the subscribed areas. The subscription process matches the metadata of published assets against subscription data and, using the composite scores of assets, selects a specified number of top-ranking assets most relevant to the subscription. The content that a user sees on the KM portal changes on a daily basis due to new publications as well as changes in the rankings of already published assets that result from new ratings contributed by users.

Reward Process

The reward process comes into play periodically (about once a quarter) to select employees with the highest composite scores in a particular unit. Incentives and awards are presented to the selected employees to promote KM. Another version of the reward process selects employees who have crossed certain milestones in their scores and rewards them appropriately.

Milestones and Measures

- First Indian company to win the Global MAKE Award, Hat-trick in 2005.
- Only Indian company in the MAKE HALL of FAME.
- Only Indian company to win the MAKE Asia Award every year since the inception of the awards in 2002.

Changes, Customization and Adaptation

Knowledge management at Infosys is administered by a small central team and a wide network of KM promoters spread across the company. The central team is headed by a principal knowledge manager and consists of three groups headed by a KM technology manager, a brand manager, and a KM operations manager. The technology manager is responsible for the design, development, procurement, and running of various KM systems. The brand manager is responsible for KM promotion, while the operations manager is responsible for content management (including the publication, review, and rating processes carried out by content editors), measurements, taxonomy management, and all other processes that constitute KM operations. The central team is guided by a KM steering committee of several directors and heads of business units. The principal knowledge manager reports both to the steering committee and the head of the education and research department.

The network of KM promoters includes a KM sponsor in each major unit who oversees the direction of the KM program in that unit. A group of KM patrons who are senior managers take ownership of the KM operations in their units. A network of KM champions supports them. In addition, each project has a KM prime who looks after the individual's project involvements and the use of KM practices and resources. All of these roles are part-time assignments, since the assignees have regular roles in the mainline business processes. Tangential to the above network, each development center (DC) has a knowledge management DC champion who coordinates KM activities and issues in that location with the central KM team.

Problems Encountered and Corrective Actions Taken

A common problem in knowledge-sharing in a large organization is the load on wellknown experts: they tend to get too many requests and are unable to satisfy them all within the

time and energy available to them. A related problem is where people with knowledge needs, especially those who are relatively new to the organization, do not know whom to ask a question of and, given the convenience of email, tend to bombard a large number of experienced people through mailing lists, hoping that one of them will lend a helping hand. As a result, senior people often waste their time going through dozens of messages unrelated to their areas of expertise. Infosys has successfully solved this problem to a large extent by the K-Mail system, which tries to automatically respond to frequently asked questions (FAQs) by matching incoming questions to a repository of previously answered questions and answers. If there is no match or if the user is not happy with the automatic response, then K-Mail forwards the question to an appropriate set of experts and, through a workflow, follows up with them to get an answer back to the user. Separate instances of K-Mail with corresponding repositories have been deployed to serve different constituencies, keeping in mind the sensitive nature of some kinds of information and the consequent restrictions on its sharing.

CULTURAL CHANGES AND CULTURAL BARRIERS BEFORE AND AFTER IMPLEMENTATION

It was observed that the KM systems and processes were not used as frequently as desired by employees on a routine basis when compared to the culture of using emails. They needed to be educated, trained, and constantly motivated to make use of the KM systems and to contribute towards KM. While there is a great deal of hype about doing KM in an organization, there are also a lot of sceptics about its ability to deliver value, so that KM needs the support of senior management before it can even take off. The KM team needs to measure returns and demonstrate value in small steps to get significantly larger budgets that need to be spent on systems, processes, promotions, and specialized KM roles to deliver further value by managing knowledge. The lessons learned after the implementation of KM should be integrated into the mainline activities of the organization to reduce its cost in relation to the growth of the organization and to make KM invisible and implicit in terms of systems, processes, activities, and people.

SELECTION AND ADAPTATION OF TOOLS AND TECHNIQUES

In addition to the four main components discussed earlier, the KM solution at Infosys includes a number of KM tools:

- K-Agent—an intelligent assistant for authoring documents. It works in the background and automatically prompts the writer with content from the KM repositories related to what is being written.
- K-Classify—a tool for automatically classifying a submitted knowledge asset according to the corporate taxonomy. It extracts a vector of key terms from the asset and matches it to pre-compiled term vectors for K-nodes in the taxonomy to suggest a good classification.
- K-Desktop—an environment for preparing a document for submission to the repository as a knowledge asset. It engages the author in a dialogue to extract necessary metadata for submission.
- K-Enterprise—a business intelligence application for analyzing and viewing KM measurements. Using data warehousing and digital dashboard technologies, it analyses KM data and presents an interactive dashboard to top management who can see the knowledge landscape and dynamics of the organization on a daily basis.
- K-Mark—an enterprise repository through which people can share their intranet or Internet bookmarks (URLs with notes), classify them, and search and browse through

others' published bookmark collections. Users can find a set of websites for a topic that is most preferred by their fellow employees.

- K-Speak—an interactive voice response interface for querying the knowledge portal over the telephone. Especially useful for querying the P-knowledge management, it also sends documents by electronic mail (email) upon completion of the telephone call.
- K-Subscribe—an application for creating customized subscriptions to the knowledge portal to receive automatic notifications about new content relevant to one's interests. Users can choose the frequency and amount of content they wish to receive by electronic mail (email).
- K-Summarize—a tool for automatically generating a summary of a document or web page. It applies linguistic and statistical techniques to extract key sentences from a document to generate a summary.

Integration of KM with Other Existing Systems and Tools

An important requirement for any KM system is its integration at various levels with the enterprise information systems. At Infosys, at the data level, the KM database was designed following the same standards and conventions used for all enterprise databases, making it easier to integrate KM and enterprise data by way of daily data pumps to update enterprise data of employees and projects in the KM database. Knowledge management data relevant to the enterprise databases are also fed periodically through a data pump to the corporate database. It should be noted here that data integration was facilitated especially by the shared use of the same corporate taxonomy across different systems.

Integration at the system and interface levels was also made easier by the homogeneity of the technologies used in Infosys. The front layers of most enterprise systems are built as webbased applications using scripting languages. In such an environment, integration was done either on the server side at the script level, by calling the appropriate script pages, or on the client side, by providing appropriate hypertext links that users can navigate.

The KM portal has been integrated with enterprise systems such as the skills database (which is used for managing information about who has what skills, how they are updated through continued education and training, and how to optimize the allocation of personnel to projects and teams). Knowledge management is integrated with the project management application that is used for tracking the progress of all projects. Knowledge management has also recently been integrated with the proposal information system, through which it now offers several KM features: proposal authors are automatically prompted with prior customer proposals in related areas, users can subscribe to be notified about any new proposals that match their area of interest, and K-Assets from the KM portal that are relevant to a proposal under preparation are automatically retrieved and presented to users.

ENABLERS

The focus of KM is not on technology per se but on putting organizational change in place. Knowledge management uses technology only as an enabler. The value comes in the practices and processes that change the organizational culture and practices. The real value is derived from tapping into intellectual capital and in harnessing the experience of employees.

Even the best IT systems cannot deliver value to the organization until they can capture learning and share knowledge. To make KM effective, its applications should be tied to measurable business goals and linked to overall business strategy. A complete KM initiative not only identifies processes for sharing intellectual capital but also measures the results.

KNOWLEDGE PROCESSES

A few of the KM processes in operation at Infosys are outlined here to illustrate the kinds of processes typical of a KM solution.

Internal and External Sensing

Besides creating and recording internal knowledge, white papers, and a reusable code, the KM system affords infoscions access to external content like websites and technology and business news. Eighteen different types of contents have been identified. Every item in the content repository is associated with one or more nodes (representing areas of discourse) in a "knowledge hierarchy" and tagged to facilitate submission, classification, and retrieval. Currently, approximately a fifth of all infoscions have contributed at least one knowledge artifact to the central KM repository, and more than 1,000 knowledge artifacts get downloaded for serious use by users across the Infosys intranet universe every day. Recognizing that practice units would not have the time or the resources to repositorize domain- or technology-specific knowledge. Infosys created two internal consulting groups: the Domain Competency Group (DCG) and the Software Engineering and Technology Laboratories (SETLabs). The DCG covers industry dynamics and trends, key players, and regulatory and accounting practices. The SETLabs focus on developing technology competency and technology architecture and frameworks that can be used by project teams and business units. Infoscions in the SETLabs submit practice-oriented journals, such as those published by IEEE, an international association for electrical and electronics engineers, to publicize Infosys' capabilities and to explore emerging ideas that can be deployed within the company.

In addition, Infosys created three new business units to focus on the emerging e-business, ERP solutions, and telecommunications sectors. Also, Infosys created an engineering services group to offer engineering services focused on quantitative modelling. The primary objective of these business units is to sow the seeds for the emergence of new knowledge and competencies. Over time, people from these business units are moved around to other units, ultimately to transfer competencies. This is the thought process behind the organization. Besides these organizational initiatives, different geographical locations have units known as "proximity centers" that generate knowledge. Proximity centers ensure that Infosys has access to local knowledge even while operating globally.

Infosys' work with start-up companies provides access to the latest technologies. Minority investments in companies such as Cidra, a manufacturer of network components, represent another avenue for gaining access to emerging technologies. Infosys internalizes and institutionalizes the knowledge acquired from all these sources, thereby ensuring that they become more effective.

Creating or Capturing Knowledge: Corporate Taxonomy

All enterprise systems in Infosys with a need to classify documents, skills, training courses, discussion forums, projects, or other entities which either contain or represent knowledge share a common taxonomy with KM systems. The taxonomy is a set of hierarchies of knowledge areas known as K-nodes. Each K-node in effect represents all the knowledge in the company about a particular area. A K-node at a certain level in the hierarchy represents an aggregation of all the knowledge at or below itself in the taxonomy. Technically, each hierarchy in the taxonomy is directed to a cyclic graph, since a K-node can have multiple parents but cannot be part of a cyclic parent-child relationship. Figure 2 below shows a snapshot of the top portions of the Infosys taxonomy.

Organizing, Storing and Sharing Knowledge

Decentralized Architecture for Content Management and Promotion

Content management is done by having a set of satellite repositories affiliated with the central KM repository. Local groups manage satellite repositories. Similarly, the central KM team merely coordinates the KM promotion effort, while KM promoters in a large network across business units take on the responsibility for promotion in their respective teams.

Incremental Scope

The KM solution at Infosys was rolled out incrementally, first to a few research units and other support functions such as the Domain Competency Group, and then later to several technical groups in the service delivery units. Only after covering most of the technical community was the solution extended to cover the customer fronting groups such as sales and marketing.



Figure 2. Multi-dimensional Taxonomy for Knowledge Classification

Content First, Then Collaboration

The Infosys KM solution was initially all content-based. This strategy, based on the theory that ramping up sufficient content for the chosen target audience would make the rollout of the KM solution to that audience more successful, has worked very well. Only when the content-based solution had generated sufficient enthusiasm and support across the organization were other elements of the solution developed in order to support the collaboration.

Voluntary Participation

The KM solution has always maintained that the use of its systems and processes is voluntary, never forcing any employee to use the KM system. In the early stages, direct incentives were provided for those participating in KM. Every K-Asset submitted and every review or quality rating done was rewarded with points on a scale. The points would give recognition to contributors by ranking them and announcing the high scorers in the KM portal. Points could even be exchanged to obtain gifts from an online store. Later in its KM journey, Infosys changed the promotion schemes to focus more on awards and recognition rather than monetary rewards.

Recently, attempts have been made to transform voluntary participation into mandatory involvement by incorporating KM activities into selected business project processes.

Using Knowledge

Transfer of Knowledge

An ability to create knowledge is one thing; making sure that it is available to everyone is another. Facilitating the distribution process is a technology infrastructure—an Intranet portal called the K-Shop—that enables infoscions to access content and expertise from their desktops. This infrastructure fosters a culture of sharing through a variety of formal and informal means. As Mr. Mohan Sekhar, Vice President of Delivery (CENA), pointed out:

The corporate message is that all company knowledge is an asset that belongs to everyone in the company. The unwritten rule is that if you can help, you should. I can pick up the phone and ask anybody who is not in my business unit to help and he/she will. Within 24 hours, we can get information from anywhere in the world on projects that have been completed in the past.

Indeed, if a question is posted on an electronic bulletin board that is part of K-Shop, it is not surprising to get several responses from employees across the organization within three to five minutes. Despite content available at the desktops of each individual, many infoscions would prefer to listen rather than read. To facilitate knowledge transfer through listening, the KM group has created an application called the "expert locator" which allows infoscions to declare their specific expertise or "go public" so that colleagues may consult them when a need arises. Rotation among project groups and knowledge domains is another mechanism that ensures knowledge-sharing across the organization. In addition to transferring knowledge from one part of the organization to another, such rotation also provides infoscions with the opportunity to learn new technologies and skills.

To supplement knowledge transfer through rotation, the KM group has also instituted formal mechanisms for the sharing of best practices across the company. For instance, groups of business managers meet once every quarter in different cities to share problems, issues, and their solutions. Such groups also share service-based best practices during these quarterly meetings.

Reuse of Knowledge

Knowledge management was instituted to alleviate the time pressures infoscions faced by encouraging the reuse of knowledge already created. Ironically, these same time pressures have reduced the extent to which infoscions can access reusable knowledge that is available within the KM system. Most infoscions have preferred to develop solutions anew instead of spending time browsing through past solutions that may have to be refined to suit current contexts. Therefore, it is critical for Infosys to make its repository of knowledge relevant and to encourage reuse.

To address this issue, the KM group has shifted from an automatic repository-based approach to an integrated approach to maintain content quality and relevance. When content is submitted from a desktop, a number of volunteer reviewers offer comments. As such, the content's quality is managed. A central group of reviewers then streamlines, edits, sanitizes, and checks content for intellectual property (IP)-related issues. Finally, the content is given one of two labels: for internal or for external consumption.

In addition, the KM group has instituted a system-imposed demand to induce knowledge reuse. As Mr. Mahesh explains:

As part of the Capability Maturity Model (CMM) and ISO 9000 processes, we have regular audits. During the audit, we will ask any person who reports having reused knowledge-

specific questions how he or she has reused it. So no one can get away with just claiming to have reused knowledge a lot.

Infosys has created an internal criterion for tracking its KM progression. The knowledge maturity model (KMM) is a series of steps and aspirations that Infosys would like to accomplish. Level 1 of the KMM represents a default level where an organization does not have an integrated KM system in place. Subsequent levels capture a firm's ability to be:

- Reactive.
- Aware (data-driven decision-making).
- Convinced (ability to sense and respond proactively to changes in technology and business environments).
- Ready to share (shape technology and the business environment).

According to Infosys, as yet the company has not reached KMM Level 5 sharing, that is, they are not leveraging their accumulated knowledge enough.

Apparently, it is the people aspect, not the technology or the process aspects, that is an impediment to knowledge-sharing and reuse. Infosys' KM group is addressing this challenge by instituting various rewards, recognition and incentive programs. For instance, an incentive scheme has been instituted to encourage all infoscions to play an active role in the KM initiative. Specifically, infoscions can earn knowledge currency units (KCUs) for contributing, reviewing, or using the BOKs (body of knowledge) or other knowledge assets. Another form of KCU (called the composite KCUs) also serves as a means to assess content quality (as determined by the various attributes related to content usage and ratings by users across the organization) and to measure the effectiveness or benefits of the KM program.

TRACKING AND MEASURING RESULTS; ENSURING IMPACT ON PRODUCTIVITY AND INNOVATION

The concept of self-assessment by communities is a central ingredient in the systems developed to determine the quality of knowledge exchange at Infosys. Measurement systems were built around the quality system to provide various types of data on usage, utility, currency and benefits. A significant part of the KM promotion is based on periodic analyses of the data in the measurement systems.

LESSONS LEARNED

An environment of continuous learning and knowledge exchange must be consciously developed over a period of time. There must be a willingness by top management to experiment with new ideas in the deployment of KM solutions. The people aspect—not the technology or the process facets—should be encouraged for knowledge-sharing and reuse. Knowledge management should be integrated into the mainline activities of the organization to reduce its cost in relation to the growth of the organization. The company has to make KM central and implicit in its systems, processes, activities, and people. The KM tools in use at Infosys—K-Speak, K-Summarize, K-Subscribe, etc.—can facilitate reuse and transfer of knowledge within the organization. A considerable component of KM promotion is based on the cyclic examination of the data in the embedded measurement systems.

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COMPANY PROFILE

The institutional history of Bank Indonesia began with the promulgation of Act No. 11/ 1953, the Outline Law on Bank Indonesia, which came into force on 1 July 1953. In discharging its duties as the Central Bank of the Republic of Indonesia, the bank was managed by a monetary board, a board of directors, and an advisory board. The monetary board determines monetary policies, even though this responsibility rests with the government. At the beginning of the new order era, the operational basis of Bank Indonesia was modified through Act No. 13/ 1968 on the central bank of the Republic of Indonesia. Since then, Bank Indonesia has continued its function as the country's central bank and at the same time has assisted the government in national development efforts by implementing the policies that it has adopted with the help of the monetary board. The board thus no longer managed Bank Indonesia.

A new chapter in the history of Bank Indonesia as an independent central bank began when a new law, Act No. 23/1999 concerning Bank Indonesia, took effect on 17 May 1999. This law provides Bank Indonesia with the status and position of a state institution that is independent and free from the interference of the government or other parties. As an independent state institution, Bank Indonesia enjoys full autonomy in formulating and exercising its every duty and authority as provided for under the law. Outsiders cannot interfere with the bank's discharge of its duties; it is under obligation to reject or ignore any interference in whatever form from whichever party. In order to better ensure this independence, this law provides Bank Indonesia with a special position within the administrative structure of the Republic so that it can carry out its roles and functions as a monetary authority in a more effective and efficient way.

In its capacity as the central bank, Bank Indonesia has one objective: to achieve and maintain stability for the rupiah. The stability of the value of the rupiah has two aspects: its stability against goods and services and the stability of the exchange rate of the rupiah against other currencies. The first aspect is reflected in the rate of inflation and the second aspect by the fluctuations in the rupiah's exchange rate against other currencies. This objective is intended to establish a clear goal that can be achieved by Bank Indonesia within its limits and responsibilities. In this manner, whether Bank Indonesia achieves the objective can be easily measured.

In the pursuit of this objective, Bank Indonesia is supported by three pillars, representing its three sectors: formulating and implementing monetary policies, regulating and ensuring a smooth payment system, and regulating and supervising the national banking system. The three pillars must be integrated to ensure that the objective of achieving and maintaining a stable value for the rupiah can be attained.

In implementing its duties and responsibilities, Bank Indonesia is managed by its board of governors. The board is led by a governor, assisted by a senior deputy governor as the vice-governor, and by at least four but not more than seven deputy governors. As the bank's highest decision-making body, the board of governors meets at least once every month to deliberate and to decide on general policies for monetary affairs and at least once a week to evaluate policy implementation or to decide on other strategic and basic policies. The board's decision-making

¹ The author wishes to express his gratitude and acknowledgement for the assistance provided by Ms. Ria Sidabutar, Commissioner of Dunamis, in the preparation of this case study.

process makes use of consensus in order to reach an agreement. When the deliberations fail to reach a consensus, the governor exercises his authority to make the decision for the board.

The mission of Bank Indonesia is to achieve and maintain rupiah stability by maintaining monetary stability and by keeping the financial system on an even keel for Indonesia's long-term sustainable development. The bank's vision is to be recognized, domestically and internationally, as a credible central bank based on the strength of national values and the achievement of a low and stable inflation rate.

Its strategic values are competency, integrity, transparency, accountability, and cohesiveness. In order to realize its mission, vision, and strategic values, Bank Indonesia has spelled out the following medium- to long-term strategic objectives:

- 1. Maintain monetary stability.
- 2. Maintain the financial sustainability of Bank Indonesia.
- 3. Strengthen the effectiveness of monetary management.
- 4. Create a sound and effective banking system and ensure the stability of the financial system.
- 5. Maintain the security and effectiveness of the payment system.
- 6. Increase the effectiveness of the implementation of good governance.
- 7. Strengthen the organization and build a corps of highly competent human resources with the support of a knowledge-based work culture.
- 8. Integrate Bank Indonesia's transformation in line with its destiny statement of 2008.

ORGANIZATIONAL SETUP

Bank Indonesia has four sectors: the monetary sector, the banking sector, the payment system sector, and the internal management sector. The bank has 6,023 employees. Of these, 27 have a doctorate degree, 946 hold a master's degree, 2,746 hold a first degree from a college or university (the first tier of the Indonesian education system, which corresponds to a bachelor's degree), and 278 hold a diploma for an academic degree. The rest are high school graduates. They are distributed in 28 units of work (on a par with a directorate, a bureau, or a special unit) at the head office, at 37 Bank Indonesia branches (KBI) located throughout Indonesia, and at four representative offices (KPw) in Singapore, Japan, London, and New York. Each unit of work at the Jakarta head office is under the management of a head of bank Indonesia's Office (Pemimpin Bank Indonesia), while the representative offices are under the management of the management of the representative office chiefs (Kepala Kantor Perwakilan).

To discuss strategic issues and monitor the previous year's performance and to establish the performance targets for the following year and its achievement strategies, Bank Indonesia holds an annual meeting called a strategic forum. This forum is directly led by the bank governor and is attended by all the members of the board of governors and all the leaders of the work units.

KEY DRIVERS FOR THE ADOPTION OF KNOWLEDGE MANAGEMENT (KM)

Bank Indonesia, as a public institution, is not exempt from the stakeholders' demand for more transparency and accountability, especially since the financial and monetary crisis of 1997–98. Irrespective of the details of this event, the financial crisis tarnished the image of Bank Indonesia, which was considered by many to have shared responsibility for the crisis. One of the responses to the crisis was the issuance of Act No. 23/1999, ensuring independence for the bank. Neither the government nor any other party is allowed to interfere with the promulgation of policies adopted by the bank. Therefore, as a consequence of Act No. 23 taking effect in 1999,

there have been demands that Bank Indonesia be more transparent and accountable by implementing the principles of good corporate governance. Internally, efforts to improve its image were made by launching a transformation program in 2001 in various fields, including those concerned with internal financial management as well as those that relate to the management of other resources.

Given Bank Indonesia's position as a central bank, its main products are policies that are oriented towards the interests of the public as the stakeholders, and its decision-making processes, in addition to being transparent and accountable, must be supported by competent human resources. This can only be attained through individual development and process improvement supported by technology. Moreover, given the demands of its stakeholders, Bank Indonesia must also be able to always adapt internally to changes in the global environment, it must have intellectual capital, it must not reinvent the wheel, and it must prevent the loss of already possessed technology (knowledge walk-out).

As part of the transformation program launched at the Bank Indonesia strategic forum in 2002, a decision was made to apply knowledge management (KM) in its operational systems beginning in 2003. Knowledge is seen as a strategic asset that must be properly managed. The application of KM is aimed at transforming Bank Indonesia into a knowledge-based organization, which in turn will make having creative and innovative human resources a reality, thus making the decision-making process more efficient and effective.

The KM initiative was carried out by establishing a special unit (outside of the existing directorates) referred to as the special unit for information management (UKMI). UKMI's function is to take the KM initiative associated with the provision of information system support (enabler) and the creation of channels to support the implementation of learning and sharing activities.

STRATEGY USED AND REASONS WHY

There is always a unique method in the application of KM in an organization. Given that the focus of KM is truly on the human resources involved in it, various ways and means are used by an organization to change the mindset or behavior of the people involved in the process in order to motivate them to learn and share the knowledge that they have. Most important in KM is not only the empowerment of those involved but also the process of changing the paradigm of thinking of each individual.

The application of KM is a long process, so the strategy for the management of change with a middle-up-down approach is used at Bank Indonesia. Why was this particular approach chosen? Given the large number of employees at the Bank who are geographically spread throughout Indonesia, the support and vision from top management for the direction that the organization will take are very important. This explains why the top-down approach is necessary. At Bank Indonesia, the strategic directive from the board of governors is embodied in a strategic map used as part of implementation of the balanced score card. The KM Initiative is one of the strategic goals at the learning and growth layer (Strategic Goal No. 7).

However, inputs from the rank and file employees are also needed; this is the reason for the adoption of the bottom-up approach, which starts with the work units, the smallest units of the organization, to carry out the learning and sharing activities. Finally, middle management has an intermediary role to play: to harmonize the vision of top management with what is being done at the level of the units.

Under the middle-up-down approach, Bank Indonesia has:

 Formalized the KM initiative in the form of a project charter which shall be accounted for to the governor/senior deputy governor of the bank.

- Use of the participatory approach by involving employees in the process of change, assigning them a role and responsibility in the process; for example, the role of those in a leadership position as a role model, the role as a partner for change.
- Establish the goals to be achieved in a detailed and specific way that include duties and responsibilities and behavioral changes expected for each role.
- Maintain persuasive, two-way communication channels aimed at providing understanding and receiving inputs and views from those affected by the change with regard to the KM concept.
- Conduct training and development programs to fill in the gaps in required knowledge and skills with regard to the desired changes.
- Integrate the learning and sharing activities into the business process to make them part of the working process that employees are able to relate to in their daily life.
- Formalize the desired changes into the regulations and policies of Bank Indonesia so that these can become institutionalized and be implementable.

IMPLEMENTATION

Milestones and Measures

To achieve KM, three components are used: people, process, and technology. In order to change the behavior of employees and to make them willing to learn and share, an integrated human resource management scheme, a leadership that is able to set a good example to be followed, and activities that will enable each employee to always learn and share knowledge are needed. In addition, a working process that facilitates the transfer of tacit and explicit knowledge is also required, where the organization has a systematic process in obtaining, organizing, using, and maintaining assets of knowledge, including those created internally and those coming from external parties. The support of the infrastructure of an information system technology becomes very important to support the learning and sharing activities, particularly when it comes to the codification of knowledge. The three components are then brought together into a framework referred to as Bank Indonesia's way (Figure 1).



Figure 1. Knowledge Management: Bank Indonesia's Way

Of course, arriving at this was not an easy matter. Certain stages were necessary in its implementation:

The Year 2003

The initial implementation of the initiative was met with great resistance at all levels of the organization, as reflected in the questions: "What's in it for me?" "Has Bank Indonesia not used knowledge at work?" "What are the benefits when knowledge is managed?" Hundreds of similar questions came up when the initiative was launched and promoted among the workforce. Throughout that year, a communication campaign was conducted continuously at all levels of the organization, starting from the board of governors down to the rank-and-file employees. This campaign was conducted not only internally but also on a sharing and learning basis with other institutions that have applied KM.

A variety of symbols and icons were presented. To facilitate employees' understanding, a story-telling concept was introduced using the SPEKTRO figure (new perspective in innovation) and through the creation of a learning-and-sharing logo that looked like a gamma ray. Color was also used as a symbol of identity. White, black, and red were used.

A writing competition was also held to encourage innovations in the bank's business operation processes, under the name IMOVATION. This resulted in inputs and suggestions for the efficiency and effectiveness of the process, and many of them began to be implemented. It was also in this year that the partner of change concept was presented as a realization of the participatory approach.

The Year 2004

Realizing that there was a change in the mindset of its workforce, and without abandoning its regular program, ongoing since 2003, in 2004 Bank Indonesia made employee codification its focus, starting with the codification of training and development results, self-learning, and the results of other seminars. In this year key performance indicators for knowledge-sharing were used and the results of the codification were stored in knowledge LYNX. All employees who took part in the activities were obligated conduct sharing activities through face-to-face meetings at their respective work units and electronically through the knowledge LYNX.

Moreover, the Partners of Change program that was set up in the previous year was evaluated on the basis of reports submitted by the partners. Rewards were given to partners of change/ units of work that were considered successful in bringing about changes and activating learning and sharing activities in their respective workplaces. It was quite surprising to see that changes had taken place, learning and sharing activities had been carried out in all units of work, and there had even been cross-cultural translation. The SPEKTRO that was created had been adopted and adjusted to the local culture.

The Year 2005

Along with the implementation of the KM initiative, there was a need to establish a KM grand design that could be used as a basis, reference, and road map by the bank. Based on the results of the assessment and the discussions that took place, the KM vision of Bank Indonesia is defined as follows: "To efficiently use the knowledge that the organization has to enhance the quality of decision-making and competence at Bank Indonesia with the objective of producing transparent and accountable policies and prime operational service for the stakeholders."

Also in this year, the codification of the knowledge of the Bank's Begawan² was completed in the form of an electronic book under the title "begawanship." Those meeting the criteria for begawanship are former members of the bank's board of governors or senior personnel with certain specifications of knowledge entering the period of preparation for their retirement.

² "Begawan" or "sage" refers to retired or senior employees who are knowledgeable about rare or specific aspects of the Bank's operations.

Within a framework from which the bank's community of practice originates, Bank Indonesia holds an internal discussion in a relaxed atmosphere that takes up issues or topics associated with internal affairs. This particular program is called "*brosan-obrolan santai*" (Leisure Talk); it is routinely carried out every month, with resource persons coming from among members of the board of governors to directors. Each employee is allowed to participate in this activity without being subjected to duress. These talk sessions have become the employee's choice when conducting learning and sharing activities.

As part of the learning process and in line with the learning loop, starting in 2005, the partners of change activities were translated into three learning activities: the learning-before activity (peers' suggestions), the learning-during activity (program alignment with regard to activities within/during codification), and the learning-after activity (program evaluation). The loop goes from the evaluation performed during the learning-after activity back to the search for ideas or peers' suggestions during the learning-before activity. The learning-during activity is carried out using a "peer assistance" technique where a successful partner of change in implementation is involved in a discussion with less successful counterparts in order to share experiences and vice versa.

In particular, the learning-during activity is carried out on a face-to-face basis; partners of change are invited to discuss practical issues concerning the implementation of KM programs in their respective areas. The purpose of the learning-during activity is to stimulate learning through a dialogue and an analysis of activities that have been carried out. The objectives are: a) to contemplate lessons that have been learned and not to obtain a solution or to criticize; b) to carry out activities internally as soon as possible; c) to learn from either the success or the failure of other Bank Indonesia offices (both at the local level or at the directorate level at the head office), to avoid repeating the same mistake.

The Year 2006

After the learning and sharing behavior had been perceived as a need and been more widely adopted, the year 2006 focused more on high-level business processes, including the need for core knowledge in each process. Technology was also introduced into the main activity in the implementation of KM.

Bank Indonesia developed an electronic learning (e-learning) system for soft-skill modules related to the business operations of the Bank. Currently, the following modules have been developed:

- Time management.
- Creative thinking.
- Emotional management.
- Negotiation skills.
- · Working as a team.
- Communication skills.
- Central banking studies.
- Inflation.
- Logistics management of Bank Indonesia.

In addition to e-Learning, the Bank has also developed an enterprise content management system that had been previously developed at the directorate for economic and monetary policy research (DKM) and at the directorate for reserve management (DPD). This management system is referred to as knowledge share and in the coming years, this system will be implemented in all of the units of work so that the bank can finally have an integrated enterprise content management system.

Tracking and Measuring Results

In the Bank's five-year plan for the 2003–08 period, the year 2008 has been set as a milestone for the achievement of excellent performance; internal measurement of improvements in work processes has been ongoing. Externally, measurements have also been carried out since 2003 through a survey on the level of satisfaction of external stakeholders. To ensure objectivity, an independent external party conducts the evaluation. Thus far, the results indicate a rising trend in terms of satisfaction among the external stakeholders requested to rate the Bank's performance with regard to service. On a scale of 1 to 6, where 6 is the most satisfactory level, the latest figure is more than 4.

CHANGES, CUSTOMIZATION, AND ADAPTATION

For Bank Indonesia, introducing changes in the corporate culture and making such changes appreciated and accepted by those affected is an art rather than a science. It is believed that the initiative must come from the top: from the board of governors. The KM initiative at Bank Indonesia adopts a heart-to-heart approach to address the question of how to make the initiatives being implemented beneficial for and felt by the Bank's entire workforce in order to create an enabling environment and enthusiasm for learning and sharing activities.

Go Global But Think Locally

KM is a management approach that comes from outside the State of Indonesia. Adjustments must be made to local culture in order to make the entire workforce interested in and willing to use and participate in it. Examples include the creation of an expert system under the title of Begawanship, where employees who are about to retire are required to codify their knowledge. Other collaborative roles are referred to as Dr. Know and BroSan. The knowledge repository established caters to the needs of the staff; it is called knowledge-LYNX. This approach was considered to be more effective than one that purely copies the approach per se.

Dr. Miranda S. Goeltom, currently acting as the Senior Deputy Governor in charge of UKMI, has also been actively communicating the importance of learning and sharing activities to both internal and external stakeholders. This KM initiative stems from her personal experience. In 1997, when she first joined the bank, she was presented with some reports. As a former university lecturer, she was curious, and she inquired about the raw data upon which the report was based. To her dismay, she had to wait for a long time before obtaining the raw data. In the meantime, she entered into correspondence with her counterparts from other countries through email and learned that they were not familiar with such a problem. She envied the other central banks' way of managing data and knowledge so efficiently that appropriate reports could be promptly shared internally with those with the authority to inquire about them. For Dr. Goeltom, the culture of sharing is a necessity in each organization and should be a part of corporate life.

Currently, changes that have been taking place at Bank Indonesia have begun to be felt, even though they were not obvious at first. If the Bank were likened to a big ship previously standing still at sea, now it had started to move. In other words, learning and sharing have now been recognized as necessities.

Selection and Adaptation of Tools and Techniques

Knowledge LYNX is a repository of knowledge developed by the Bank as a result of key performance indicators for knowledge-sharing (Figure 2). Knowledge LYNX integrates all employee reports of those who have participated in the training and development seminar as well as in self-learning. Since its inception in 2004, knowledge LYNX has undergone several changes in accordance with the learning and sharing needs at Bank Indonesia. In addition to

serving as a repository for employee reports, it has other features such as Dr. Know, a function in which employees are able to ask a question of a person who is an expert on that issue, which in this case is defined as a member of the board of governors. Knowledge-sharing also includes online discussions (which are what the community of practice is about), reports on the implementation of the activities of partners of change, networks (for the networking needs of the Bank), and also employees' personal data. In line with the development of technology, a feature similar to Wikipedia (www.wikipedia.org) has been created and named Wiki-BI. Thus, each article uploaded by an individual can easily be added to by another individual. As a result, the knowledge contained in the article can always be expanded, updated, and referred to.



Figure 2. Knowledge Lynx

Integration of KM with Other Existing Systems and Tools

Implementing Knowledge Share

Knowledge Share has currently been implemented in DKM and DPD; process of work and working documents have been integrated into an enterprise content management system called Knowledge Share (Figure 3).

The benefits of implementing Knowledge Share are:

- Easy to use.
- Information available when needed.
- Enhanced customer relations.
- Reduction in costs.
- Reduction of redundant work.

Scope of Knowledge Share at DPD:

- e-Document.
- e-Process:
 - Decision-making process.
 - Reserve transaction.
 - Intervention.
 - Submission of reports for board of governors' meetings.
 - Counter-party evaluation.

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Figure 3. Knowledge Share

Scope of Knowledge Share at DKM:

- e-Document.
- e-Process:
 - Submission of reports for board of governors' meetings.
 - Research process.

The implementation of Knowledge Share is primarily applied to core directorates to enhance and shorten the working process and to make the results available to the board of governors. The implementation of the KM system will continue to be ongoing well into the coming years, and attempts have been made to broaden its implementation to include other bank functions such as the banking and payment system.

Enabler

Bank Indonesia has peculiar characteristics that made this KM initiative work: a specific structure and standard operating procedures as well as certain facilities to run these initiatives. Moreover, from the employees' point of view, there are many ways to describe the kind of people who work at Bank Indonesia. Dr. Goeltom opts for a performance-based approach to describe the character of an employee. A typical feature of a performing employee is consistent performance. The high quality of Bank Indonesia employees lies in their ability to complete the tasks given to them. This often eludes the perception of individuals even when they are working at Bank Indonesia. This quality is often hidden, quietly kept, as if it were not in existence. Implied in this is the untapped potential of the Bank's workforce. However, it is the bank's culture of always delivering results that makes this KM Initiative work four years after its inception.

Bank Indonesia is aware that the knowledge of the existence of good or best practices and specified knowledge alone is not enough. Their benefits are limited unless they are transferred and applied or put into practice.

WHAT IS BANK INDONESIA DOING?

- Sharing its experience and knowledge in KM implementation and concepts in particular with universities across the country under the catchword of BIDIK, an Indonesian abbreviation for the sharing of information in universities.
- Encouraging individuals who have been successful in applying KM to provide peer assistance.
- Learning new things regarding approaches adopted by other organizations.
- Extending the network of communities experienced in KM to national and international levels.

LESSONS LEARNED

As a large organization subjected to various levels of bureaucratic influence from the government of Indonesia, Bank Indonesia is confronted with some challenges in making itself into a knowledge-based organization. Even though there have been no major difficulties in terms of introducing information technology, some lessons that have been learned as far as human perspectives are concerned are presented below.

Inviting big elephants to dance is a significant challenge. As the country's central bank, Bank Indonesia is an organization with no competitor. This means that its employees live in a comfort zone, resistant to change. "Why must we change? This present situation is already so good and smooth. What is change for?"

"Teaching smart people to learn" is perhaps the most accurate phrase to describe the situation in Bank Indonesia. The quality of its human resources is high, and yet this is exactly the reason why it is difficult to ask these intelligent individuals to learn again. And finally, there is another factor that is often encountered in almost every organization: a lack of trust. Somehow this must be dealt with.

Lessons learned in implementing KM at Bank Indonesia are:

- Start small, not with a Big Bang.
- Have a clear vision.
- Have key performance indicators (you will not be able to manage if you are not able to measure).
- Have commitment from top leadership.
- Have a reward and recognition system.
- Reinforce learning and sharing activities and integrate them into the business process.

It has also been learned that KM is not a technology project. It is a "heart" project, for it is about how to find a place for your initiative everyone's heart and how to instill in everyone a spirit of learning and sharing activities. It justifies the belief that "In the end, it is too early to say that our implementation is a success story; we are embarked on a journey of knowledge management, reaching towards our destiny ..."

Andiral Purnomo National Expert, Indonesia

COMPANY PROFILE

PT¹ Unilever Indonesia, Tbk (UI) was founded on 5 December 1933, under the name Lever's Zeepfabrieken N.V. Today, UI is one of some 400 publicly-listed companies in Indonesia. By 2003, the company had sales of USD984 million, around 84% of which were home and personal care items such as soap powder, household cleaning products, hand soaps, and shampoos. Around 16% of sales were accounted for by food items such as tea, margarine, and ice cream. UI is ranked as the thirteenth-largest company in sales volume in Indonesia and the fourth-largest company in the Fast-Moving-Consumer-Goods (FMCG) sector. UI's products are available throughout the country, from Banda Aceh city at the westernmost tip to Jayapura city at the easternmost. About 95% of Indonesian families use at least one of UI's products.

For the five-year period beginning in 1999, 25% of UI's total pretax profits were retained and reinvested in local business activities. These funds represent an investment in UI's longterm future in the country, as well as an investment in Indonesia's long-term development, particularly in the manufacturing and distribution sectors.

UI's business structure consists of a core workforce of about 5,000 people and a well-established network of suppliers, distributors, and retailers. UI sets high standards in the treatment of its permanent employees. Pay and benefits are above what is required by law, positioning UI in the top quartile of Indonesian companies.

KEY DRIVERS FOR THE ADOPTION OF KM

UI has long recognized the value of their personnel. However, the economic crisis that hit Indonesia in 1997–98 affected both their business and the way they deal with people. Before the crisis, insufficient attention and efforts (including tools and processes) had been given to retaining and developing personnel. Many business processes, particularly in the human resources area, were considered effective in achieving this goal. However, when the crisis hit all industries in all economic sectors, UI was also affected. Changes in external factors could not be confronted with what had already been established. New approaches had to be sought. Innovative business processes, particularly in human resources management, were needed, as were new policies.

One of the important decisions was to appoint an experienced manager on the business side to lead the Learning Department (LD). Under this new leader, the LD's mission is to develop UI's people. New initiatives in the knowledge process had to be created. While the HR department is in charge of human resource management processes and the IT Department in charge of support services, including the knowledge portal, LD is in charge of developing people. All contribute towards the knowledge management process.

STRATEGY USED (TOP-DOWN/BOTTOM-UP) AND WHY

UI's vision is to be the first choice of customers, consumers, and the community. Its mission:

¹ PT (Perseroan Terbatas) means "corporation" in Bahasa Indonesia.

- To be the first and the best in its class in meeting the needs and aspirations of consumers.
- To be the closest in the market to the customers and suppliers.
- To remove non-value-added activities from all processes.
- To provide job satisfaction for all.
- To aim for lofty targets for profitable growth and secure above-average rewards for its employees and shareholders.
- To earn respect for its integrity and concern for the community and the environment.

In aiming for this vision, UI uses the strategy of people development through a learning organization. In years from 1998 to 2000, UI implemented the Unilever business excellence model (UBEM), designed to enable a management team within the company to assess progress towards business excellence with the learning and people development section, focusing on Knowledge Management (KM). Since then UI has continued its efforts to keep on track for a strategy of people development, particularly through the human resource balanced business plan.

In April 2000, UI introduced the Enterprise Award, a scheme to encourage innovative and enterprising projects designed to foster an enterprise culture and bring out the soul of a small company by encouraging entrepreneurial actions in all areas. In line with the KM concept, this will help shape an environment for the creation of new knowledge.

IMPLEMENTATION STEPS

UI translates the strategy into programs and initiatives in line with its values—focus on the customer, consumer and community, teamwork, integrity, making things happen, sharing the joy and excellence. In order to foster the sharing and learning culture in UI and to motivate UI's employees to share and contribute their knowledge/experience, UI launched a Learning Award in 2001 for all management (head office) staff and in 2002 for all employees company-wide. UI also developed an enterprise award scheme that underscores the fact that its key success depends on the degree of learning. The learning facilities have also been expanded to include the Mega Mendung Learning Center, e-Learning access to the Harvard Business School, Crestcom, etc.

UI began its journey to implement in-house coaching in 2004. The first approach was to nurture senior managers to become a coach in their respective departments. They were trained in workshops in comprehensive and relevant coaching techniques. Neeco, the dolphin, is used as the mascot of the UI coaching program. The dolphin has been chosen because it is seen as a wise creature with a willingness to help, guide, and share. The coaching method is used for developing people, and it also serves the purpose of being a KM enabler.

"Retrospect," launched in 2003, is a program to retrieve tacit knowledge from previous corporate projects as documented, disseminated, and applied by others. The write-ups are published on the Knowledge Club website, and a hard copy is distributed to those affected.

Delivering the best products and services to customers and consumers is done through a brand marketing planning (BMP) initiative. In 2003, UI introduced the 3C's (Consumer, Customer, and Community) connection program to their employees. They are encouraged to proactively listen to their consumers, customers, and the community to collect insights that can contribute to further product improvement. UI wants to be a part of the solution for any relevant issues. Their vision is to be the first choice of their customers, consumers, and the community, and it is their job to make this happen. The mandatory 3C's Program makes it possible, since the company can get closer to the market for more useful and insightful contributions.

In 2005 UI introduced the collaborative planning, forecasting, and replenishment (CPFR) program, with the purpose of improving its relationship with its trading partners through collaborative processes and shared information. The Key Performance Indictors (KPIs) of CPFR are:

- Forecast accuracy = actual sales vs. forecast.
- Order accuracy = order vs. forecast.
- Case fill = actual delivery vs. order.

UI is committed to creating an environment for collaborative knowledge-sharing. The learning department is the driving that enables this to happen. With an excellent strategy and application, knowledge-sharing becomes embedded in the company culture and in employee behavior. Everyone is participating, either as a contributor or a knowledge receiver. UI has different kinds of Communities of Practice (CoPs):

- K-Club shows—business sharing in the form of a talk show.
- (Group of learning and development GLAD—a sharing forum among the youth.
- Book Club sharing—some people read a book and share it with others; the outcome of the discussion is captured and documented in the K-Club site.
- Sharing of learning and discussions (SOLAR)—UI invites prominent leaders from outside the company to share their invaluable knowledge.
- A video cafe session is organized in a coffee shop where the participants watch a video on a specific topic followed by a facilitated discussion.
- A good idea is a medium to accommodate someone's brilliant idea for the company's benefit.
- Retrospect is the vehicle to make tacit knowledge become explicit.
- Cinemania—one gains new knowledge by watching a movie followed by a facilitated discussion.

A new feature of the K-Club online is the expertise locator, which enables an employee to effectively find an internal expert.

For the Enterprise Award, anyone in the company is welcome to join, as an individual or as a team. This is not just another "idea generation" scheme but, more importantly, it is about making things happen. The initiative can be based on a new or existing idea or it can act as a springboard to make things happen. The action does not have to be on a grand scale. Typical applications are a consumer test, an experiment on one brand or in one part of one factory, the acquisition of a new capability, a test on new channels, new alliances, etc. In principle, all opportunities to open paths to growth are welcome. All ideas must be tried and implemented before being nominated for the Award.

SELECTION AND ADAPTATION OF TOOLS AND TECHNIQUES

UI management adopts change smoothly and with full commitment. Thus, with the adoption of new techniques (coaching is one of them), it is relatively easy for the company to create a culture of knowledge-sharing. Every layer of the organization, including the company chair, shares and learns from the others.

In May 2006, the company launched the Trainee Journal, a learning journal for new hires that involves nurturing and coaching from their direct superior. Every mid-career recruit (MCR) in UI is guided by a mentor responsible for assisting the MCR in adapting to the new environment in a plan called the "buddy program."

The learning department recently launched a new integrated learning system portal called Planet Learning. Employees can now access required services and information on learningrelated matters (online course registration, learning events, Mega Mendung learning center, etc.)

The total productive maintenance (TPM) system is unique to the Japanese manufacturing system that has been adopted by UI as their way of work. TPM has been in use for 13 years; they

have reached the special awards level. TPM is a tool that employees can use as a guide to performing tasks with an institutional basis and to developing a more disciplined culture. The primary aim of TPM is to attain "zero accident," "zero breakdown," and "zero defect." TPM involves all company departments (production, engineering, quality, development, etc) within the framework of the eight pillars: autonomous maintenance (AM), planned maintenance (PM), quality maintenance (QM), focused improvement (FI), initial control and maintenance prevention (ICMP), safety, health, and environment (SHE), education and training (E&D) (TPM in the Office). The platform of all these pillars is the 5S's: *Seiri, Seiton, Seiso, Seikatsu*, and *Shitsuke*— a tool to ensure a bright and clean work place supportive of better performance from the employees. An audit is required to maintain the spirit of discipline of the 5S's.

One of the unique aspects in a TPM organization is the "circle," a group of shop floor employees with a leader. The members of this group come from the function area. Their goal is to be a communication channel to discuss anything related to their work areas with the members. During discussions pertaining to improvements in work routines, outputs are written down and formulated into valuable information that can be shared with others. Employees also hold regular meetings on a weekly basis to discuss the progress of TPM implementation in their circle and to share knowledge. Each circle has its own activity board located near its work area. The activity board is used to showcase the activities of the circle (AM step progress, outputs of the work area, minutes of the meeting, one-point lesson (OPL), frequency of breakdowns, planned maintenance schedule, etc). Each circle member works within the Plan-Do-Check-Action (PDCA) cycle for continuous improvement.

The Learning Award is a particularly useful tool for maximizing intellectual capital, designed to encourage employees to share their ideas, knowledge, skills, and experience. Those who have contributed are acknowledged during a prestigious event in the UI Rungkut Factory, where many in-house modules are available, prepared by and for workers. This initiative has resulted in an increase in factory productivity and efficiency and is acknowledged by the company through the Learning Awards for non-staff. The facilities of the Mega Mendung Learning Center are used as part of the strategy to provide a reliable medium for in-house training/brainstorming activities. At the end of last year, the company launched Planet Learning, an integrated learning system that provides better service for employee learning purposes. The Knowledge Club (K-Club) LIVE offers an interesting way to disseminate knowledge among employees. The Knowledge Club online captures organizational knowledge for future utilization. Other programs are also available, such as SOLAR, Good Idea, Book Club, etc.

INTEGRATING KM WITH EXISTING SYSTEMS AND TOOLS

The UI learning department relaunched its website—Learning Planet—in the UI intranet at the end of 2005, replacing the old one, responding to the employees' need for learning within the company. The main concept behind this website is a one-stop learning experience. Employees log in just once and can then browse and access all the information that might be of interest. The bottom line is to provide easy access to the site for all employees. Facilities such as learning events, with a direct link to the Knowledge Club and the Library Online, MyDevelopment and Learning Beyond are also available. The latter two provide more detailed information about the performance development plan (PDP), the Harvard Management Mentor, and the regional learning portals.

The portal's designs and features are current with recent trends and developments in IT applications. To date, 90% of UI's employees have browsed and used Planet Learning for their various learning needs.

Learning Vision:

• To provide unlimited learning opportunities for people to grow.

Learning Mission:

- To establish a learning organization through the continuous development of a learning culture.
- To provide learning programs for everyone in the company according to their learning needs.
- To develop learning staff capabilities to deliver high-quality service to customers and the business.
- To build an excellent learning infrastructure.
- To provide creative and effective learning facilitation to help people in the business deliver better results.

UI fosters a consistent, comprehensive deployment and utilization of its resources to achieve its short- as well as longer-term business plans. People are a major resource, and the company has the responsibility to maintain and improve the knowledge, skills, attitudes, experiences, and operational effectiveness of its employees at every level.

Everyone at UI is responsible for learning. Contrary to popular belief, learning is not the exclusive domain of the HR department, although it is always an important partner in formulating solutions to the company's learning needs. Learning initiatives may come from the CEO, the board of directors, the functional committees, category leaders and managers, or individual employees. Online nomination for training activities can be initiated by an employee, a direct superior, or the learning department.

Under the current system, managers are able to monitor and assistn in the development of subordinates via MySub-Ordinate. Employees' attitudes toward the website have been very positive, especially in the new application MyLearning. Here employees can register themselves, their superior, and the learning department, and they can also see their training history.

ENABLERS

UI has some enablers for its use: the culture, the HR system, the learning initiatives, the IT system, and even the business processes. UI has a reputation as a very successful company among all Unilever companies worldwide. This has been a positive contributor for any initiative taken in any company areas of concern, such as in the launching of the UBEM.

When the effort to become a learning organization began, all efforts were fully supported by management. Each member of the BOD was fully committed to attaining the goals of the company, including the aim of becoming a learning organization.

The initiatives in HR include, among other things, a reward system. For the learning initiatives, they include, among others, the IT system, the Knowledge Club, and other intranetbased facilities that have been developed and are widely used. The IT system facilitates not only the knowledge flow among employees but also online applications such as Siebel, Andromeda, consumer and market information, the transporter system, and consumer experience activation (CEA).

In the business processes, initiatives have taken the form of projects, such as collaborative planning, forecasting, and replenishing (CPFR), Project Journey, measuring customer satisfaction, Klab Sukses, a program for general trade wholesalers, and Project Lilis, partnering with shopkeepers. In addition, the company maintains a complete, comprehensive customer profile.

KNOWLEDGE PROCESSES

In 2004 UI embarked upon a journey to develop a generative coaching culture. The "generative model" was the guiding anchor in the process of initiating the "uplifting people en-

gagegment" program during the first 18 months. This was followed by "building growth leaders" in the next 18 months, launched for the following reasons:

- The findings from the Mojo Jojo survey on coaching showed that the greatest need was to build openness and trust between staff levels.
- The generative coaching model first addressed openness and trust, which are linked with the findings in the above survey.
- The generative coaching model also emphasized the critical link between coaching and the business benefits it brings. It works back from the business benefit to evolve a coaching model and thus becomes an integrated driver of business rather than just another people intervention program.
- The four levels of generative coaching allowed for a structured way to integrate coaching in a large organization like UI over a period of time.

Learning Award Processes

The Learning Award (LA) launched in May 2001 was for management staff only. LA is a program to encourage UI management staff to share their ideas, knowledge, skills, and experience with others, to reward and recognize people who are willing to contribute/facilitate in any learning activities, and to motivate coaching and cascading best practices and failures. UI implemented the Learning Award for the following reasons:

- UI wants people to participate passionately in learning activities.
- It is a very important initiative for promoting a learning culture in UI and, in time, building a learning organization.
- UI wants to preserve (tacit) knowledge to fuel future growth.

Coaching was implemented within the respective work areas, with a resulting increase in the number of best practices and failures shared and the number of trainers, coaches, facilitators, and other learning contributors in the company. The Learning Award rewarded only those activities (both oral and written) that focused on skill or knowledge transfer with an impact on the business. Consequently, activities that are not meant to improve skill or knowledge (such as "informational cascade" or "business process facilitation") are not included.

- Knowledge-Sharing—sharing information which adds value to an employee in terms of personal development; familiarity with a job process gained from experience. (Hence, merely explaining company initiatives/programs does not fall under this category)
- Skills—sharing expertise which directly enhances trainees' ability to perform their jobs well.

Only a transfer of knowledge and skills with other UI's employees or third-party employees who work for UI is rewarded. For facilitators whose inherent responsibility includes delivering training sessions, the score is downgraded one category. However, training sessions that are part of the job are not part of the scoring system of the Learning Awards.

1. Category A: The facilitator contributes during a full-day transfer of knowledge or skills or "What Went Wrong" (mistake-sharing) program. If a facilitator conducts two sessions or more in one day and the total number of hours is greater than four, the facilitator is eligible for a Category "A" reward. Otherwise, those sessions will be calculated as a Category "B" session. All "What Went Wrong" contributors are eligible for this category.

- 2. Category B: The facilitator contributes in a short session(s), up to half-day long, in one day.
- 3. Category C: The facilitator shares knowledge in a small group (a minimum of five participants with one-hour duration) from his/her department.
- 4. Submitting an article(s) about knowledge or skills to the Knowledge Club site will earn nine points. Articles submitted to the SUI will also be given nine points.
 - Points are calculated daily on time-spent basis (half or full day), not on a per-session basis.
 - When two people share at the same time, both get as many points as if they were working alone.
 - To improve continuously, they must learn after each activity so that they can carry lessons forward to the next time they carry out the same activity.

UI aims to improve continuously by introducing the Retrospect Project, a team meeting conducted after a project has been completed to develop lessons for future project teams. There are 14 learning steps:

1. Call the meeting.

The key to willingness

- Announced by or on behalf of the project leader.
- Intention expressed to develop lessons for a future team.
- Held as soon as the project ends.
- 2. Invite the right people.

The key to team sharing

- The project leader/manager is active in the inviting.
- Do not invite individuals from outside the project team, unless acceptable to the group.
- Great value: invite the new project team.
- 3. Appoint a facilitator.

The key to good sharing

- The facilitator was not closely involved in the project. "What we did" vs. "What should the next team do?"
- Outside the line management structure; not a performance assessment; not an audit. The project team should own the meeting and not the facilitator.
- 4. The right start.

The key to effective sharing

- Start with the project historical background, objectives, deliverables, and criteria for success.
- The project leader should introduce, followed by discussions for better understanding.
- 5. Revisit the plan for delivery.

The key to systematic learning

- Revisit the project plan, compare it with what actually happened, and identify what is "missing" from the plan.
- Participants can construct a flow chart, identifying what were the tasks, deliverables, and decision points.
- 6. Ask: "What went well?"

The key to start acknowledging

• "What were the successful steps towards achieving your objective?"

- "What went really well in the project?"
- "How do we repeat success?" or "If you were to do this again, what would you do to repeat success?"
- 7. Ask: "Why did these aspects go well?"

The key to start learning

- "What repeatable, successful process did you use?"
- "What would you advise future project teams to do, based on your success here?"
- "How can we ensure that future projects go just as well or even better?"
- 8. Ask: "What could have been done better?"

The key to start improving

- "What could have gone better?"
- "What were the aspects that stopped you from delivering even more?"
- "Would additional resources (if any) would make the project go better?"
- 9. Explore specific difficulties encountered.

The key to the next improvement

- "Given the information and knowledge that we had at the time, what could we have done better?"
- "Given the information and knowledge that we have now, what are we going to do differently under similar situations in the future, to ensure success?"
- "What would your advice be to future project teams, based on your experiences here?"

10. Uncover the special skills employed.

- The key to uncover hidden skills
- "Did you discover that you employed any special or specific skills for the project?"
- "What specific skills did you apply?"
- "Describe the situation in which you applied the new skill."
- "What was the impact of using these skills?"
- "Can we hear your suggestions regarding these skills? Development through training? Spread out the skill?"
- 11. Request participation feedback.

The key to self-rating

- Ask for a numerical rating for the project.
- Review results and processes separately (if necessary).
- 12. Summarizing the learning.

The key to acknowledgment

- Make a short summary of the learning from the meeting and call it "Lessons for the future team."
- Ask: "In your experience, how will learning be reinforced for a future project?"
- · Ask: "How does this learning experience relate to the organization's strategy?"

13. Publish the lessons learned in retrospect.

The key to translating tacit into explicit knowledge

- Publish the lessons learned from the team on the K-site.
- When necessary, conduct a SOLAR session regarding this lesson.
- 14. Give awards.

The key to starting the behavior

- Give the project team a good token soon after they accomplish the sharing session.
- The token should be so special that people will want to share more given the next chance.

TRACKING AND MEASURING RESULTS

Learning Award

The expected outcomes: people will start implementing coaching within their work areas, increasing the number of best practices and failures shared and increasing the number of trainers, coaches, facilitators, and other learning contributors in the company.

How Has It Been?

First launched in May 2001 for management staff only, the management scheme improved in 2002. The non-management Learning Award was launched in 2002, but few non-management staff were aware of the scheme, or, if they were aware of it, they did not dare to "show off" or simply did not know how to do it. Details of the mechanism (again) needed some more improvements.

The enthusiasm of the management staff was on the wane and needed to be re-energized. Both the management and the non-management schemes were improved in 2004 with more participation from the non-staff.

Why keep relaunching? To maintain people's interest in participating in learning activities, to make the leaders (and/or future leaders) feel that they are responsible for the development of their people, to start disseminating their knowledge to others, to transform UI into a learning organization where everybody shares and learns.

The benefits to the company are changes in behavior towards sharing, strengthening of a coaching culture, recognition of employees' achievements, development of personal competencies, and investment saving (2001–04).

The Learning Award was taken to the factory, and resulted in a new enthusiasm for learning, confidence in trainers to conduct sessions, new standards of module development, higher morale, pride and motivation, a climate of harmonious industrial relations, and the preservation of knowledge not captured previously.

LESSONS LEARNED

- Adoption of KM may be triggered by external or internal forces, or both.
- UI had used the word "knowledge" in daily life for many years. However, they were not familiar with the term "knowledge management" until it was brought out in the Indonesian MAKE Study in February 2005.
- Many initiatives in people development catering to knowledge-sharing and creation that were taken for granted in the past by UI and by other organizations were actually practices and initiatives of knowledge management.
- In the past, UI had only given lip service to the term "knowledge management." Over the past few years they have become a champion of KM in the country as they have advanced in undertaking initiatives for knowledge-sharing.

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COMPANY PROFILE

P.T. Wijaya Karya (WIKA) was originally owned by the Dutch during the period of colonization, at which time it was called "Vies." On 11 March 1960, it was renamed P.T. Wijaya Karya and is now known as WIKA. It began as a subcontractor under a well-known contractor, and then in the 1970s a deputy director put forward the idea of expanding into other areas of business in order to make the company grow. WIKA entered the business as a civil works contractor and also became a housing building contractor, thus initiating its involvement in the construction business. Today, WIKA maintains operations in water and energy, transportation infrastructure, heavy equipment, steel structure manufacturing, mechanical and electrical works for buildings, engineering, procurement, and construction and has subsidiaries in concrete, real estate, and trading.

In early 1998, WIKA had 1,422 employees. As a result of the economic crisis that hit Indonesia in 1997, the company streamlined its organization, reducing the number of employees to 850.

KEY DRIVERS FOR THE ADOPTION OF KM

But WIKA successfully turned the company into a flourishing business only a few years after that. Their capability has improved substantially. WIKA has evolved from a one-business entity—construction—into a multi-business conglomerate that can now tackle a project from design to finish. This growing capability provided WIKA with the confidence to explore other opportunities in the market.

By 2002, the company had reformulated its vision into "Becoming a notable company in the construction and engineering industry in Southeast Asia by 2010." Its mission: "Pioneering quality development in the construction industry and fully satisfying the demands of all interested parties." WIKA believes that its vision and mission will remain dreams if no effort is made to realize them.

In the same year, WIKA formed a preparation and implementation team of a business success model (TPPBSM). Headed by the general manager of the business and system development department, with 105 members drawn from all other departments, the team developed the WIKA STAR 2010, symbolizing the long-term objective of becoming one of the top ten construction companies in Southeast Asia by 2010.

But WIKA realized that the most effective way to meet the fierce competition in the environment head-on was to improve and maintain organizational competency. As a result, the group acknowledged that of the three value propositions—product leadership, customer intimacy, and operational excellence—a focus on achieving operational excellence was the best strategy. WIKA would have to become a learning organization to implement its business model, and the programs developed by the team were all directed towards this goal. In this endeavor, the team encountered the concept of knowledge management (KM). In 2004, the foundations of KM were put in place in the company. A year later, WIKA launched its program on becoming a learning organization, which included KM.

STRATEGY

By 2002, WIKA had several strategies in place designed to enable them to achieve their short- and long-term objectives. The five short-term strategies were: 1) revenues were to be among the top three in the country and among the top ten in Southeast Asia; 2) WIKA had to be a regional "player" in accordance with the changes in the market environment, i.e., ASEAN will become a free market by 2010; 3) WIKA must achieve the AAA rating of the Ministry of BUMN (State-Owned Companies); 4) an integrated HR management system must be put in place; 5) WIKA must improve the quality of its intangible assets, particularly its brand image.

As for becoming a learning organization, the strategy was to launch pilot projects before applying the initiative company-wide. Two divisions were chosen: the engineering and HR, for the following reasons, among others:

- To learn the aches and pains of launching new initiatives.
- To create the sample model.
- To create strategic early wins to heighten the acceptability rate.
- To create knowledge for later transfer to the other divisions.

In order to achieve the WIKA STAR 2010 objective, the company applied eight paradigms, formulated by the TPPBSM Team:

- Change is a necessity.
- The market is the basis for business development.
- Customers are the source of the employees' income.
- · Leadership drives operational excellence.
- Knowledge and competencies are core assets.
- Every activity must provide added value.
- Speed is essential.
- Technology drives productivity.

These new paradigms are important for employees, especially since the company is faced with fierce competition and more demanding clients.

The WIKA STAR 2010 program was developed using both the top-down and the bottomup approach. The team that designed the WIKA STAR also developed the WIKA Business Excellence Model using the balanced scorecard approach with the Scandia version. This was then used as a message board to monitor the key performance indicators.

WIKA had three plans for achieving its long-term goals. There was a need to improve company performance through operational excellence (Opex), chosen from among the three value propositions (operational excellence, customer intimacy, and product leadership). Opex will help WIKA achieve correct and appropriate business processes. This was also in line with the accepted level of cost, quality, and time that corresponds to the conditions and demands of the construction service world.

IMPLEMENTATION STEPS

To achieve WIKA STAR 2010, the company needed to have competent and motivated employees and leaders who could implement the achievement of both short- and long-term goals. But only limited human resources were available. WIKA had grown by more than 20%, human resources by only 5%. To address this gap, WIKA had to develop HR efforts that would match the company's growth.
A second challenge was financial. Only about 10% of earnings were retained; the rest was distributed among the shareholders. To achieve its IDR10 trillion target, WIKA needed to find investor partners for new projects.

To become a learning organization, the company decided to embark on the following development programs:

- Engineering competency through an innovation system.
- KM system and operational excellence.
- Brand equity through the application of a competency-based human asset management system (CBHAMS[®]).

The KM implementation plan was broken down into short-term and long-term steps. It included the KM branding strategy and programs and its communication program. The KM focus of the company for 2006 was knowledge-sharing, with the motto "Sharing Everyday." This was combined with current and proposed future programs to make knowledge-sharing part of the company culture.

HR developments and core competency identification are done structurally and systematically. On the organizational level, one of the outputs of CBHAMS® is a learning organization. This is done through a group structure, including knowledge-sharing and the coaching, mentoring, and counseling (cMc) program.

At the personal level, learning motivation and ability are achieved. The CBHAMS initiative is knowledge-oriented and has integrated the vision, mission, values and the objectives of the company. So far, with CBHAMS, the competency model and competency profiles for each job have been prepared to cover both the soft and the hard ones.

The structure of the organization has been overhauled to include KM, as incumbents at managerial levels have KM functions and roles. This is done to facilitate the holding of KM activities.

The post of KM Manager is held ex-officio by the GM of System and Business Development, supported by the GM of HR in the personnel aspect. GMs from other divisions, such as marketing and engineering, act as KM Coordinators.

At WIKA, the corporate culture developed since 1993 consists of five beliefs, seven values, and 64 behavioral patterns. The values of the company, with the acronym of CIBERTI, are:

- Commitment: keeping promises.
- Innovation: always looking for the better option.
- Balance: aeeping all aspects balanced.
- Excellence: producing better results.
- Relationship: maintaining good relationships with all parties.
- Teamwork: creating synergy both among team members and between teams.
- Integrity: cohesiveness and sincerity, which includes fairness, accountability, integrity, transparency and honesty.

Recognizing that knowledge and competency are company assets, these new paradigms have become the guidelines for all employees. They are placed into programs within the KM Budget Plan.

WIKA has eight business strategies:

- Adopting operational excellence to attain the goal of achieving the position of market leader.
- Gaining international recognition.
- Obtaining privatization of subsidiaries and WIKA.

- Improving financial returns.
- Applying a modern management system.
- Transforming Human Resources Management into Human Assets Management.
- Applying the Knowledge Management System.
- Applying Brand Value Chain Management.

From the eight main strategies, eighteen grand policies evolved that later produced 59 generic programs. To measure purpose against program implementation, 21 key performance indicators were prepared to measure WIKA achievements company-wide; 23 indicators were established for divisions and 19 for project-level activities. Using BSC, each work unit was measured not only from the financial aspect, but also internally in terms of service and HR.

During 2004–07, WIKA undertook the following steps:

2004: Establishing the KM foundations.

- 2005: Officially launching the learning organization program, which includes KM.
- 2006: Applying the WIKA balanced scorecard.
- 2007: Applying personal KPI, which includes individual contributions and willingness to utilize knowledge.

SELECTION AND ADAPTATION OF TOOLS AND TECHNIQUES

In 2006, WIKA used the balanced scorecard with some modifications. While the original BSC used four elements, the WIKA scorecard has five: finance, external, internal, people, and innovation. This is in line with the Scandia experience/method.

A company-wide knowledge system is defined within the WIKA-Business architecture that integrates three aspects:

- Business strategy WIKA Star 2010.
- WIKA knowledge management.
- WIKA scorecard and management system.

The basic principle that WIKA applies is to use the knowledge-based system on the company's human resources. In this way, the IT then serves only as an enabler. The system for the management function is already integrated with KM, that is, through the context diagram as specified by ISO 9001:2000, Occupational Health and Safety Management System. This means that every activity in each function area will manage the knowledge which is integrated within the WIKA KMS.

INTEGRATION OF KM WITH OTHER EXISTING SYSTEMS AND TOOLS

WIKA uses the following tools:

1. WIKA scorecard.

In addition to the financial aspects, the following are also covered:

- External: customer satisfaction, stakeholder satisfaction, competitiveness and market portfolio.
- Internal: quality, safety, 5R.
- People: competence, performance, and satisfaction.
- Innovation: engineering method, business development and intellectual property rights.
- 2. Pefindo Rating (an Indonesian rating system prepared by Pefindo).

3. MBCFPE, where WIKA won an Indonesia Quality Award in the Good Performance Company category in 2005.

The board of management and all other senior management members have shown their commitment to implementing the learning organization plan by developing the core competencies needed through CBHAMS and developing engineering through innovations. All of these are done in the spirit and system of KM. This commitment is also demonstrated by:

- 1. Preparing a long-term plan and launching the new values and paradigms which define KM as an important factor in achieving the long-term success of the company.
- 2. Joining the "Begawan" profile (two of the BOM members have done so). A begawan is a mature, experienced member of a company, a member of senior management or a professional. The begawan program is intended to facilitate the transfer of tacit knowledge into explicit knowledge (recorded voice, book-writing, etc.).
- 3. Being involved in many activities: preparation of the long-term plan and the annual work and budget plan, management review, site visits, learning organization programs, attending knowledge-sharing, and acknowledging and rewarding the performing employees and work units.
- 4. Being involved in KM launching.
- 5. Deciding on the use of the WIKA Scorecard, which uses knowledge acquisition through innovation as the measurement tool, as a strategic parameter (KPI) to measure the performance of the company. The WIKA scorecard is applied company-wide, in all divisions and projects. KPI is further instilled in each employee through the work agreement and performance management.

Training and development of knowledge leaders are based on the principles of CBHAMS. The plans are incorporated in the annual work and budget plan company-wide, division-wide, and project-wide. The purpose of training is to introduce KM. This is also the basis for changing employee mindset to increase innovative capability.

ENABLERS

Information technology is one of the enablers WIKA uses. By 2004, IT was developed to facilitate the knowledge flow through communication channels. WIKA puts a great deal of effort into building its culture, including supporting KM, innovation, and a learning organization. For KM, WIKA rewards and acknowledges its outstanding work units and knowledge leaders in many ways:

- 1. The Adi Prestasi Award: given to work units that have shown good overall performance in increasing margin, quality, innovation, safety, and delivery.
- 2. The Adi Kualita Award: given to work units that have turned in quality performance.
- 3. The Adi Komersial Award: given to work units that have shown a strong commercial sense and have contributed to the company's incremental profits.
- 4. The Innovation Award: given to any individual or work unit that has made some innovations, either in the form of a better finished product or an improved system or a positive contribution to the company image.
- 5. The Safety Award: given to those work units who carry out their work safely and very satisfactorily.
- 6. The 5S's Award: for work units that have been successful in applying the 5S's.
- 7. The Knowledge Award: goes to individuals or work units that have contributed benefits to the company and individuals with their knowledge-sharing.

- 8. The Engineering Award: given to individuals or work units for their performance in engineering and their contribution towards incremental increase of added value.
- 9. The Partner Recognition: to recognize business partners of WIKA for their cooperation and support in accomplishing tasks with WIKA.
- 10. The Inspirator Award: anybody in WIKA who makes a breakthrough and inspires others in achieving excellence in work will receive the Inspirator Award.

All of the ten awards and recognitions have been created with the idea of "sharing knowledge." Four are directly related to KM—the Innovation Award, the Engineering Award, the Knowledge Award, and the Inspirator Award. These awards are given during the WIKA anniversary celebrations. For any Project Manager who receives the Inspirator Award, the award is given during the annual gathering of PMs.

KNOWLEDGE PROCESSES

Learning is carried out using various methods, from classroom programs to out-of-class/ outdoor programs, online and offline. The out-of-class method is for problem-solving (included in the quality control circle), experiments with new approaches (engineering with design and work methods), learning from past experiences (LPS sharing), learning from best practices (Engineering Forum, K3 Sharing), and knowledge transfer or information dissemination companywide via the KM-online and the mailing list. Included within the KM-online is an e-library unifying all department libraries, including standard operating procedures, job instructions, policies, etc.

Innovation is a main performance parameter within the WIKA scorecard, from companywide initiatives down to the division level and the project level. Every quarter (three months), the board of management, divisional heads, and project managers review their respective work units according to the WIKA scorecard on financial, external, internal, personnel, and innovation aspects.

WIKA encourages its clients and suppliers in knowledge acquisition and usage through the following process:

- Contract Review: This is done with clients to develop an alternative design or construction method. This contract review with suppliers gives WIKA an opportunity to acquire the supplier's knowledge, which can leverage WIKA's own knowledge for value creation back to its clients. WIKA has been a pioneer in many projects and is well known for its world-quality techniques and technology.
- Client satisfaction evaluation is done throughout the project process. A WIKA client satisfaction survey is done in parallel with the coordination meeting when the project has achieved 40% completion and again when it achieves 70% completion. A survey on the clients' perception of how the work was done is undertaken annually by an independent institution. The results are then used by WIKA for its improvement program.

Organizational knowledge improvement and enhancement:

1. External

External benchmarking is done locally and internationally. Domestically, WIKA has done benchmarking studies with Regional Division II and Regional Division VII of PT Telekomunikasi Indonesia. Internationally, WIKA has undertaken benchmarking efforts with some companies in Malaysia, the Philippines, and Japan. In addition, WIKA also collaborates with universities (such as the Bandung Institute of Technology, the University of Indonesia, and the University of Gajah Mada), consultancy companies (such as the PPM Institute and Dunamis), and other professional bodies in improving their knowledge. Aside from acquiring knowledge, the cooperation and collaboration help WIKA with the implementation of projects.

- 2. Internal
 - Setting up Communities of Practice.
 - Involving Begawans (the well-seasoned executives/staff members/engineers) in specific projects.
 - Conducting knowledge-sharing, either online or offline, particularly those of the WIKA center of excellence such the Power Plant. In knowledge-sharing, the process of project implementation and the lessons learned from it are shared.
 - Conducting the externalization process (from tacit to explicit knowledge) for the innovations arising from the projects.
 - Documenting the standard book of "concrete."
 - Implementing KM-online as a facility for knowledge acquisition, repository and distribution.
 - Conducting cMc (coaching, mentoring, and counselling) programs.
 - Task force.
 - Internal benchmarking (interdivision/projects/subsidiaries).

Knowledge and idea transfers, up to the "point of action," are done through several mechanisms:

- Clinics, routinely done by the quality and safety team.
- Begawan Program, involving all the Begawans in special projects.
- Sharing of lessons learned from finished projects, so as not to reinvent the wheel and not to repeat the same mistakes and to improve on the next project.
- Engineering forum.
- Survey on client satisfaction and perception.
- Value analysis/value engineering.

Through the above mechanisms, knowledge resources can be transferred easily and rapidly to the users.

A special recognition for employees who have come up with innovations is given annually in the form of an Innovation Award. This recognition has rapidly increased the number of innovative works as more employees participate in the innovation competition. The value creation process is based on the requirements of the MBCfPE (Malcolm Baldrige Criteria for Performance Excellence). The MBCfPE is, for WIKA, a combination of ISO 9001:2000, OHSAS 18001:1999, and the knowledge management system.

In order to become a learning organization, WIKA enhances knowledge transfer among individuals or between groups. The transfer also includes the company-wide process to further improve on the knowledge assets.

The training of employees on the concept and the mechanics of intellectual capital is done through:

- 1. Training and educational programs, such as the training program on MBCfPE and BSC that stress the need for intellectual capital management, not only on the financial aspect.
- 2. Benchmarking programs.
- 3. Participation by management, such as during the evaluation of the long-term plan, annual plan, management review, project visits, and during sharing sessions.

Knowledge resources in the entire organization are mapped out within the context diagram of each function. All these are managed within the database management system. Mapping of data resources is done using the LPJK pattern with the SBU division and knowledge mapping. From the HR point of view, the mapping facilitates resources mapping identification within WIKA.

Knowledge conversion—the transition from individual tacit knowledge into organizational knowledge—is done through the Begawan/Seniorship program, book-writing (innovation performance, *menuju bintang*/toward the stars, concrete standardization, engineering journal), LPS sharing, and other knowledge-sharing activities.

A systematic mechanism in knowledge-sharing takes the form of structured programs, either online or offline. For external parties, knowledge-sharing is done offline. Knowledge management at WIKA that is done online started with identifying the knowledge resources, from internal as well as external entities (such as customers and suppliers).

Only WIKA employees have access to KM-online (KM Portal). Knowledge-sharing from and to external parties is done offline, for example, in the sharing sessions. Information or knowledge being shared can be uploaded according to the knowledge category—benchmarking, best practice, innovation, project data, work methods, and so on. After being approved by each knowledge coordinator, the information/knowledge can then be retrieved by WIKA employees. This mechanism is contained in KM-online and the related programs process flow. The technology platform being used within KM-online is supported by DBMS.

Collaboration to accelerate the learning process is accomplished through external and internal cooperation efforts:

1. Externally

- Cooperation with suppliers and clients in the process of acquiring contracts and the process of the construction work, such as the work method for a continuous slip form.
- Cooperation with consultants, educational institutions, or other professional organizations. WIKA has MOUs with the University of Gajah Mada, ITB (Bandung Institute of Technology), DMC Singapore.
- Joint operation with competing companies in analyzing some construction work, such as TPPI Tuban Project conducted by WIKA and AK.
- Becoming a subcontractor for a world-class contractor, such as Mitsubishi for the CCPP Project at Cilegon, West Java (now Banten).
- Inviting benchmarked companies such as Dupont, Total Bangun Persada, and IKPT to come to WIKA for knowledge-sharing.
- 2. Internally
 - Mentoring program for new recruits.
 - cMc program.
 - Forming multidiscipline task forces, including CoPs.
 - Involving in-house experts, including retired, experienced staff, in acquiring contracts and construction works.
 - Buddy system.
 - Sharing sessions: LPS sharing, forum engineering, forum quality, and safety.
 - Sharing among current employees.
 - KM-online.

Converting individual tacit knowledge into organizational explicit knowledge is accomplished by:

- 1. Designing the procedures: safety plan, quality plan, work instructions, work methods. These documents are then uploaded into KM-online for easy access by all the employees in the company.
- 2. Documenting innovations.
- 3. Documenting knowledge on concrete technology.
- 4. Writing the book *Menuju Bintang* (Toward the Stars)—WIKA strategies to expand the market without leaving the core business. To enrich the content of this book-writing project, all senior management members, active and retired, were interviewed.
- 5. Disseminating knowledge through the in-house WIKA magazine *Media Warta* and the *Engineering Bulletin*.
- 6. Recording all the minutes of meetings and the follow-up actions, as required by the ISO 9001:2000 System.

Learning from doing/application is done through:

- 1. Applying the Neuro Linguistic Program (NLP) to develop the soft competency of employees to facilitate employee experiential learning to eventually develop a good leadership style. This training is aimed at strengthening leadership regeneration to enable WIKA to move into the future. It has been done for 141 people (breakthrough), 200 people for Corporate Care, and 223 people for Corporate Awareness.
- 2. On-the-job training and mentoring for new recruits.
- 3. Rotation program.
- 4. cMc Program: every superior acts as an HR Partner for subordinates and supports them in self-development. As many as 249 managers have been trained in cMc techniques. The MBTI (Myers Briggs Type Indicator) techniques are also included in the training curricula. MBTI enriches the managers' understanding of their people.

TRACKING AND MEASURING RESULTS

Ensuring an impact on productivity and innovation:

- The amount of sharing has increased from year to year, from 97 in 2005 to almost 200 in 2006. This is stored in their knowledge repository.
- The number of innovations.
- The amount of available knowledge.

The measurement tools:

- 1. WIKA scorecard, which covers financial and other aspects:
 - External: customer satisfaction, stakeholder satisfaction, competitiveness, and market portfolio.
 - Internal: quality, safety, 5R.
 - People: competence, performance, and satisfaction.
 - Innovation: engineering methods, business development and intellectual property rights.
- 2. Rating Pefindo.
- 3. MBCFPE, where WIKA won an Indonesia Quality Award in the Good Performance Company category in 2005.

LESSONS LEARNED

Information contained in a database is meaningless until it is used. This means that KM is not the same as IT. As information is dependent on people who use it before it can become knowledge, so KM is in regards to people. In order to succeed in KM, the process must be approached from the people aspect and not from the IT angle, as shown by experience. This approach is carried out through communications. An example is branding with the use of the star. The purpose is to encourage people to want to share their knowledge and to utilize it. People become more open and are more willing to share. They learn not only from best practices but also from failures. It becomes a matter of how one can be an inspiration for other work units. People work competitively with each other and share the feeling of "What have we achieved?" This still demonstrates an attitude of wanting to excel, seen as deemed positive by management because it boosts innovations.

For 2007, the plan is to focus on the functions that are essential to the value process:

- Marketing.
- Engineering.
- Contract administration.
- Procurement.
- Construction.

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INTRODUCTION

Samsung's achievements over the last decade have been impressive by any measure. Once perceived widely to be just another "me, too" player, providing "reasonable" quality at a "reasonable" price, the Samsung group of companies has now successfully established itself as a global multi-technology leader. This success is not coincidental, as numerous academic and popular literature reports on Samsung's development efforts over the past decade have shown. The company has successfully committed to and embraced change, set new and challenging directions, and boldly redefined their marketplace image through a very strong focus on R&D and technology. After many years of work throughout the company, the result has been a revitalizing and repositioning of Samsung as a global multi-technology leader known for its product innovation and quality and the creation of the world's most profitable technology company.

Currently, the Samsung Group of Companies consists of over 60 different affiliate companies in four broadly defined industrial sectors: electronics, finance, machinery and chemicals, and trade and services. Samsung has secured its leadership position in a number of products, including memory chips and TFT-LCD. Since 1999, the number of local patents has increased over sevenfold, while international patents have increased more than 15 times. The results have shown themselves not only in the laboratory and on the product shelves but also in sales, profits, and the company's stock market share prices. In 2003, the Samsung Group of Companies reported combined sales of over USD100 billion and a total profit of USD5.6 billion. In 2004, Samsung Electronics alone, a key member of the group, reported a net profit of USD10 billion. These figures represent an increase of over 10 and 50 times over the last 10 years, respectively. In that same time period, the market capitalization of Samsung Electronics has grown by over 700%.

While not often publicized outside the Samsung Group, many recognize that the Samsung Advanced Institute of Technology (SAIT), established as the group's central R&D facility in 1987, has made critical contributions to ensure the Samsung Group's position at the leading edge of technology. This case study presents the story of SAIT and its knowledge management (KM) activities. For almost a decade, KM has been a key performance driver at SAIT. Continuous KM innovations have been introduced and implemented to ensure Samsung's position at the leading edge in their industry. This case study will discuss various KM initiatives at SAIT, as well as the KM infrastructure and the internal organizational relationships which have worked to make SAIT KM what it is today.

The success of SAIT KM is well publicized and has been repeatedly recognized both in Asia and globally. SAIT has been acknowledged as an Asian MAKE (Most Admired Knowledge Enterprise) winner every year since 2003. This is the first time that a Korean organization has been so recognized.

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BACKGROUND: A BRIEF HISTORY OF KM AT SAIT

Since its establishment in 1987, SAIT's mission has remained unchanged: "a boundless search for breakthroughs." For this purpose, SAIT has always been looking ahead five to ten years into the future, preparing the Samsung Group for the challenges in the dynamically changing technological environment. In addition to performing innovative R&D projects, SAIT also serves as the group's chief technology office, setting both mid- and long-term technology strategies and providing a central platform for various technologies. In this role, SAIT works closely with all Samsung affiliates, leading and supporting R&D activities within the entire group, thereby serving as the perennial infinite growth engine for the whole group.

For this purpose, SAIT has three primary roles: seeds R&D, needs R&D, and fusion and synergy. Seeds R&D carries out pioneering R&D activities for new businesses. Needs R&D develops core technologies for strengthening current strategic businesses. Fusion and synergy is perhaps the most important function: a central coordinating role that exploits maximum technological synergy for the entire group. For the coming technology age of convergence, fusion and synergy orchestrates all activities by integrating and combining technological domains that are becoming increasingly critical.

Thus, SAIT has been responsible for three basic knowledge activities at Samsung:

- 1. Knowledge identification: forecasting critical leading-edge technologies for the next five to ten years into the future.
- 2. Knowledge creation: conducting research to actualize the technologies of the future.
- 3. Knowledge delivery: transferring developed technologies to relevant Samsung affiliates for commercialization.

From this perspective, R&D is, by definition, a knowledge activity, and SAIT recognized the importance of KM early on.

At SAIT, we believe that innovation, simply put, is the transformation of knowledge into money. Research, on the other hand, is to use the money from the sales and profits to generate new knowledge. In this sense, research can be described as the transformation of money into knowledge. Mr. Jun Yeon Kwak, Vice President, SAIT

KM is now utilized as a central management tool at SAIT. All major management and innovation activities are coordinated and consolidated from a KM perspective. In other words, KM is now playing a central role as the integrating and enabling mechanism for all core activities at SAIT.

The growth and development of KM at SAIT can be broadly classified into three basic phases. The first phase was up until 1999, during which foundations and infrastructure were established to prepare for aggressive KM initiatives for the subsequent phases. The second phase was between 1999 and 2003, when the first integrative IT-based KM system was introduced and subsequently upgraded. The third phase began in 2003 to integrate KM and other management initiatives into the work processes to maximize operational efficiencies. It is important to note, however, that SAIT considers KM as a journey, rather than as a goal. To translate, KM at SAIT is continuously innovating and developing the system to facilitate knowledge identification, creation and delivery.

1999 AND PROCESS-BASED KM

1999 marked the year when Samsung, as a whole, made it clear that it intended to become a great company and a global business leader in the true sense, transforming itself from being one of many good companies in Asia. To support this broad objective, SAIT announced three strategic goals:

- 1. Fusion and synergy to facilitate Samsung's leadership in the age of convergence.
- 2. Dominant design development efforts to develop leading standards in the rapidly changing technological environment.
- 3. R&D maximization from both effectiveness and efficiency perspectives.

The nature of these objectives clearly indicated the need for a systematic knowledge management program. SAIT's efforts to address these goals can be divided into three broad groups: an IT-based Knowledge Management System (KMS), a process-based KM approach, and a cultural/behavioral change management.

As described below in further detail, it may well be this balanced approach that made SAIT KM so successful. A process-based KM approach made it possible for SAIT to clearly identify core knowledge components and their mechanisms. In other words, everybody in the organization could now understand what knowledge would be created in which stage in the process and in what format it should be reported, delivered, and/or reutilized. It captured most of the essential activities of an R&D organization and was eventually expanded to become a primary management and innovation tool at SAIT.

It should also be noticed that various cultural and behavioral change management initiatives were aggressively implemented to enable a process-based KM program to succeed. These initiatives emphasized the fun aspects of the program to minimize organizational resistance and were closely coordinated for maximum results. One of the major goals of the SAIT KM team was "habitualization," where SAIT members would make it a habit to use KM processes for all, if not most, of their research and work activities.

2003 AND KM EXPANSION

By 2003, KM had been accepted as the standard tool at SAIT. SAIT employees were routinely using KM-based processes to report, collaborate and reutilize knowledge. SAIT, in 2003, was ready to expand the KM scope for further innovation.

The primary focus of innovation was placed on research quality enhancement. Research quality was defined along three dimensions: 1) research quality assurance, 2) research results diffusion, and 3) research project flexibility. These dimensions were identified in part because of KM successes in the previous period. As knowledge creation and sharing began to grow substantially, the need to establish a systematic evaluation system of the knowledge quality increased accordingly. SAIT members simply could not afford to lose time going through all created knowledge and deciding for themselves if the knowledge was pertinent to their individual needs.

To address this issue, SAIT decided to align the Six Sigma methodologies and processes with KM. This approach proved to be especially successful because KM at SAIT had already been designed along the employees' actual work processes. In other words, KM work processes and the Six Sigma processes have become completely synchronized at SAIT. As a result, key knowledge experts, called Knowledge Managers, are positioned at critical points along the research process to provide guidance for further progress and to evaluate research quality. This has also proved to be quite effective in transferring and diffusing created knowledge within SAIT for

further research and for dissemination to other Samsung business units for purposes of commercialization.

Another key development during this period is in the customization of the research process. This is designed to address the differences in the types and range of SAIT research projects, which run the gamut of basic conceptual research to actual product or software development. Over 20 different customized processes are now incorporated, fully supported by IT-based KMS.

SAIT KM now serves as an invaluable tool for communicating and sharing knowledge development within SAIT. The KM efforts at SAIT have produced impressive business results. The number of patents has grown over 630%, from 175 in 1999 to over 1,300 in 2006. The number of international patents has grown even more impressively: from 57 in 1999 to over 900 in 2006. SAIT managers expect that the increase in technological integration and convergence will make technological breakthroughs even more important in the future. While KM is a journey and KM at SAIT will certainly continue innovating, it is clear that the KM initiatives at SAIT have been and will continue to be a critical enabler behind the Samsung Group's achievements.

KM INITIATIVES AT SAIT

Process-based KM

As mentioned above, one important characteristic of KM at SAIT is its process-based approach. This was a natural extension from SSP (SAIT Standard Process), which had already been established at SAIT before KM efforts were introduced in 1999. SSP is now fully integrated into all work, KM, and the Six Sigma-based processes at SAIT and serves as a standard process from concept generation to commercialization.

Simply put, SSP divides the entire process into five phases, from the very beginning of project conceptualization to the very end of transfers for commercialization. Figure 1 presents a simplified version of SSP.



Figure 1. Phases and Core Knowledge of SSP

Samsung Advanced Institute of Technology (SAIT)

The concept of design review (DR) is of essential importance for SAIT KM. Introduced in 1999, DR is a formal review process at the end of each phase, as defined in the SSP. DR intends to ensure that each project phase has properly completed the originally planned tasks or, if changes had been made, that these were appropriate. As seen in Figure 1, SAIT has currently identified five DR steps: DR: Planning DR, Starting DR, Validation DR, Completion DR, and Product DR. It should be noted, however, that the main purpose of DR is not to serve as a gate-keeper or to review progress. On the contrary, DR is mainly intended to anticipate problems or challenges, to provide guidance and possible solutions, and to share new knowledge across technological disciplines.

This has become increasingly important as technological convergence and integration progress even further. As indicated above, one major mission of SAIT is to lead "fusion and synergy" across various business units within the Samsung Group of Companies. By 1999, the number of projects that span traditionally defined technology areas had grown, and as the number of laboratories also began to increase at a rapid rate, the matrix organizational structure was introduced to manage the integration process. Researchers from different labs were brought together to pursue joint research projects. Fostering different ideas has become a fact of life in any R&D projects.

In earlier projects, project membership had mostly been within a specific technological discipline, making it easy to resolve differences in ideas, assumptions, and/or project methodologies. Most of the members had offices close to one another and shared similar training and backgrounds; the main source of the disagreement could be quickly identified, understood, and resolved. But this quickly became a luxury as innovative solutions were sought so that researchers of inherently different backgrounds could be brought together to pursue a common purpose. Moreover, research findings and the knowledge created now needed to be shared and reutilized across the traditional boundaries of technological disciplines.

SAIT's answer to the new challenges is to define core knowledge. Simply put, core knowledge indicates all core outputs from each distinctive phase throughout the research process. For consistent management, SAIT adopted templates that prescribed the necessary conditions for core knowledge from a utilization perspective. Templates are defined, reflecting both internal and external requirements, e.g., within the project team, among prospective users in other research teams, or eventually among other Samsung business units for further commercialization. Knowledge created in each phase of the SSP is redefined according to each relevant template and unergoes a formal review and evaluation process. The review process ensures knowledge utilization and therefore maintains quality. In sum, knowledge created in each phase of the SSP review and evaluation process is stored in a KM system in a structured manner. This makes it possible to have easy and effective knowledge transfers and maximizes knowledge reusability.

Thus the most important characteristic of SAIT KM is that it defines project-based knowledge expression, evaluation, storage, and sharing activities. SAIT's various systems and rules are designed to support these activities. The processes, operational definitions of core knowledge, and templates have been and are being constantly upgraded to encompass all work processes. In this aspect, SAIT has used the Six Sigma methodologies extensively.

The IT-based knowledge management system (KMS) is continuously upgraded, reflecting the developments and changes in the processes. KMS at SAIT now serves as a critical means of sharing not only the final reports, but also in-progress findings and issues among the researchers. As such, the value of SAIT KMS has been substantially enhanced. It is more than a simple means of sharing final knowledge output. Rather, it manages the entire process of how implicit knowledge or research ideas evolve into explicit and usable knowledge.

IT-based KMS has also enabled SAIT to manage knowledge transfers and the sharing process with the customer. At the Samsung Group's central R&D facility, SAIT's direct cus-

tomers are the group's affiliate companies, in the sense that they are the one who translate SAIT's technological achievements into profits. This process naturally requires substantial collaboration and interaction between SAIT and the affiliate companies concerned. SAIT KMS and the standardized rules and formats developed have been invaluable in expediting the transfer and collaboration processes. The business development and technology teams at the affiliate companies now use SAIT KMS regularly to discuss various technological issues with SAIT researchers.

Communities of Practice

From the earlier days of KM implementation, SAIT recognized that much more than formal systems or rules would be needed to ensure successful knowledge management. This was especially true given SAIT's role within the Samsung Group: to develop innovative new technologies and then to transfer them to appropriate Samsung business units for commercialization. This means that SAIT knowledge management will have to address the needs of not only SAIT researchers but also of other Samsung personnel for more effective knowledge transfers.

SAIT has looked into communities of practice (CoPs) to address these challenges. CoPs typically consist of employees from all over the organization, regardless of their formal positions and immediate responsibilities. Exchanging ideas freely from diverse perspectives, CoPs are now commonly accepted to be uniquely valuable in generating, sharing, and validating key knowledge.

Preliminary forms of CoPs began to appear some 10 years ago. As is typical in researchoriented organizations, voluntary discussion groups began to form among the research staff at SAIT in a natural and voluntary manner, sharing common research interests. Realizing the value of the discussion groups in facilitating knowledge generation and sharing, SAIT encouraged and supported their development into CoPs, integrating their activities into SAIT's KM agenda.

This brought substantial changes in CoP activities. While remaining separate from the formal organizational structure and voluntary in its operations, CoP activities and progress began to be managed systematically. The changes coincided with organization-wide efforts to adopt the Six Sigma-based methodology for research process standardization. Coordination between CoP activities and formal research projects progressed smoothly and led to a significant performance enhancement.

More importantly, this development made it easier for SAIT researchers to communicate with the company's customers. As indicated above, knowledge created at SAIT must be transferred to the appropriate Samsung affiliate companies for commercialization. In this sense, the other members of the Samsung Group of Companies are SAIT's customers. As is well known, extensive interaction is often necessary for successful knowledge transfers. In such a transfer case in 2000, the SAIT project team leader realized that CoPs can be extended to include the customer's R&D team members to increase interaction effectiveness. Participation in SAIT CoPs enabled the customers' R&D team to be involved throughout the knowledge generation and development processes. This practice was quickly adopted. By 2001, SAIT was already playing a leading role in establishing group-wide CoPs, encompassing all affiliate companies of the Samsung Group of Companies. SAIT CoPs have now progressed from a simple means of discussing and sharing core research ideas to an essential tool for sharing and distributing knowledge. Knowledge transfers now require much less time to complete and, as a result, the shortened turn-around time has quickly become a key competitive advantage for the members of the Samsung Group.

The number of CoPs at SAIT grew at an impressive rate, especially in terms of volume of knowledge created and the number of members. Corresponding to the increases in CoP activities,

the number of technology transfers from SAIT to the affiliate companies increased from only 19 in 2001 to 94 in 2003.

The second major evolution in CoP activities took place in 2003. The rapid changes in the technological environment made it necessary for R&D efforts to address not only technology but also marketing and sales issues from the earliest possible phase. In response to this challenge, SAIT decided to expand the scope of CoP activities to also involve the business development and marketing teams of the affiliate companies. This provided both technology-oriented researchers and business-oriented operating managers with opportunities to discuss commercialization issues and the marketing implications of new technologies from the earliest possible stages.

IT-based KMS at SAIT has also proven to be very effective in CoP activities. The CoPs at SAIT are formed around distinctive research topics, and their activities benefit greatly from KMS. Various ideas are actively discussed and the results are shared by the CoP participants on a real-time basis. As of 2004, over 140 CoPs are actively operating, having firmly established themselves as a critical part of KM initiatives. Thanks to the KMS, SAIT CoPs have become famous, attracting members of other Samsung affiliate companies who are now able to interact with SAIT researchers to share the commercialization and marketing aspects of new technologies.

The over 140 CoPs now actively operating at SAIT host and organize the Annual Samsung Forum, where researchers, engineers, and business managers from all of the Samsung affiliate companies come to share knowledge and explore collaboration opportunities. Fully integrated into the KM system, SAIT CoPs have now firmly established themselves as a critical part of KM initiatives. Leading knowledge collaboration and sharing activities within and across SAIT boundaries, it is clear that SAIT CoPs will continue to play an indispensable role in Samsung's technology leadership for a long time to come.

In addition to these basic KM activities, SAIT also provides various formal and informal activities through which employees may actively express and share their ideas.

Patent Expo

A Patent Expo is open to all SAIT researchers; researchers from any research group of any technological background may choose to display research ideas and/or challenges in the Expo. In a festival-like environment, the researchers move from one topic to another, asking questions, sharing ideas, and proposing possible solutions. Some researchers may also choose to leave written comments on the display panels. The Patent Expo serves as a fun way of exchanging ideas from different angles and provides fresh perspectives among researchers of different backgrounds and expertise. In many cases, crude suggestions or tips from experts of totally unrelated fields have resulted in entirely new approaches and led to major breakthroughs.

SAIT has benefited greatly from the Patent Expo. Among other things, the Patent Expo has promoted integration among different technologies at SAIT. Comments from researchers of different backgrounds and expertise often prove to be very insightful in developing unique and provocative solutions to problems and challenges.

The Patent Expo has also accelerated the development of prototypes from concepts: new breakthroughs often need new approaches to translate innovative ideas into reality. In this regard, the Patent Expo provides an open venue from which comments and suggestions from experts of all technological areas can be easily secured. The event has also enhanced R&D resource allocation: researchers generally tend to concentrate all their time and energy on their favorite R&D agenda, often without being aware that others have already pursued similar routes without success. The Patent Expo showcases such experiences, thereby helping other researchers to make better use of their time and energy.

Patent Expo was initiated first as a small departmental event of the electro-chemistry group. The concept and results, however, quickly stimulated other departments to participate. In the second year, the intra-departmental event has grown to include major units, such as the Micro Electro Mechanical System (MEMS) department. By 2004, the Patent Expo had become a major event. Three departments and two project teams participated in the Joint Patent Expo of 2004.

The results are impressive. In the May 2004 event, 225 ideas were submitted and 214 new or supplementary ideas for potential breakthroughs were generated. Surprisingly, of the 214 submissions, over 30% were generated by departments other than the initial project team. This indicates that the event does facilitate intertechnology collaboration and that new answers to new challenges often require nontraditional approaches. To further stimulate collaboration and integration across traditional technological boundaries, SAIT keeps a careful track of new ideas and their providers. Called the "idea ownership" system, this means that the names of the researchers generating any ideas or suggestions are registered. Should the idea be proven to make a significant contribution to the development of the original issue, SAIT officially recognizes the contribution. In many cases, when the contribution has been substantial, the idea providers are included as co-inventors of the patent.

CRC and External Collaboration

Considering the longer-term perspective, one of the major issues in SAIT's KM journey has always been that of collaboration with an external expert community. Needless to say, the technology trends over the next five to ten years are uncertain at best, always a challenge to predict. It is therefore a must to interact closely with an expert community and to keep close track of technological breakthroughs and the directions that they are taking. In other words, collaboration with the external expert community is a key factor for SAIT in attaining its strategic objectives.

It is not easy, however, to maintain good working relationships with the leading minds in the world over an extended period of, say, five to ten years. It can also be expected that there will be changes within SAIT. Individual researchers may be transferred to take on other responsibilities, and some may choose to leave the organization entirely. SAIT recognizes this as a critical issue and has resolved that it be carefully managed.

The Cyber Research Center

The Cyber Research Center (CRC) is an essential element of KM at SAIT and has proved to be an especially effective means of collaboration with the expert community. CRC is the basic tool in which any and all research activities are to be recorded. It was first designed to facilitate effective communication among the researchers at SAIT. Using standardized output documentation templates at each major step of the R&D process, it became possible to minimize individual variations in the frequency and extent of information-sharing. Furthermore, it effectively supplemented the often time-consuming reporting system, since CRC maintains most critical reports: project progress, current project status, meeting minutes, and decisions. SAIT has continuously upgraded the CRC and has now established specific documentation standards in 16 areas.

Although CRC was originally designed to facilitate intra-organizational collaboration within SAIT, SAIT researchers soon discovered that it is an equally effective tool for external collaboration. CRC has made it easy to record all interactions with the expert community and the results thereof. In addition to the basic information, such as the names and dates of the interaction, further details of the discussions are reported and kept in CRC. As a result, CRC quickly developed into an extensive knowledge base.

Samsung Advanced Institute of Technology (SAIT)

Success stories from CRC abound. Quite a few online-based research colloquia have been organized around CRC among SAIT researchers and leading experts from different parts of the world. While some remain simply discussion and idea-sharing communities, many identify valid research topics and develop into core R&D activities. A good example would be how SAIT helped a key Samsung affiliate company overcome potential accusations of a possible patent violation. It was brought to the attention of the affiliate company in question that a core manufacturing process it had been planning to implement might be in potential violation of patents held by a Japanese firm. The company naturally turned to SAIT for help and was surprised to find that SAIT was well prepared to address the problem. Through CRC, SAIT had been discussing the patent and related issues with the external expert community and, as a result, could quickly form an extended task force to develop a solution in much shorter time than anyone had expected. The efforts of the task force resulted in 11 new patents for SAIT, in addition to financial savings of over USD1 million for the affiliate company.

In another example, SAIT had made a critical contribution for another Samsung affiliate company in leading global standard efforts for an innovative product in mobile communication. SAIT researchers have been in close contact with the leading experts in that area, through CRC, seeking their opinions and concerns at every major stage of the technology development. As is usually the case in the standardization of an innovative product, this process lasted more than five years. CRC records during the period indicate that over 350 active discussions took place with the external expert community, which have, of course, been shared with the affiliate company to address the challenges in the most appropriate manner. The efforts resulted in the Samsung affiliate company securing a leading position in the standardization of the new product in question.

It seems clear, therefore, that CRC has proved to be invaluable in SAIT's collaboration efforts. Collaboration will become increasingly important for SAIT to achieve its mission of leading Samsung Group's innovation efforts into the future. As such, CRC will continue to play a critical role in facilitating more effective collaboration with not just the external expert community, but also with its customers, the Samsung affiliate companies.

Cultural/Behavioral Initiatives

Conventional wisdom would suggest that a successful KM system requires a careful marriage between a set of KM systems and/or an infrastructure and reinforcement mechanism (Figure 1). This is because organizational members must be persuaded and reinforced to accept and take advantage of the KM system and infrastructure before KM can make the expected contributions. KM leaders at SAIT cannot agree more; KM practices must be embedded into the organization and be fully accepted by its employees for maximum results.

After over five years of serious KM efforts, KM leaders at SAIT now agree that planning and implementing a KM system and infrastructure is the easy part. Of the two requirements for a successful KM, experiences at SAIT suggest that it is more difficult to design and implement reinforcement mechanisms through which the organizational members will understand, be excited about, accept, and make contributions to KM. In other words, it is critical for KM success that the KM system and infrastructure be fully embedded into the organization.

Knowledge Intensive (KI) Staff Meetings

Considering the nature of the organization and its members, most of whom are highly educated and talented scientists and researchers, SAIT KM leaders agreed that even slightly coercive methods would be counterproductive. It was therefore decided that internal communication be emphasized as a major means of reinforcement. To stimulate internal communications, SAIT adopted Knowledge Intensive (KI) staff meetings. KI meetings are integrated into the formal

problem-solving process. At typical KI meetings, project teams are encouraged to bring problems that are "unknown, uncertain, and in need of a breakthrough." Participating researchers from different areas then look at those problems. The following discussions can get quite heated but often result in insights for possible directions to create breakthroughs. KI meetings have been indispensable in occasioning behavioral changes among the researchers. They form extensive social networks across the once-formidable walls of technology boundaries. A substantial amount of knowledge-sharing and collaboration are now taking place.

Praise Ground

KI meetings are supplemented by other means of internal communications. Praise Ground is a less formal means than KI meetings. It is designed to foster cross-functional and crossorganizational boundary communications. While rather simple in nature, Praise Ground has been proven to be a very important and effective way of sharing successful KM performances and promoting consistent KM values and behavior among SAIT members. In brief, Praise Ground plays a critical role in embedding KM practices into the various activities and processes at SAIT.

Praise Ground is essentially a relay of praises among SAIT members. A member identifies another employee who has done something worthy to be praised and writes a short, entertaining note about it on the website. That member then identifies another employee to praise, and the process is repeated over and over. This encourages SAIT members to look for members and activities to praise. The Praise Ground is one of the most popular and most frequently visited websites at SAIT. Most, if not all, members at SAIT consider it a great personal honor to be mentioned at the Praise Ground. While the praises are not exclusively related to KM activities, a substantial number are. Typically, praises address activities or behavior of knowledge-sharing, collaboration, and problem-solving supports, especially in creating value for SAIT customers. All major phases of KM processes at SAIT, from knowledge accumulation and sharing to knowledge creation, are commonly covered in the Praise Ground, which in this manner provides SAIT members with entertaining yet effective opportunities to learn about the KM system and the best and/or new ways of using it. Anecdotal evidence abounds on how other members successfully applied the lessons gained from the Praise Ground which in turn helped them gain knowledge in other settings and/or purposes. Since 2002, when the Praise Ground was first adopted, more than 200 SAIT employees have been recognized and praised. The monthly average of praises increased from five in 2002-03 to six in 2004. Considering the size of SAIT—about 1,200 employees—it seems clear that the Praise Ground has now been established as a key means of internal communication. KM leaders at SAIT agree that the Praise Ground has made critical contributions in embedding the knowledge culture within the organization.

LESSONS AND IMPLICATIONS

SAIT represents one of the most successful KM organizations in the Republic of Korea. Since 1999, SAIT has been pursuing its KM journey in an aggressive and effective manner. Their success has frequently been recognized both within and outside the country.

The case of SAIT presents three broad lessons for successful KM implementations. First, KM should be implemented in close coordination and alignment with the organization's work processes. Second, substantial cultural and behavioral initiatives should accompany the KM implementation. Lastly, KM's progress and effectiveness should be closely monitored and evaluated.

Process Alignment

The most important characteristic of SAIT KM is that it is fully integrated into work or, in SAIT's case, its research processes. The entire research process is divided into distinctive

knowledge-generating phases. At each phase, generated knowledge is reported and stored in predefined formats for easy accumulation, sharing, and reutilization: core knowledge. In other words, core knowledge is defined with primary attention as to how this knowledge is to be utilized in subsequent phases and/or in other applications in the future. KM is no longer an extra burden for the employees. Generated knowledge then only needs to be reported and stored once. Rarely, if ever, do researchers perform any additional activity for KM. As a result, operational efficiency and effectiveness are substantially improved.

Process alignment also offers other important advantages. Continuous process innovation is now a reality in SAIT, with process phases added or deleted as needed. SAIT has adopted the Six Sigma-based methodologies for this purpose and integrated important additional processes, such as knowledge quality assurance, without any difficulty.

Cultural/Behavioral Initiatives

Knowledge is an inherently human factor. Even the most advanced system and rules cannot be employed successfully if they are not fully supported and accepted by the people in the organization. In organizations such as SAIT, whose people include the brightest minds in the world, it is even more important to secure voluntary acceptance from them. They will not adopt externally enforced systems until and unless they are convinced of their value. SAIT has introduced numerous cultural and behavioral change initiatives to address these challenges.

More formal approaches, such as the CoPs and Samsung Patent Expo, have been carefully coordinated with more informal or softer initiatives, such as the praise relays and KI meetings, and have been implemented in a constant yet flexible manner to win voluntary acceptance and cooperation from the organizational members and to reinforce KM's success.

Monitoring KM Effectiveness

It is always important to measure KM effectiveness. Through careful monitoring of KM activities and their impact on organizational performance, potential areas of weakness may be identified for proper corrective actions. The inherent nature of KM as an indirect organizational activity, however, makes it a challenge to be able to develop accurate measures of KM effectiveness. This was especially challenging for SAIT because of the organization's nature. As a research organization, SAIT is primarily responsible for developing new technologies and then transferring them to other business units for commercialization and resulting profits. SAIT does not have any direct revenues or profit-generating responsibilities. All business performance results accrue to the business units to whom SAIT's technological breakthroughs are transferred.

Reflecting the non-sales-generating nature of the organization, SAIT first identified a set of key measures of business objectives: patent, business applicability, and R&D effectiveness. Patents are generally recognized as an acceptable measure of technological innovation. It is also generally accepted, however, that not all patents are equally innovative. As such, SAIT adopted both quantity and quality of patents as key KM performance measures. Business applicability is a measure of commercialization or business performance outcomes of a technological break-through. R&D effectiveness measures the extent of value added and time saved in the entire R&D process; it measures R&D effectiveness in terms of value and efficiency as well as in terms of time.

A series of KM performance indices was developed to measure KM effectiveness in relation to these organizational objectives. Each of them was designed to represent aspects of KM effectiveness, either by itself or in combination with other aspects. Through these indices, SAIT can closely monitor KM progress, making any necessary adjustment decisions for maximum effectiveness.

In conclusion, the case of SAIT offers one of the most successful KM stories in the Republic of Korea, perhaps in the world. Their story offers interesting lessons and implications for other organizations in other parts of the world on how to successfully establish and implement a knowledge management system.

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INTRODUCTION

The SK Group of Companies is one of the Republic of Korea's largest business organizations, with revenues of USD70 billion in 2005. Founded in the early 1950s as a small textile manufacturer, SK is now one of the world's most successful vertically integrated organizations, operating in all prime areas "From Petroleum to Fibers."

The SK Energy is a core member of the SK Group, with annual sales of over USD22 billion in 2005. In addition to operations in the Republic of Korea, SK Energy operates R&D facilities in the United States and in China to support technology businesses in South East Asia, Africa, and the Middle East.

Originally established in 1962 as a petroleum company, SK Energy has continued to expand the boundaries of its operations. Building upon competencies in the energy and chemical areas, SK Energy's business operations now include energy, chemical, automotive services, and biopharmaceuticals. SK Energy's automotive service business is especially worth noting. It is an innovative extension of SK Energy's petroleum and gas station operations. Cooperating with SK Telecom, another member of the SK Group, SK Energy has successfully turned its extensive gas station network into a total service network for drivers. More importantly, SK Energy has successfully introduced an innovative customer relations management (CRM) service called OK Cashbag. It is an integrated membership services system across various businesses and industrial areas. OK Cashbag members may accumulate mileage points in OK Cashbag member restaurants, for example, and may choose to use them for movies, gas, or even microwave ovens. This service is the only one of its kind in the country and has been highly successful. SK Energy is, therefore, a formidable combination of high technology and innovative marketing and customer-centered operations.

This case study presents the story of SK Energy from the knowledge management (KM) perspective. Started in the 1970s, KM at SK Energy has a long tradition. The main foci of KM have changed, reflecting strategic goals and operational necessities of the company. Over the years, SK Energy's KM efforts have been identified as a critical enabler of SK Energy's success. This case study will discuss KM philosophies and approaches at SK Energy and how they interact with corporate management.

BACKGROUND: A BRIEF HISTORY OF KM AT SK ENERGY

At the SK Group of Companies, knowledge as a tool for competitive advantage has had a long tradition. Since its official adoption in 1979, the SK Management System (SKMS) still serves as the Group's basic management philosophy, behavioral guidelines, and unifying conceptual mechanism for SK managers and employees. SKMS identifies knowledge as a core component of value creation, and as a result, attention to knowledge and KM has been an important management activity at SK. Figure 1 illustrates the basis of SKMS.

By the early 1990s, knowledge activities at SK were already quite extensive. Cross-functional study groups, groupware-based Closed User Groups (CUG) and a best practice sharing

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system are the most important examples of the KM tools used during this period. As the name implies, cross-functional study groups were voluntary informal groupings across departmental boundaries that facilitated critical knowledge-sharing and utilization. The groupware-based CUG, in contrast, was primarily a department-based knowledge activity. The results of these activities were rapidly transferred to other business units through the best practice sharing system and the Knowledge Plaza.



Figure 1. SKMS Framework

The study groups and the CUGs proved to be quite effective in enhancing organizational competitiveness at SK. A good example would be the KM study group. Its members explored both conceptual and practical aspects of KM closely. As they deepened their understanding of the value of knowledge in organizational performance, it became apparent to them that SK needed to establish a more systematic approach to KM. The study group decided to submit a formal report to top management. The report was submitted and finally adopted in 1998 to serve as the basic guideline for subsequent KM initiatives. It can thus be argued that KM as it is practiced today at SK is a direct result of the knowledge activities of this period.

THE PILOT PHASE

During the first phase, SK management emphasized two critical KM objectives: to foster close communication and coordination across functional units and to establish work-aligned KM processes. Considering SK's broad coverage in both operational and business areas, management decided to follow a sequential approach to KM. First a pilot program was launched for each of the two objectives intended to discover potential problems and solutions before the company embarked on a full-scale expansion, which was scheduled to follow almost immediately.

The Ulsan Complex and the Lubricant Division were selected for the pilot program. The Ulsan Complex is the largest production facility of any kind in the world, covering almost 10 million square meters with 49 different operational facilities. In operation for over 40 years, the Ulsan Complex was generally believed to have accumulated a substantial amount of knowledge in various areas and formats. The Lubricant Division was selected to address knowledge transfer and sharing issues. As the nature of its business requires close cooperation and coordination among related functional units, SK calls this the Marketing, Production, R&D, Staff, and Top Management (MPR/S/T). As competition intensifies and customer preferences change rapidly, accurate communication and collaboration among the related functional units and timely decision-making become major factors in sustaining competitiveness. As explained in further detail below, the MPR/S/T represents a key concept in SK's KM strategy.

The pilot program had two main purposes: a systematic classification and accumulation of knowledge in various areas and formats and a rapid and timely transfer and sharing of knowledge across related business functions.

The pilot program in the Ulsan Complex focused on the Communities of Practice and the Knowledge Base, SK's knowledge portal. Key knowledge areas were identified in order to establish CoPs around them to stimulate knowledge creation and learning. These CoPs, in turn, were organized within a given knowledge base for more effective knowledge accumulation and utilization. At the Lubricant Division, an IT-based knowledge management system was implemented to facilitate knowledge process innovation through which all work-related knowledge can be created, shared, and utilized to enhance business performances.

The pilot program came to a successful conclusion in 2000 and the decision was made to expand KM. A corporate-wide KM system was finally introduced at SK in October 2001.

THE KM MODEL AT SK CORPORATION

Figure 2 illustrates the three-tier knowledge model at SK. It is designed to align knowledge accumulation and utilization with work processes. The KM model serves as a basic framework for all KM activities. Different KM activities at the different organizational units and interest groups share the same philosophy, the same methodology, and the same "look and feel," making transfer of knowledge throughout the entire organization very effective.



Figure 2. The Three Tier Knowledge Process at SK Energy

The first tier of the SK KM model is called the Working Room; it serves as the primary tool in producing, accumulating, sharing, and utilizing knowledge. The basic KM methodology at Tier 1 includes the communities of practice (CoP). At SK, the CoP is fully established as the primary tool for organizational learning. Organized around a specific task and/or practice, the CoPs at SK have been extremely powerful in enhancing organizational competence, overcoming time/space limitations, and stimulating virtual collaboration and knowledge-sharing. The Working Room is thus the basic space for everyday knowledge activities, where questions are raised and answered (Q&A), heated discussions are exchanged (discussion), and experts and thought leaders are identified for further contacts (expert map). As of 2006, over 2 million knowledge items had been posted and utilized for performance improvement.

Because of the nature of the Working Room, which was designed for immediate application and utilization, knowledge postings at the Working Room are often crude and without sufficient background information, and it is often difficult, if not impossible, for others to appreciate the full potential value of what has been posted. Tier 2 of the SK KM model is called the Knowledge Base (K-Base), and it addresses this challenge. Simply put, the Knowledge Base is a collection of filtered and refined knowledge from the Working Room. The numerous knowledge items originally stored at the Working Room are carefully screened for possible application to other business areas or for future opportunities. These are then refined with additional details and background information and stored at the Knowledge Base for easier transfer and reutilization in other applications.

Tier 2 knowledge postings are then searched and studied by other operational or business teams for possible application to their respective needs. This process is called a Can Meeting at SK (Figure 3). Once successful, the knowledge is then registered at the Knowledge Map (Figure 4) on the knowledge portal. The application process is further refined and packaged for further reutilization. The output is a Solution Pack.



Knowledge Base Process:

Core Knowledge, CAN Meeting, and Knowledge Mapping

Figure 3. Core Knowledge Definition Process

SK Energy



Figure 4. Knowledge Map

Tier 3 of the SK KM is a collection of these solution packs. Since 2001, SK has created 113 solution packs (Figure 6), which represent the highest form of knowledge refinement that can be easily and systematically applied to arrive at new business creation and/or operational excellence.



Figure 5. Solution Pack

Case Study 1. KM as Communication Channel: The Entrac Business Development Team

Entrac is the name of SK's telematics business. It is the first of its kind in the Republic of Korea to take advantage of rapidly developing mobile and ICT technologies and is intended to provide automotive drivers with all necessary information while driving. It is a tremendously innovative service and is expected to bring about substantial changes in the way automobiles will be used.

As in other businesses, the quality of the people in the team is one of the critical determinants in the success of an undertaking. The challenge is even greater when the business is new and innovative, as in this case, because there simply are not enough people with the sufficient experience or knowledge. This case shows how KM at SK has enabled the company to overcome this challenge.

When Mr. Seongwhan Joo was assigned to the Entrak team, he confessed that he did not have the knowledge or experience that he felt he needed to do the job. He had just joined SK after a few years of working in a completely different field. It was essential that Mr. Joo adapt to the new industry in a new work setting. It was, naturally, impossible for him to make meaningful contributions without understanding the specifics of the new businesses and the cultural/work processes at SK. At that moment SK's KM came to a rescue. KM became a good study tool and a way to enrich Mr. Joo's knowledge in this situation.

Acquire Knowledge

The first thing Mr. Joo did was to join several CoPs: the "Entrac General" and the "Developing Traffic Information System." He explored the contents posted on the knowledge portal. He also began to submit his own materials on system engineering into the CoP and the K-Base.

His expertise was in System Engineering, which is based on various views and ideas. The CoP and the K-Base had no shortage of different and, in many cases, conflicting views. He found it exciting to discover, investigate, and build upon these new ideas, through which he could identify potential threats and possible opportunities. He had excellent ideas, but it soon became clear to him that conveying them to and convincing his team members and superiors of the value of his findings and conclusions was a totally different matter. He concluded that sharing his knowledge and data was the only way to solve this problem.

Share Knowledge to Get New Knowledge

Looking back, it was fortunate that Mr. Joo was running out of his hard disk space. Like many others at SK, Mr. Joo kept all of his analysis and data on his hard disk because he was not sure what to share with others. Also, he was hesitant to share all his knowledge with others, believing that it might put him in a disadvantageous position later. Some might discover his mistakes or even criticize his results from a different perspective. Mr. Joo did not feel comfortable about registering his knowledge until and unless he was absolutely sure. But eventually he ran out of options and out of sheer lack of disk space, Mr. Joo began to register his knowledge, i.e., his analyses and data, onto the KM portal.

Very interesting results followed. As he continued to publish his knowledge at the KM portal, he realized, to his surprise, that new, better, and improved knowledge began to be produced by others as a result of his postings. Mr. Joo had finally realized why others always praised KM and its usefulness It was a very rewarding feeling to see that his knowledge postings were helping others in the organization.

KM as a Trusted Knowledge Cargo

Before long, Mr. Joo found out that he had accumulated ov 100 K-Points in SK's knowledge incentive system. He began to enjoy this turn of events, setting a goal of earning over 200 points. He organized all his work files and registered them into the knowledge portal. He was finally beginning to realize the important role of the KM portal as a knowledge bank.

Mr. Joo went a step further and began to provide comments on his colleague's knowledge postings and utilizing them in his own job. It was a pleasant surprise to him that even this enhanced his work efficiency. He no longer had to spend as much time requesting meetings to obtain information and/or opinions from his colleagues. Furthermore, by the end of the year, he had surpassed 500 K-points.

Mr. Joo was selected as a manager and a QoS (Quality of Service: Caretaker) of the Entrac CoP. As manager, he began upgrade the extensive amount of knowledge from his CoP to the K-Base. The K-Base has become his most reliable knowledge repository. He organized and published all knowledge and information from projects, whether they failed or succeeded. There were lessons to be learned and knowledge to be gained from both. He also published new knowledge from international seminars and meetings which he believed would be helpful to the members for immediate as well as future opportunities. It was not long before Mr. Joo was nick-named the "knowledge evangelist" at SK. In knowledge, he found the best weapon in the fiercely changing and competitive environment.

Whenever anybody asks Mr. Joo a question on Entrac, he always answers kindly: "Find it in the K-Base. There are knowledge items related to it."

Jumping from Beginner to Expert

"I think KM helps people to gain and create enormous knowledge and also hone their special skills." (Seungwhan Joo, Manager, Entrac Team)

Mr. Joo's experiences show him that KM is effective not only in organizing and reporting information and data, but also in influencing and stimulating others to cooperate and collaborate to create new knowledge. He is currently working on a plan to develop his K-Base knowledge into a Solution Pack. The vast amount of data on wireless networks, contents requirements, and analysis reports can be easily developed into a Solution Pack and used in a new knowledge-based business. Mr. Joo is quite confident and hopeful that it can give rise to new business opportunities.

Case Study 2. KM as an Alignment Tool: The Cashbag Strategy Team

The Cashbag is a unique service, probably the only one of its kind anywhere in the world. It is similar in concept to the frequent flyer mileage accumulation of those who use the same airline when flying. The difference, however, is the magnitude of participants. SK has created a unique network of retail services, from gas stations, bakeries, and restaurants to automobile service shops, movie theaters, and supermarkets. All the members identify and accept SK-led Cashbag points. By now, the Cashbag service has proven to be very successful and has been incorporated in the everyday lives of many, if not most, Koreans. At least in the Republic of Korea, Cashbag points are honored in many online, offline, and even mobile markets. SK is currently expanding this service to global markets.

Understandably, the success of the Cashbag business model depends on SK's ability to analyze and interpret customer data—what, where, and how often they buy—and to develop business strategies and action plans accordingly. The Cashbag strategy team is responsible for deriving timely and effective business models for existing and new products and services. SK's data base management (DBM) and customer relationship management (CRM) capabilities and

how these results are effectively aligned with new business model development are the critical success factors.

The development of the Cashbag business was not without its difficulties. As the first of its kind in the country, there was no benchmark; as everything had to be created from scratch. The only thing clear was that the business model required a substantial amount of data about customers and that its markets must be derived and analyzed. At the start, however, nobody had clear ideas as to how the fragmentary data should be analyzed or interpreted meaningfully.

The Importance of Managing Knowledge

The Cashbag team realized that the success of the new business model depended on the effectiveness and efficiency with which the fragmented data could be translated into wise business decisions. This would be a four-phase process: from data to information to knowledge and to wisdom. Mr. Nakhyun Choi, head of the Cashbag Strategy Team, pointed out the importance of knowledge and knowledge management:

Simple data is nothing but trash. We need to create and share knowledge before any data can be utilized, and then we should expand and reproduce the knowledge. The most important key through these processes is how to organize the information we have gained.

The process is highly experience-based, with frequent trial and error, digressions, accidental discoveries, etc. Some achieved exactly the opposite of the hoped-for result, and others went well. It became apparent that any and all new knowledge had to be carefully tracked and systematically managed to avoid repeating mistakes and to exploit new possibilities. The Cashbag team developed the concept of core knowledge to manage various experiments and information throughout their endeavor.

A Systematic KM Process

While everyone on the team understood the importance of having a systematic KM process and the concept of core knowledge, this was not well received during the early phase. One reason that made the members hesitant was that they did not know what and when to share. KM, just like any other system, must first demonstrate its impact and value to the members. Without convincing results, members may simply put the entire concept aside as another meaningless burden. It was vital to prove that KM really works and can contribute something to the team as well as to individual performances.

To address this issue, the Cashbag Strategy team resorted to the CoP site, provided within the company's KM portal. The knowledge produced was to be systematically categorized and managed by an administrator to facilitate knowledge understanding and sharing. The administrator serves as a knowledge expert in a given knowledge area and provides guidance as to how the knowledge can be interpreted and utilized by other members.

However, the amount of knowledge was expected to increase substantially. Thus, it was important to establish a common agreement or knowledge classification scheme to enhance efficiency. While all knowledge was certainly important and potentially valuable, it was also true that some knowledge had the potential to make a larger impact. Therefore, the Cashbag team decided to identify what constitutes core knowledge for closer knowledge management.

As of 2004, the team had identified and was managing some 150 core knowledge items, which all team members are expected to be familiar with. These 150 are carefully coded and managed and serve as basic checkpoints to ensure accurate analyses and comparisons.

Illustrative Conversation on Core Knowledge

Team Member:	"I have just finished the message test system to activate low-performing
	customers accounts."
Team Leader:	"Thank you. Let's see. Oh, the customer feedback is linked to our site,
	OKcashbag.com."
Team Member:	"Yes."
Team Leader:	"Did you talk to the OKcashbag.com system management about the
	possibility of addressing a rush problem?"
Team Member:	"Rush problem? No, I am afraid I didn't."
Team Leader:	"Did you forget Core Knowledge 14? There is a possibility of overloading
	the system."
Team Member:	"Oh, I missed it. I will look into it. Thank you."

The concept of core knowledge has also made significant contributions towards expediting cross-functional communications within SK. The Cashbag Strategy team must work closely with various operations teams to monitor progress, make the necessary adjustments, and analyze the results.

Due to the fact that the employees do not work together in the Cashbag operation division, it was not easy to share their work information. But as a result of continuous study and research, they were not only able to solve the communication problem but were also able to advertise their business from the operation division. The related units have all adopted the concept of core knowledge, and through CoP activities they now have standard terminology and shared understanding. The amount of time and effort exerted has been substantially reduced, and SK's flexibility has become a clear strategic advantage over any competitive threats.

Sharing Failures Quickly

The Cashbag team also used the CoP to share mistakes and failures. The failure stories describe what was originally intended, what had happened, and what new knowledge was obtained as a result. By quickly announcing and sharing failures and mistakes, the team could learn for future successes.

Example 1: Birthday Cakes. The Cashbag team worked together with a bakery chain to launch a birthday cake event. The team sent out direct mails to Cashbag cardholders in their thirties and forties with discount coupons for birthday cakes. The response from the customers, judged by the number of redeemed coupons, was surprisingly low. It was revealed that the customer segmentation identified for the target was inaccurate. An existing service from Cashbag had already provided a similar service to customers in their tens and twenties The Cashbag team had expected that the new service would be an extension beyond this age group. It turned out, however, that the birthday cake discount coupons were applicable only in a small number of cases, most of which were designed for the younger generation.

Example 2: New Year's Eve Event. On another occasion, the Cashbag team organized a big New Year's Eve event. Invitations were mailed out, but the response was surprisingly low, even just a few days before the event. It turned out that the postal service was heavily overloaded during the last days of the year and had placed a higher priority on personal mail items than on commercial mailings. Most of the invitations never reached the target audience in time.

SUMMARY AND CONCLUSIONS

The KM activities at SK demonstrate that knowledge is truly an effective and essential tool for better business performance with clear objectives:

- Knowledge accumulation and transfer to expedite skill and capability development of organizational members.
- Knowledge creation and reutilization to stimulate and support new business opportunities.
- Organizational communication to establish standard terminology and systems to facilitate effective decision making.
- Change management to create an open atmosphere and culture in order to share lessons from successes as well as failures.

An internal SK survey indicates that KM contributed 36% in efficiency gains and/or cost savings. Most of these contributions were the result of direct cost savings, training and communication cost savings, and production efficiency gains. SK's experiences illustrate that KM is a potentially powerful tool that does not come without a cost. Change management efforts must accompany all the major stages of knowledge activities so that knowledge will not be hidden and kept by the individual. The SK KM team's efforts to provide continuous incentives to share and utilize knowledge is one of the most important reasons behind its success.

FUTURE DIRECTIONS

SK continues to aspire to become a global knowledge business leader. To this end, SK plans to reinforce KM as a key corporate strategy enabler. This indicates that all knowledge activities at SK will be realigned with the corporate vision and strategic goals. Core knowledge will be redefined to match the necessary core competences for immediate and easy utilization by its organizational members. If successful, such efforts will result in transforming SK's knowledge assets to produce superior corporate performance.

Ida Yasin National Expert, Malaysia

COMPANY PROFILE

Bank Negara Malaysia was established in 1959 with the mission of a commitment to excellence in promoting monetary and financial system stability and in fostering a sound and progressive financial sector to achieve sustained economic growth for the benefit of the nation, to be achieved by:

- Promoting a work culture which emphasizes the highest standards of professionalism and integrity, prudence, teamwork, and innovation.
- Developing and maintaining a committed work force that is highly competent and proactive, sensitive to the changing needs of the industry.
- Adopting a collaborative approach.
- Promoting the effective use of technology and good work practices to enhance the competitiveness of local financial institutions in addressing international competition.
- Having the necessary financial resources and financial instruments to effectively manage monetary stability.

Currently, the total Bank Negara work force is about 2,000, located throughout Malaysia. Those in the executive level who hold a minimum basic degree comprise 24% of the total staff, the middle management level comprises 45%, and the rank and file comprises 31% of the total work force. However, the staff profile of the Bank had shifted towards having a higher proportion of middle-level management staff, reducing the percentage of the rank and file personnel. Staff demographics has also changed, with 63% of the staff population now being younger than 40, with a more diverse academic and professional background and experience.

KEY DRIVERS FOR THE ADOPTION OF KNOWLEDGE MANAGEMENT

The main impetus for the adoption of knowledge management (KM) was the need for Bank Negara to become a more knowledge-based organization after the financial crises in 1997.

As private capital inflow to developing countries surged in the 1990s, financial crises in emerging market economies occurred with increasing regularity. The sudden cessation and then reversal of capital flow into Mexico in 1994 caused the first tremors in the global economy, leading to a devaluation of the currency and a recession, with direct spillovers into Argentina. A major financial earthquake in East Asia soon followed. The currency crisis in Thailand rapidly expanded to Indonesia, Malaysia, the Philippines, and the Republic of Korea, and its impact reverberating throughout the global economy.

As a result, several strategic reform initiatives were introduced in Malaysia. One of the key initiatives is the creation of a more versatile organization. The Bank recognizes that the ability to sense, anticipate, and manage "volatility and uncertainty" will be enhanced by having a responsive information and knowledge management system. Thus, the Bank embarked on a strategic initiative to instill the characteristics of a "knowledge-based organization" (KBO) in all aspects of its structure.

¹ The Central Bank of Malaysia.

INITIATING THE JOURNEY TO A KNOWLEDGE-MANAGEMENT ORGANIZATION

In 1999 a task force was formed to carry out the undertaking of becoming a knowledgebased organization (KBO). It released its recommendations in July 2000, and in that year Bank Negara Malaysia launched its five-year KBO strategic development initiative to leverage on the application of knowledge as a critical resource to enhance productivity and organizational performance. A KM Roadmap was adopted (Figure 1). The Bank's KBO development efforts incorporated human resource management, training and learning management, knowledge management, information and communication technology management, corporate governance, information security management, and office space management. The posts of Chief Knowledge Officer (CKO), Knowledge Management Officer (KMO), and Knowledge Management Committee were introduced.



KM Roadmap 2001-2005

Figure 1. Roadmap 2001-05

THE JOURNEY TO A KNOWLEDGE-BASED ORGANIZATION

During the period 2000–02, various programs and improvements related to KM were introduced in the Bank:

- Enhancing network facilities through KBO information technology.
- Introducing gradual changes to a wide range of human resource policies through a human resource management development (HRMD) program.
- Introducing new courses, systems, and competencies.
- Facilitating communications and awareness through the Knowledge Management Committee.
- Redesigning the library environs to become more reader-friendly in terms of ergonomic furniture and providing cheerful colors used in paintings and furniture on walls. In addition, the library system was improved by providing portal services and easier information sourcing.

From 2002 to 2003, policies and guidelines for the management of corporate memory were introduced. The aim was to enable the Bank to capture both tacit and explicit knowledge.

A challenge was how to sustain the knowledge application, knowledge-sharing, and knowledge development in the Bank. It is not surprising that employee interest in the programs may fade after some time. Among the initiatives taken to address this issue were to create crossfunctional teams and benchmarking projects and to conduct study visits or attachments. At the same time, the Committee continued to promote the use of email and a virtual discussion room and to disseminate knowledge through department home pages.

Due to the intense use of information and communication technology (ICT) through the various programs that were introduced, more technical staff members were needed to support and ensure the efficient running of the systems. Hence, the Bank began recruiting personnel with new skills and expanding the knowledge horizon of the existing staff in the field of KM. More personnel with web design skills were recruited, and staff members participated in postgraduate KM programs.

In KM, there is a need to define the ownership of information and content for resource management purposes. Without clear ownership, the sharing of information and knowledge may experience problems like duplication and confusion. Therefore, the KMC laid down the internal and external communication policies for the Bank. For example, the ownership of staff biodata, internal training, and learning content, originally under the human resource division, was transferred to the human resource development council.

The role of the librarian has been expanded to that of an information specialist. The librarian was made responsible for conducting departmental-level knowledge audits (K-audits). The corporate taxonomy was formulated and organized the effective provision of information through the library portal.

In 2003, the Bank conducted an independent organization climate survey to assess the progress achieved over the previous three years. The results indicated that the Bank's organization development initiatives had created a more effective organization in terms of leadership, operational efficiency, knowledge management, communications, career development, compensation, and work-life balance.

In the same year, the Bank embarked on a technology blueprint for central ICT-Knowledge Management (KM) services. This framework provides a focus for action to address ICT and KM infrastructure needs as well as information and technology integration. The emphasis is not only on automating the organization but, more importantly, on connecting people to people and achieving more rapid access to well-organized information across all relevant spectrums for sound analysis and decision-making. The aim is to create an organization with highly knowl-edgeable and collaborative people and where ICT is leveraged extensively to serve stakeholders.

The Virtual Discussion Room (VDR), Departmental Home Pages (DHP), and other collaboration and communication services introduced earlier continue to mature, with steady growth in usage and content. In 2003, a new channel, the Corporate Portal (Kijang.Net), was introduced to provide a single window that facilitates awareness and communication through access to online electronic information services and application systems in the Bank, as well as polls and surveys.

From 2003 to 2004, the Bank initiated its KM measurement framework. In this framework, the key performance indicators (KPI) were defined and the measurement taxonomy was designed. It was then followed by data collection and the analysis of KM performance.

From 2003 to 2005, the KM culture was further promoted to all employees of the Bank, including promoting changes in behavior and protocol. Usage of the KM infrastructure was heavily promoted among staff members.

KEY ENABLERS FOR KM

The Bank believes that key enablers for KM depend on factors such as the role of leadership, organizational structure, information structure, and human resources. Leadership in the organization plays an important role by providing an example for employees.

In terms of organizational structure, a more flexible structure was preferred, with certain guidelines. In this context, cross-department projects were encouraged in order to broaden the knowledge perspectives on certain issues and to enable new ideas to be introduced within the team. A strict hierarchical structure in an organization could hinder innovation and limit the creativity of the employees because people pay more attention to protocol and red tape than to achieving creative results.

Human resource is also a key enabler in KM because knowledge, especially tacit knowledge, originally resides in the employees' minds. Knowledgeable employees contribute to the performance of an organization; knowledge can be transformed into procedures, business strategies, and new products and services. Therefore, a good human resource practice is critical in producing knowledgeable workers. Lastly, KM initiatives should be able to transform employees' knowledge into benefits for the organization.

In this information era, the information infrastructure can contribute to the success of a KM program. It makes the sharing of knowledge more efficient and effective in terms of time and coverage. Currently, knowledge—especially explicit knowledge—that resides in journals, working papers, and other publications can be easily retrieved from the Internet and intranet. At the same time, the dialogue among a community of practitioners can occur in real time. This means that knowledge acquisition and sharing can be accomplished very quickly. The challenge is how to take this knowledge to the next phase: conversion and application.

The Process Enabler Model

The KM enablers mentioned above should synchronize with the knowledge process to arrive at a KBO end game which includes KM skills and aptitude, deliverables, and the establishment of a KM culture and practices within the organization (Figure 2).



Figure 2. KM Processes and Enablers

Knowledge Organizational Structure of the Bank

The knowledge organizational structure of the Bank is led by the designated Knowledge Champion, to whom the Chief Knowledge Officer (CKO) reports. Directors of divisions report to CKO as well as to the assistant CEO. In each division, a knowledge officer is appointed to provide the relevant KM inputs to the directors and the CKO. At the same time, the knowledge officers assume the role of agents of change and gatekeepers of organizational knowledge for their respective divisions.

The Knowledge Management Committee is the advisor to the CKO as far as evolving the KM strategy is concerned. The KM Center provides the facilities for the knowledge officers to carry out their tasks, while the assistant CEO guides the directors at the macro level.

KM CENTER STRATEGY AND SOME INITIATIVES

The vision of the KM Center is to create and enhance business value through an explicit and systematic management of knowledge assets through KM strategies:

- Management of internal as well as external information and knowledge by properly collecting, analyzing, repackaging, value-adding, and representing items so that they become visible and accessible.
- Continuing the enhancement, collaboration, monitoring, and measurement of KM and knowledge processes.
- Proactively providing the right information, in the right context, to the right people at the right time.
- Supporting the stakeholders by understanding and meeting their specific information and knowledge needs.

The strategy of embedding KM practices into the Bank's work processes is a continuous process expected to contribute towards the creation of a better enabling environment for the knowledge workers in the Bank.

Corporate Taxonomy

A key milestone was the successful completion of the Bank's corporate taxonomy project, the Bank's information classification framework established as a foundation to develop a KM repository system referred to as the Bank's knowledge hub. Supported by search engines and information security policies, the hub serves to enhance knowledge visibility and accessibility, thus further facilitating the process of knowledge acquisition, reuse, sharing and creation.

KM Measurement

The KM measurement system was introduced by the KM Center to measure the effectiveness of the programs. Appropriate indicators were chosen and suitable data collection methods identified. Besides measurement, the knowledge audits (K-Audits) are also important to assess the status of KM within the Bank. The audit checklists were also prepared by the KM Center.

KM Fair

The Bank hosted a KM Fair during the year to help increase awareness among the staff about the new KM techniques and practices as well as the importance of information security management. Learning games and exhibits showcased the many KM solutions introduced in the Bank. The fair also brought together some of the better-known KM practices, such as storytelling and social networking through communities of practice.

Redesigning Spaces

The reconfiguration of space within the Bank has resulted in more open and flexible areas, including connectivity to information systems, thus allowing staff from different departments to meet for discussions and work.

Training and Learning Management

In response to the Bank's priority of becoming a more performance-driven and knowledgeenabled organization, internal capabilities in fields such as human performance improvement, evaluation of learning effectiveness, and instructional design were enhanced.

As part of the Bank's efforts to develop leaders from within, the first customized leadership development program for senior management was conducted in collaboration with the Center for Creative Leadership. Seventy potential leaders took part in the program, which spanned a period of one and half years. They were involved in highly engaging interactions with senior management for strategic alignment and values inculcation. The 360-degree assessment feedback tool provided greater self-awareness in leadership styles and focused on personal development plans.

OUTCOMES AND LESSONS LEARNED

The KM initiatives were first initiated in 1999, and the Bank has completed all four stages of a KM roadmap. Generally, the KM initiatives have resulted in a positive impact on the organization in terms of increasing the efficiency and effectiveness of the Bank's operations.

An encouraging outcome was the increased utilization of the KM infrastructure. For instance, the number of walk-in users of the Bank's Knowledge Management Center (KMC), established in 2004, increased by 92%, from 8,386 to 16,126. The number of subject-specific repositories created in 2005 by the KMC increased from 32 to 42 (a growth of 25%), which is partly a measure of the growth in the Bank's intellectual capital. The other notable trend was the higher utilization of the KM's library portal by 13%, from 31,969 to 35,990, as well as an increase of 10% in user access of online databases, from 14,010 to 15,440.

Lessons learned that can be shared with others:

- Get the strategy right; don't spend too much time on planning and none on taking off.
- Emphasize small wins more and a "big bang" approach less.
- Place more emphasis on the human aspects and the knowledge process.
- Do not call every initiative "knowledge management."
- Have more face-to-face interaction; allow sharing of tacit knowledge, where people exchange views, acquire a leadership style, and discover the art of negotiation and decision-making.
Ida Yasin National Expert, Malaysia

PROFILE OF THE ORGANIZATION

The MARA University of Technology (UiTM) is an institution of higher learning in Malaysia that has experienced rapid growth since its founding in 1956. It has expanded nationwide, with three satellite campuses, 12 branch campuses, eight city campuses, 19 affiliated colleges, and a smart campus for the future. It has as its vision outstanding scholarship and academic excellence capable of providing leadership in all internationally recognized fields of professional study. Its library is the Tun Abdul Razak Library.

UiTM generates, disseminates, and advances knowledge within an ever-changing multicultural and technological global context. There is a broad range of disciplines, from hotel and tourism management to accounting to communications and media studies to medical and health technology, encompassing 25 faculties and over 200 academic programs spread over Science and Technology, Social Science and Humanities, and Business Management.

UiTM has forged linkages with a number of professional bodies, such as the Association of Chartered Certified Accountants (ACCA), UK; the Chartered Institute of Transport (CIT), UK; the Institute of Chartered Secretaries and Administrators (ICSA), UK; the Institute of Marketing, UK: the Institute of Administrative Management, UK; the Chartered Institute of Building (CIOB), UK, and many others around the world. Some of these ties go back a long way, such as that with the Ealing Technical College in the 1960s and Ohio University in the 1980s. These linkages have become a benchmark for UiTM's academic programs and research. Over the years, UiTM has entered into collaborations with other universities located abroad. To date, UiTM has more than 100 partner universities.

The Knowledge Management Portal in UiTM is managed by the Tun Abdul Razak Library (PTAR). There are 13 branches of UiTM in all states of Malaysia, with a library in all UiTM branches. The headquarters of PTAR are in Shah Alam, Selangor, where the UiTM main campus is located. Currently, there are 1.3 million collections in the library plus 46 online database subscriptions and 1.7 million images consisting of dissertations, theses, journal content pages, UiTM publications, and the Tun Mahathir collections. PTAR has three million users all over the country, mainly academics, researchers, and students.

The mission of PTAR is to improve library services through physical resources, KM, and current technology in support of learning and research through the delivery of quality services and a conducive learning environment for UiTM communities. PTAR's objectives are:

- To be an excellent information center with emphasis on customer services.
- To provide up-to-date and comprehensive information resources and ICT facilities as well as to emphasize continuous improvement in its work processes.
- To develop, through continuous training and learning, highly skilled and innovative staff, ethical, and proactive, with a strong spirit of teamwork.
- To develop staff with integrity and accountability who are resilient, practice good values, and strive to be knowledgeable, creative, and open minded.
- To ensure cost-effectiveness in library expenditures.
- To maximize the use of resources (manpower, facilities, system collection, and space).

KEY DRIVERS FOR THE ADOPTION OF KM

Key drivers for the adoption of KM in PTAR stemmed from the Chief Librarian, who saw increasing customer demand to improve the quality and range of library services. Since there are 13 PTAR branches, with users scattered all over the country and more than 100 partnerships with universities overseas, there was a need to implement KM so that acquisition and sharing of knowledge could be done more efficiently. PTAR clients have increased from 1.13 million in 2004 to 1.47 million in 2006 (Figure 1). The trend is expected to increase each year due to the expansion of the university's capacity as well as the increase in student population.



Figure 1. PTAR's Clients 2004-06

The knowledge of an organization can take many forms, but it resides primarily in the explicit and tacit categories. Explicit knowledge refers to recorded or encoded knowledge that can be transformed easily, stored in documents: examination papers, theses, minutes of meetings, student profiles, etc. (Figure 2). Tacit knowledge resides in the minds of people: professors, lecturers, administration staff, and students.



Figure 2. The Organization Content in Disparate Repositories

Explicit knowledge is more easily shared among an organization's members because it can be transformed into digital form and stored in a server. The Knowledge Portal facilitates the acquisition, classification, and sharing of knowledge in many forms: examination papers, journal articles, seminar papers, theses, minutes of meetings, student profiles, etc.

Implicit knowledge can be disseminated through dialogues, public lectures, meetings, cross-functional projects, and informal discussions among students and lecturers.

IMPLEMENTATION OF KM SYSTEMS

The Enterprise Knowledge Management System (EKMS) in UiTM was developed in 2005 at the Tun Abdul Razak Library (PTAR). Prior to EKMS, the library has gone through many stages of information and technology development. Looking at the history of the library since 1991, the computerization of library processes initially undertaken by the use of the SISPUKOM system, a huge transformation of the library system where the administrator and the users had to change the way they worked and used library facilities, from the manual method of searching books using cards to total computerization.

In 1993, the library implemented an integrated library management utility (ILMU) system, an improvement on the previous one in terms of technology. The system was available only at the main campus at Shah Alam. Two years later, ILMU was implemented at the UiTM branches as well. In 1998, ILMU became web-based to allow users outside UiTM to access the system, even from home. In 2000, the library recognized the importance of digitalization of the library repositories, such as examination papers, UiTM journals, journal content pages, theses, seminar papers, etc.

In 2003, a Bibliographic Data Management System (BDMS) came into operation which allows data tracking in terms of the location of publications from all PTAR branches in Malaysia. In 2004, a Multi-media Object Management (MOM) system was introduced, followed by an upgraded version of ILMU. In 2005, the enterprise knowledge management system was implemented. It has been providing the tools for KM in PTAR to this today. The PTAR route towards KM can be summarized in Figure 3.



Figure 3. PTAR ICT Route towards KM

The KM program in PTAR was divided into four phases (Figure 4). The first phase, begun in 2005, analyzed the existing infrastructure and aligned KM with the organizational strategy. In the second phase, the KM infrastructure was designed, a KM team was formed consisting of PTAR librarians, an audit was conducted on the knowledge assets and systems, a KM blueprint was created, and a KM system was developed. The third phase is where the KM system was

installed and PTAR had to manage change, culture, and reward structures. Lastly, in phase four the performance of the system is evaluated and the KM system is incrementally refined. As of this writing, PTAR has arrived at stage four.



Figure 4. Knowledge Management Roadmap

KNOWLEDGE CONTENT AND PROCESSES

Knowledge management in PTAR includes several key processes: capturing, storing, managing, preserving, and delivering knowledge (Figure 5). The first stage is capturing knowledge, which can be in the form of human-created or application-created information. Human-created information refers to information from office documents, forms, media, and microfilm. Application-created information refers to enterprise resource planning, electronic forms, and finance. The use of technology expedites document imaging, forms processing, and aggregation of processes. All these inputs are classified by input design, index, and category as determined by the librarians.

The second stage of the knowledge process is to manage, store, and preserve knowledge. Managing knowledge refers to the management of the document, content, workflow and records. Storing knowledge refers to knowledge kept in the database and data warehouse in the form of DVD, magnetic storage, optical discs, or server. Preservation of knowledge refers to the archives for future reference and back-up.

The third stage is the process of delivering the knowledge, which includes the transformation process, security measures, and distribution of output. The final output of this KM process to users can take various forms: paper, Internet, intranet, portal, email, fax, mobile devices, electronic statements. The content and knowledge process is shown in the graphic presentation below.

IMPACT ON PRODUCTIVITY

Implementation of the enterprise knowledge management system has had a positive impact on the organization to the advantage of both the user, who can access information and knowledge efficiently, and the administrator, for whom the working process has become more productive. Based on the statistics collected by PTAR, each cataloguing staff was able to increase productivity seven-fold on average. Previously, the cataloguing rate was fifteen titles per day for each staff. With the use of the KM enabler, cataloguing can be done at the rate of 105 titles per day per staff (Figure 6).



Figure 5. Content and Processes

USING KM ENABLER				
Original Cataloguing at 15 titles / day			Using a KM Enabler at 105 titles/day	
Full-time Catalogu er	Orginal Catalogui ng (per day)	Titles catalogued per month	With the KM Enabler (per day)	Titles catalogued per month
1	15	15 x 22 days = 330 Titles	105	105 x 22 days = 2310 Titles
2	30	30 x 22 days = 660 Titles	210	210 x 22 days = 4620 Titles
3	45	45 x 22 days = 990 Titles	315	315 x 22 days = 6930 Titles

Figure 6. Using KM Enabler

The organization was thus able to save about MYR80,000 per year based on the premise that PTAR handles 20,000 titles per year, with an 80% hit rate by the users and MYR5.00 per title. In other words, PTAR has become more productive in terms of labor productivity, using the same human resources but producing more output.

Users have provided feedback in terms of the benefits of the knowledge acquisition process:

- Improved response time.
- Improved output quality.
- · Accelerated learning.
- Better sharing of good practices.
- Increased availability of expertise through the experts' profiles.

CHALLENGES IN KM IMPLEMENTATION

In implementing KM at PTAR, there were a few challenges addressed by top management. Firstly, it was about managing change in the organization. When EKMS was started, it required total commitment from all levels of staff to understanding the importance of KM within the organization. Awareness talks and discussions were organized to promote the advantages of EKMS and to get buy-in from employees from the beginning. This was important because it entailed extra work to be done on the part of employees to ensure that the system performed effectively and smooth-running of the system ran smoothly. Only when the system was in place could employees appreciate its advantages in terms of helping them serve customers. The library users will definitely welcome such improvements as well as the KM facilities because they make their life easier, especially in terms of acquiring and sharing knowledge.

Secondly, PTAR recognized the challenges in the university when new students and lecturers come to the campus. To educate these new members, PTAR designed the User Education Program, consisting of information searching skills training and the library orientation program. In 2004, 1,120 people attended the information searching skills training program and 3,570 the library orientation program. These numbers increased in 2006: 3,272 for the information searching skills training program (Figure 7).



Figure 7. User Education Program

TUN ABDUL RAZAK LIBRARY ACHIEVEMENTS

The library has received accolades over the past few years for its innovative and creative circles, achievement of quality standards, and quality awards:

- ISO9000: 2000 Certificate" Lloyds registrar quality assurance (April 2006) for headquarters.
- ISO9000: 2000 Certificate : Twelve UiTM state libraries (December 2006).
- UiTM Vice Chancellor Quality Award 2006 in six categories:
 - Best department.
 - Leadership.
 - Management, analysis and knowledge management.
 - Strategic planning.
 - Organizational performance results.
 - Student, stakeholder and market focus.
- UiTM Vice Chancellor Quality Award 2004 and 2005:
 - Top four finalist Vice Chancellor Quality Award in 2005.
 - Information and analysis award 2005.
 - Quality output award 2004.
- UiTM Innovative and Creative Circle (ICC) Convention 2006:
 - Best innovation award.
 - Best logo award.
 - Best male presenter.
 - Best documentation award.

CONCLUSION

PTAR is an organization that regards quality initiatives as its most important activity, believing that they are able to make increase their productivity. With that premise in mind, PTAR has shown a strong commitment to put in place the KM system needed to meet future challenges. Since knowledge has become the competitive edge, PTAR strives towards knowledge acquisition and knowledge-sharing among the members of the university as well as other parties with the same interests. The UiTM website is www.library.uitm.edu.my/.

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BACKGROUND

The Department of Health is one of the line departments or ministries of the Philippine government, with more than 1,400 employees in the central office, about 700 employees in attached agencies, nearly 5,000 employees in the regions, and more than 21,000 employees in specialized and retained hospitals. It is responsible for health policy, health regulations and standards, and operation of specialized hospitals. Health operations were devolved to local governments by the Local Government Code of 1991, except for some specialized and retained hospitals.

In summer of 2000, Crispinita Valdez, the director of Information Management Services (IMS) embarked on a study tour on the health information infrastructure in Canada and the USA. Upon her return she brought with her brochures and other information materials on what was then the new trend in Health Canada: knowledge management (KM). She was quite surprised to learn that the IMS Division's functions were already KM components. She suggested that the IMS Division be renamed the knowledge and document management division (KDMD), but the proposed name was rejected by DBM because they had never heard of knowledge management. They wanted the unit called electronic data processing (EDP). However, EDP was not acceptable to the DOH. The DOH repeatedly submitted justifications as to why it should be named KDMD. After six months, the DBM finally approved the name of the new division as the Knowledge Management Division under the leadership of Ms. Charity L. Tan. This was the first KM unit in the Philippine government (Figure 1).



Figure 1. Reorganization of Information Management Services

KM at the DOH was created prior to the KM Systems Bureau of the Philippine House of Representatives, which was set up in September 2001, and also prior to the Development Academy of the Philippines' (DAP) Center for Knowledge Management, which was set up in 2002.

¹ The author acknowledges the contributions and assistance of the following in the preparation of this case study: Ms. Charity L. Tan, Chief of the KM Division; Ms. Aida Aracap, DOH Librarian and Mr. Arnel Villanueva.

The IMS after the 2000 Rationalization

The three IMS divisions at the DOH—the systems and software development division, the database and network management division, and the knowledge and document management division (Figure 1)—deal with software, hardware, and content, respectively. Thus, the archives and the DOH Library are under the document management division, which was subsequently renamed the knowledge management division (KMD).

From 2001 to 2005, the KMD computerized the DOH library, preserved and digitized permanent records and archives, established the administrative issuance billboard, and developed and maintained the DOH Internet and intranet websites.

The first community of practice (CoP) was established long before the KM division came into being, in 1998, when the health information technology professionals (HITPRO) was registered with the Philippine Securities and Exchange Commission (SEC). HITPRO is an e-community of ICT professionals whose members come from the DOH central office and from the DOH regional offices (called centers for health development or CHDs). HITPRO members meet every year in an event called ICT Update, participate in trainings, and exchange knowledge and the latest developments via their own Yahoo e-group.

KM STARTS IN EARNEST

In 2005, IMS obtained funding from WHO-Philippines to develop a KM framework for DOH. In early March, Ms. Charity Tan contacted a KM service provider, CCLFI.Philippines, for possible collaboration. The project involved the development of a KM strategy and resulted in KM programs and an action plan, to guide the development of a DOH KM system aligned with DOH goals and mandates, and a training program, which involved the participation of and the nurturing of a sense of community among the members of a KM team, composed of internal ICT/KM champions from various DOH units. The project formally began on 6 July 2005.

A KM Champion from Within

It was very apparent that KM had a champion in the person of Ms. Tan. She is supported by WHO-Philippines program officer Ms. Lucille Nievera, who also has a strong interest in KM. The close proximity of the WHO-Philippines office to the office of Ms. Tan may have contributed to the close coordination between the two. However, it was important that more potential champions throughout DOH be identified and invited to join the KM team being formed.

Identifying Other Potential KM Champions

Even before the formal start of the project on 6 July, a questionnaire was issued to middleto upper-level managers of all DOH units. DOH has eight bureaus, eight bureau-level centers and services, six attached agencies, and a few other specialist units, including a research institute. The questionnaire consisted of items to gauge the respondents' behavior and was expected to be correlated with the desired qualities of an ICT/KM champion.

The steps that were taken to identify potential KM champions who would be invited to form an eventual DOH team were:

- 1. Design and administer a questionnaire (with quantitative items) for middle- to upperlevel DOH managers to identify potential ICT/KM champions.
- 2. Factor analysis of items to get the best composite score.
- 3. Nominate high scorers to each bureau director.
- 4. Bureau directors make the final decision.

It is interesting to note in relation to Steps 1–3 that among the 33 questionnaire items, the most effective factors related to being a potential KM champion were a self-image of being computer- and Internet-savvy (a "techie"), a self-rating of above average individual productivity (a "performer"), one's ideas being often listened to and accepted within and outside the unit (an "influential"), skill in PowerPoint presentations, technical writing, and presentation, and acting as emcee, public speaker, or chair of a meeting (a "communicator"), and having many friends outside DOH and enjoying networking (a "networker").

Obtaining Initial Buy-in

Below is a simple one-page chart which was shown and explained to the DOH bureau, center, and service directors as to how KM can benefit their unit. They were informed that a department-wide KM team would be formed and that they would be asked to select and approve a nominee from their unit. The KM team member would be trained in KM and be the liaison between their unit and IMS.



Figure 2. Benefits of KM to a DOH Bureau/Center (KRA=Key Result Area)

Horizontal Spread

The intent behind forming a team of internal KM champions from various DOH units was to broaden the understanding, appreciation and support of KM throughout the department (horizontal spread). Eventually the team would be able to contribute to a greater awareness and understanding of KM among the lower ranks (downward spread). Because the KM initiative was started in the middle level of the DOH bureaucracy, from IMS Director Valdez and KMD Division Chief Tan, there was a need to get executive buy-in (upward spread).

Obtaining Executive Sponsorship

The KM project was presented to the DOH Executive Committee (Execom) for approval in August 2006. The Execom consists of the secretary, undersecretaries and assistant secretaries, and selected support senior managers. Included in the agenda for Execom approval were the proposed strategy for framework development and the funding for a knowledge audit in the central office. The plan for an audit, which would determine the knowledge resources, gaps, and possible interventions at DOH, was presented. Likewise, a corresponding budget was approved to conduct a knowledge audit. There was not yet a KM framework, so there was no need for large-scale financial support.

In the briefing for the Execom, it was also decided that all upper-level managers of the central office would be required to attend a whole-morning briefing on KM and the DOH KM project, participate in the KM audit the following afternoon, and fill out the requisite questionnaires. DOH Secretary Duque subsequently issued Department Personnel Order No. 2005-2276 on 19 October 2005 to authorize and provide budgetary resources for the KM briefing and writeshop among the top managers of the DOH central office.

The first issuance signed by Secretary Duque in support of KM DOH was Department Memorandum 2005-0077, which enjoined all DOH units to cooperate with IMS in formulating a department-wide KM framework and action plan. In the document "Developing a DOH Knowledge Management System," signed on 3 June 2005 the secretary explained:

We envision a system that will enable DOH workers to quickly access the information they need to make prompt and effective decisions and to provide quality services for our internal and external clients. In accordance with this vision, we intend to develop a worldclass DOH portal that will serve all DOH units and attached agencies as well as external stakeholders and partners of the Department.

For this purpose, you are hereby enjoined to cooperate and support the Information Management Service, which is mandated to lead the successful execution of this project. IMS, through its Knowledge Management Division, will shortly communicate with you regarding the necessary operational steps and requirements for this Departmental initiative.

PREPARING FOR THE FORMULATION OF AN ORGANIZATION-WIDE KM FRAMEWORK

Aligning KM with Organizational Goals

One way to align KM to organizational goals is to ensure that the KM system or initiative is designed and implemented to support the core business processes of an organization. The core business processes, in turn, are assumed to have been properly selected, defined, standardized, and continuously improved to produce the desired organizational results. The core and other business processes should fittingly operationalize the value proposition of the organization.

In other words, the proper sequence of management questions is: What are our organizational goals and desired results? (Value creation by the organization) What is the right thing for us to do? (Value propositions of the organization together with corresponding identified core and support business processes) How do we do it well? (The KM framework or strategy of the organization) (see Figure 3).



Figure 3. Aligning KM with Organizational Goals

For the WHO-supported KM framework development project, the assumption was that the project would not audit or question existing DOH functions and processes.

Starting August 2005, the German Development Cooperation agency, Deutsche Gesellschaft für Technische Zusammenarbeit GmbH (GTZ), deployed a German KM expert to undertake a short-term KM audit specifically of the policy-making processes of DOH. He experienced difficulty because the policy-making processes at the DOH were not yet completely defined, standardized, or documented. The local GTZ program officer realized that a policy process audit should have preceded the KM audit of policy processes. As a consequence, negotiations for a policy process audit/improvement project were initiated between GTZ and CCLFI.Philippines in December 2005. This project, entitled "Improvement of the Health Policy Process in Support of Fourmula One for Health," was subsequently implemented between March and December of 2006. "Fourmula One" is the DOH policy framework initiated by DOH Secretary Duque.

Twenty-seven existing and recommended processes in the national health policy cycle were examined through a participatory diagnosis-prescription cycle. The diagnosis covered the official or legal mandate, efficiency and effectiveness gaps, appropriateness and adequacy of inputs and support systems, including information and knowledge, and external coordination and support. In the last stage of the project, a training program in policy research tools for the DOH Health Policy Development and Planning Bureau (HPDPB) was conducted.

KM Audit

A KM audit to characterize existing DOH readiness and capabilities for KM and to identify and prioritize information and knowledge gaps was needed to provide input for the KM framework formulation process. The chart below summarizes the steps in the organization-wide KM audit (Figure 4). It shows how the audit proceeds from organizational goals and feeds input to the KM framework. It begins by identifying the kind of knowledge needed to perform existing DOH mandates (goals and strategies specified by law, by higher executive bodies, and by the DOH secretary and Execom) and unit-level functions. In other words, the KM audit is a demanddriven audit. To capture all unit-level demands, the knowledge taxonomy is not simply a categorized listing of knowledge assets but also a tool to quantitatively prioritize or rank the various items in every category according to demand.



Figure 4. KM Audit

The KM audit assumes that the existing functions and processes, as well as the staff complement and their skills sets, are already extant and therefore are not to be audited. The exceptions are the health policy processes, which were separately audited in another project (see Section 3.1). What was audited in this undertaking was basically the support system that manages and supplies information and knowledge to DOH knowledge workers.

Steps 2, 3 and 7 are participatory. They involve the participation of DOH personnel, especially the DOH KM Team. Steps 2 and 3 were performed through a series of four day-long KM briefings and writeshops for DOH managers in November 2005. The scope of Step 2 is both internal and external (stakeholders) knowledge demand; the outputs of Step 2 are intended to improve the DOH intranet serving internal users and also its website serving the public. Step 6 was performed using a proprietary instrument of CCLFI.Philippines, the Learning Organization Diagnostics[©].

Training and Engaging the DOH KM Team

On 5 January 2006, the DOH secretary issued Department Personnel Order No. 2006-0075 formally creating the DOH Knowledge Management Team, consisting of 29 members drawn from each unit of the central office. The two functions of the team are 1) to constitute a core group or community of KM practitioners within DOH, and 2) to act as advisor to IMS in the continuing development of the DOH KM system.

The functions of the individual team members are:

- 1. To act as liaison between one's Bureau and IMS and thereby facilitate customization and updating of the Bureau's portal in response to its priority information and knowledge requirements.
- 2. To act as a resource person in KM for one's Bureau.
- 3. To act as a representative of one's Bureau in KM trainings, conferences or projects.

The order came after several months of formative meetings and training of the KM team. It formally acknowledged and cemented the identity and role of the DOH KM team.

The timeline of the development of the KM team was:

- 1. Informal organization of the KM team in August 2005.
- 2. Weekly training of the KM team members (August 2005 to March 2006) and their engagement in the KM framework/strategy formulation processes.
- 3. Formal creation of the DOH KM team with a department personnel order from the secretary in January 2006.
- 4. Participation of the team in a KM framework development and action planning workshop in March 2006.

In addition to lectures, the training involved hands-on exercises with tangible and useful results. The KMD also set up support activities for the team:

- FAQ or frequently asked questions on KM:
 - Simple definition of concepts.
 - Clarification of issues most often encountered.
 - Establish a common language among the KM team members.
 - Help KM Team members field questions or explain KM to others.
- "KM Elevator Speech": a short, 30-second speech explaining to a very busy person what KM is and its benefits.
- Experiential exercises, polls among participants, practice of a process.
- Start of an expertise locator map or internal "White Pages."

- An e-group.
 - Group communication.
 - Common files that members can download and read.
 - Venue for Q&A.
- KM@DOH webpage in the DOH portal.

DOH Portal Enhancement

Another project in the DOH-WHO technical assistance plan for 2005 was a Portal Enhancement Project. This ICT project was implemented a few months after the KM framework development project was begun. The DOH directors were also informed that one of the outputs of the KM audit would be to input to the Portal Enhancement Project (Figure 2). The intended result would be an improved DOH intranet that would more effectively provide the "right and prompt knowledge for the technical staff" of their unit.

IMPLEMENTATION PROBLEMS

Implementation problems were encountered and addressed.

- Text chat did not work out; most members either do not have time or are not familiar with the technology. A mix of emails and face-to-face interaction remained effective. The lesson learned was to use a mix of technology appropriate to the level of sophistication of the users.
- Before the DOH secretary issued the department personnel order, attendance at KM team meetings and weekly training sessions was perfunctory. The members tended to give more priority to the performance of duties in their mother units. The lesson learned was that in the Philippine government context, an order from the top that authorizes the deployment of staff for KM purposes is essential.
- Perhaps for the same reason, the initial plan where the KM audit instruments are to be administered by individual KM team members to their units was not feasible. This was replaced by four day-long writeshop sessions.
- The original plan of each unit administering the stakeholder survey did not work out; instead, a research assistant from CCLFI was tasked to perform the job. Most units did not have an integrated database of external stakeholders; they had isolated telephone directories in the hands of various managers and secretaries. Like many other government agencies, the perspectives and capabilities for customer orientation and for sensing customer or stakeholder needs are also weak.
- After the writeshop, a few participants who could not finish the survey were allowed to take the forms home. Most of the take-home surveys forms were not promptly returned, and it took many weeks of follow ups before they were received from the respondents. The lesson learned was that the writeshop must be completed on the same day and the surveys must be shortened and simplified.
- In late 2006, Ms. Charity Tan obtained KM certification from the US-based International KM Institute. Most of the members of the DOH KM team also obtained this KM certification. This significantly boosted the knowledge and confidence of the KM team and contributed to the sustainability and spread of KM across DOH. Subsequently, in May 2007, DOH invited to the Philippines the Institute's lead resource person, Mr. Douglas Weidner, for a series of meetings.

PARTICIPATORY WORKSHOP TO DEVELOP A KM FRAMEWORK AND ACTION PLAN

A three-day workshop was designed with a technical and a behavioral objective. Its intended output was a consensus among the KM team on the DOH KM framework and an action plan. The workshop also aimed at enhancing teamwork and personal motivation of the work team members. Figure 5 summarizes the approach used in the workshop to identify and work on the overlap between personal and organizational goals.



Figure 5. Harnessing Energies for KM

The KM framework that the KM team agreed upon in the workshop is shown in Figure 6. It is focused on the DOH knowledge worker. It envisions a KM system that provides tangible and intangible inputs and support for the DOH knowledge worker to be able to perform his or her job well.



Figure 6. Initial KM Framework

To formulate an initial KM action plan, the team identified, scored, and ranked actions that promised short-term tangible benefits, were doable, and required only minimal resources. What the team liked most was that they "learn KM by doing KM" by developing KM toolkits that will be used by DOH as well as by other health ministries in developing countries. This priority action was supported by WHO in the following year.

Among the top-ranked toolkits identified were a web-based FAQ for the general public (to decrease the time spent by DOH staff answering phone-in and walk-in queries and requests for documents and forms), a web-based Expertise Locator, and the manualization and computerization of more DOH work processes, such as a web-based staff selection and recruitment process.

The thinking behind the choice of KM toolkits is:

- "Learning by doing" by the KM team allows them to continue their training in the area of KM practice and to further their working relationships; consultants are hired but function only as guides or mentors.
- The toolkits must generate benefits for the DOH knowledge worker (save time, increase productivity, etc.) and for DOH's external clients (save time, greater convenience, less hassle, etc.).
- The impact of KM toolkits must be measureable so that the rest of DOH can see and appreciate the benefits.
- Toolkits should be web-based to further enhance usage of the DOH intranet.
- The initial set of toolkits selected were "White Pages" (or internal expertise locator; the word "expertise" was viewed as too presumptive), requirements and FAQ (for public applicants of permits, etc.), experimental wiki (for collaborative authoring or consultations), and computerization of a business process (process selected was an integration of all steps followed by new employees).
- The documentation should be replicator-friendly for the benefit of other Asia-Pacific health departments/ministries which may want to copy the work of the DOH KM team.

In April of 2007, with WHO financial support, the team started on their KM toolkits project. At this stage KM had reached the operational levels. The team was now in a position to see and measure the results of KM.

A big boost to the training of the KM team came in May 2007. Ms. Tan was able to obtain financial support from various sources to provide KM certification for most team members. Mr. Douglas Weidner of the International KM Institute in the USA came and presented a five-day training program for them as certified knowledge managers.

THE HEALTH SECTOR REFORM (HSR) RESOURCE AND LEARNING CENTER

Prior to 2005, the Asian Development Bank committed to fund the equipment for a databank to support the Health Sector Reform Agenda. In mid-2006, a five-year plan for the Health Sector Reform (HSR) Resource and Learning Center (RLC) was formulated by DOH with assistance from the Asian Institute of Management (AIM). AIM recommended that the RLC be aligned with the knowledge management (KM) system and framework of the Department of Health (DOH). The GTZ-supported health policy process audit/improvement likewise made a similar recommendation.

The initial products and services identified for the RLC are:

- Repository library.
- Knowledge desk.

- Networks and communities of practice.
- Knowledge broker, including translation of research results for input to policy-making, expertise locator, and venue for participatory multi-sectoral discussions in health policy issues.
- Facilitator of customized, blended learning programs, covering the training needs assessment phase, course designs, and provision of logistic support.

Operationalization of the RLC is not the responsibility of IMS but of the Health Policy Development and Planning Bureau. How the center will be integrated with the overall DOH KM system is still to be seen.

BRINGING INTERNAL KM AND EXTERNAL KM TOGETHER

A KM system for a government department or ministry must source information, knowledge, and other forms of support not only from within but also from outside. It must serve the information and knowledge needs of itself as well as those of its many publics: local governments, industry, public and private institutions, professionals and practitioners, and citizens.

DOH has been engaged in various externally-oriented ICT/KM initiatives:

- 1. Supporting an e-community: K-mapping of DTTB
 - To serve numerous remote Philippine rural communities without doctors, the DOH set up the Doctors to the Barrios (DTTB) Program in 1993. The K-mapping project aims to describe and map, using a social network analysis (SNA) software, the nature and frequency of communications and knowledge flows among the doctors and between the doctors and support institutions in preparation for enhancing the social and professional support system of the doctors to improve their diagnostic capability and facilitate their integration with mainstream health support systems. This project shows the readiness of DOH in supporting e-communities in the health sector.
- 2. e-Learning for DTTB

The e-Learning project aims to upgrade skills of rural doctors in the DTTB program. It aims to lessen the negative impact of large numbers of nurses and doctors leaving the Philippines to work abroad. The initial pilot study focuses on tele-mentoring to improve the quality of diagnostic radiology in primary health care centers.

3. e-Jobs

A web-enabled job posting system (e-Jobs) is being developed to facilitate electronic posting of job vacancies in the DOH system as well as in other government agencies, local government units, and private facilities/organizations involved in health care. As employers post their job requirements, job seekers may apply online.

4. Knowledge translation: the annual Health Research for Action National Forum (HRANF)

Since 2000, the HRANF, an annual two-day conference, has been sponsored by the DOH, the Philippine Council for Health R&D, and other partners to bring together research for inputs to health policy-making and to clinical practice. The basic objective is to bridge the "know-do gap" between research results and the needs of users of knowledge and to improve evidence-based health policy-making and decision-making.

5. Health Metrics Network and the strengthening of the Philippine Health Information System (PHIS)

Strengthening the PHIS is the main goal of the Philippine Health Information Network (PHIN), a multi-agency and multi-sectoral network led by the DOH with the National Statistics Office, National Statistics Coordination Board, and the Philippine Council for Health Research and Development. The PHIN will facilitate the exchange and sharing of relevant and quality information and knowledge. It will develop policies and standards for health information generation, sharing, interoperability, confidentiality, and other concerns. The Philippines was selected by WHO as one of the first batch of 40 countries that will pilot-test the Health Metrics Network, whose purpose is "to increase the availability and use of timely and accurate health information by catalyzing the joint funding and development of country health information systems." In mid-2007, the Network project is in its assessment phase. It is expected that in two years' time, the project will greatly improve PHIN.

LESSONS LEARNED

The firm institutionalization of KM at the Department of Health increased in the last three years, thanks to a growing internal advocacy from IMS and confidence in a core group in its capacities for KM. IMS is planning to convert itself into a national health knowledge management center. It is ready to integrate internal KM with external KM.

However, vulnerabilities remain. The most serious is the dependence on donor funds from outside. Coordination falls short in bridging the gaps: the gaps in KM funding by donors which led to KM for policy processes moving ahead of the formulation of the DOH KM framework, the gap between the HSR resources and learning center program and the KM initiatives at IMS, and the programmatic gaps between various ICT and KM initiatives and pilot projects funded by WHO headquarters and the DOH KM framework.

The KM journey at the DOH taught valuable lessons or confirmed what had been found workable elsewhere:

- The importance of executive sponsorship and support.
- The role of an internal KM champion for initiating KM.
- The attention to both technical and behavioral processes and outcomes, such as optimizing the overlap between personal and organizational goals towards KM objectives and adopting a flexible approach to fit the prevailing organizational culture.
- The effectiveness of a participatory instead of a consultant-driven KM.
- The role of a cross-functional in-house KM team with official sanction from top leadership.

TEAM LEARNING AND LEARNING-ORIENTED MANUALIZATION: EXPERIENCES OF THE MALAMPAYA MULTIPARTITE MONITORING TEAM

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ORGANIZATIONAL PROFILE

The Malampaya Multipartite Monitoring Team (Malampaya MMT) is the mechanism for transparency of the Malampaya Deepwater Gas to Power Project (Malampaya Gas Project or Project for short)². Under Philippine laws, all projects that are either environmentally critical in nature or are located in environmentally critical areas must secure an Environmental Compliance Certificate (ECC) from the Philippine government before operations can begin. When approved, the project owner—in this case, Shell Philippines Exploration B.V. (SPEX)—must form a corresponding monitoring team and fund its operations. The Malampaya Gas Project received its ECCs in 1998 and in 1999; as a result, the Malampaya MMT was formally instituted on 7 September 2000. Transparency is ensured by the multipartite membership of the MMT, consisting of representatives from local governments, local civil societies, and academic institutions as well as representatives from SPEX, the Department of Environment and Natural Resources (DENR), the Department of Health and other concerned agencies of the Philippine government.

Functions and Geographic Scope

The Malampaya MMT's function is to monitor the Project's compliance with ECC requirements and its implementation of the Environmental Monitoring Program (EMP), a program proposed by SPEX and approved by the Environmental Monitoring Bureau (EMB) of the DENR.

The Malampaya Gas Project's operation traverses three provinces in the Philippines: Palawan, Batangas, and Oriental Mindoro. The actual extraction of natural gas happens offshore from Palawan province, where the shallow water platform is located. The Malampaya Onshore Gas Plant, a facility that processes the extracted gas for commercial use, is located in Batangas province on Luzon Island.

The 24-inch, 504-kilometer pipeline that brings the raw gas from the extraction site to the processing facility passes through the boundaries of Oriental Mindoro province. With the project's wide coverage, the Malampaya MMT is the biggest one in the Philippines today. It consists of two smaller sectoral monitoring teams (SMTs) and is governed by an Executive Committee (ExeCom). The SMTs are the operational members of the Malampaya MMT, tasked

¹ The authors wish to acknowledge and thank for their assistance in the preparation of this case study Ms Esperanza A. Sajul, EIA-EMB representative to the MMT Execom, and Mr. Dennis Tojos, Executive Assistant of the Malampaya MMT.

 $^{^2}$ This is the country's biggest and most significant energy undertaking. The USD4.5 billion Malampaya Gas Project is a government venture through the Department of Energy (DOE), with the development and operation hedged on Shell Philippines Exploration B.V. (SPEX). Over the estimated 20-year lifespan of the project, it would supply 30% of the power needs of Luzon, one of the three main islands of the Philippines, thereby easing the country's dependence on imported fuel. The revenue stream for the project is projected to reach USD8–10 billion, not to mention the foreign exchange savings of the same magnitude. This project not only gave birth to the natural gas industry in the country but also reinforced the richness of the country's natural resources.

to organize and carry out the field monitoring activities in their respective localities. The two SMTs are the Palawan SMT (PSMT) and the Batangas SMT (BSMT). A third SMT, the Mindoro SMT, was established in 2006.

The monitoring task consists of two major activities: first, data gathering is done through a variety of appropriate methods, including sampling, observation, interview, and validation; second, data obtained are compared with a set of standard limits and/or acceptable parameters as stated in the ECC or in prevailing environmental laws; and third, reports are generated from the monitoring activities which are then sent to the ExeCom and eventually to the public for information and any appropriate action.

The general function of the SMTs is the monitoring of the Project's compliance with the requirements indicated in the ECC, as well as the monitoring of the proponent-sponsored social development projects and its information, education, and communication (IEC) activities. However, while the function remains the same for all SMTs, the structure and day-to-day operations of each are quite distinct. Differences in the aspects and areas monitored as well as in membership composition contribute to the uniqueness of each SMT. For instance, in the PSMT, monitoring activities center on water quality and waste management at the extraction site. The BSMT's monitoring duties include checking air and water quality, noise emissions, and bio-physical impact. Because of the geographic constraints and the logistic difficulties of the members, the PSMT operates on a more flexible structure, while the BSMT operates on more fixed terms, ensuring that all of the multiple monitoring areas are covered.

Before 2004, each SMT monitored and prepared reports independent of the actions of the other SMT. In fact, even for the functions that were common to all, in the past SMTs performed their tasks without any knowledge of how the other SMT was doing theirs. Operations thus proceeded without the benefit of standardized procedures or templates, where applicable, and without any knowledge of good practices and lessons learned by other SMTs.

A NEED OF THE MMT: PRESERVING AND TRANSFERRING LEARNING

Breaking the isolation between SMTs and facilitating cross-SMT learning is the first challenge. A second is that members of the MMT are constantly changing, since it is made up of positions in various government agencies, local government bodies, and non-government organizations. A newly-elected barangay captain, for example, will replace his predecessor as an MMT member and will have to quickly learn the operations of the MMT to enable him to do his task well. Orienting and training new members has always been a challenge for the MMT. Hence, members recognized the need to document what had been learned, since the MMT's goal was that what had been learned could easily be transferred and learned by new incoming members.

As membership of the Execom and the SMTs change, team-building is a felt need from time to time. The former Chief of the Environmental Impact Assessment (EIA) Division of the EMB, Mr. Reynaldo Alcances, who also served as the alternate Chairman of the Malampaya MMT in 2003–06, decided that the Malampaya MMT needed team-building combined with training in team learning for the purpose of capturing and documenting team learning into a management systems manual. This documentation was needed because the co-sponsors of Malampaya MMT, SPEX and DENR, had been considering the establishment of a third SMT in the island province of Mindoro Oriental, through which the natural gas pipeline passes from Palawan province to Batangas province. A manual would facilitate the transfer of learning to the members of the new SMT. Recognizing the richness of the lessons that can be derived from the operations of the biggest and most well-funded MMT in the Philippines, Mr. Alcances took this perceived need even further as he saw the value of sharing MMT learning with other smaller and less well-funded MMTs in the country.

KEY DRIVERS FOR ADOPTION OF KM

Leadership

The leadership of the MMT has a critical role in introducing and embedding KM in its operations. Himself a visionary and an idealist, Mr. Alcances provided the entire MMT with concrete directions and visible support. With the Malampaya MMT's specific needs in mind, he helped shape the interventions that would take the MMT through the stages of becoming a "living and learning" organization—the vision it has set for itself.

Vision of the Executive Committee

Other members of the ExeCom also expressed their desire for the Malampaya MMT to perform other socially transformative actions which were not part of their original mandate. The Execom, in the course of a team learning workshop in November 2004, adopted the basic direction for the Malampaya MMT: that it continuously grow, take on other developmental roles, and become a "living and learning" organization.

The direction of the MMT's growth is summed up in what the ExeCom calls "MMT+," with the "plus" denoting the extra developmental functions they want to perform beyond their current mandate:

- Monitoring and evaluation remains a core function of the MMT.
- Involvement in pre-ECC work.
- Help in the capacity building of stakeholders such local communities, empowering them through awareness, and capability- and expertise-building.
- Develop and maintain the KM systems as learning organizations, particularly for the purposes of R&D, having a data source or repository, and for IEC.
- Build partnership among the different stakeholders, serving as a bridge between proponents and stakeholders and attending to issues and concerns of the different stakeholders.
- Assume the role of "take-off to manager of change," utilizing inputs from business and government for the benefit of the environment, culture, and the people, including children.

Built-in Stakeholders' Interests

The organization's passionate and dedicated members also contributed to the institutionalization of KM and to organizational learning systems and processes. The team is composed of representatives not only from the Project and the government but also from the affected local communities and stakeholders. These representatives have a very strong and natural desire to serve the interests of their local communities and are thus looking for new and more useful ideas on how to better perform their processes so that their communities are well-informed and protected.

Immediate Need for Cross-SMT Knowledge Transfer

Organizationally, the impending creation of a new SMT—the Mindoro SMT—pushed the MMT to review its operations and refine its systems in a way that would allow the new SMT to learn from the experiences of the two existing SMTs.

STRATEGIES USED

Employing the services of CCLFI.Philippines, a consulting organization dedicated to KM, organizational learning, and change, the Malampaya MMT conducted a series of interventions that sought to build KM into its operations and establish a learning culture among its members.

These interventions occurred in two phases and were governed by the principles of empowerment, trust building, knowledge-sharing, and continuous improvement.

Phase 1: Team Learning

In recognition of the magnitude and diversity of membership in the Malampaya MMT, the initial phase centered on eliciting lessons in the context of team-building and team learning activities. The main tool employed was the lessons learned meeting (LLM) (Figure 1). The modality through which LLM was undertaken is "appreciative inquiry." LLM is a value- creating tool used by learning organizations to review actions made and to gather lessons and knowl-edge gained in the performance of any activity. To establish a learning environment, the LLM creates the habit of group introspection by reflecting on the lessons gained and how such lessons can improve the execution of succeeding activities. The LLM empowers the individual members of the Malampaya MMT to become essential contributors of lessons and improvements, while their interaction strengthens the trust within the organization.



Figure 1. LLM to Elicit Learning and Knowledge from a Team

Phase 2: Embedding Learning in MMT Processes

The second phase revolved around knowledge-sharing and continuous learning. Focusing on embedding the lessons extracted from the first phase into their operations, the second phase had two components: building a learning team and developing learning-oriented manuals to systematize the MMT's processes. These two components work hand in hand, with the former concentrating on ensuring that the environment is conducive for enriching the individual's tacit knowledge and encouraging a tacit-to-tacit knowledge exchange and the latter making sure to convert this tacit knowledge into explicit forms for replication and further improvement (Figure 2).





Figure 2. Embedding Learning in MMT Operations

The second component was accomplished through the creation of a "living" management systems manual (MSM) reflecting not only existing MMT operations but also innovations and improvements that the SMTs have made. Documenting the processes and procedures as well as the improvements would enable the Malampaya MMT to more efficiently and effectively perform their monitoring duties and facilitate skills enhancement, knowledge-sharing, and further strengthening of a culture of trust within the organization.

From Intrapersonal to Interpersonal and to Organizational Learning

The design of the two-phased intervention was dictated by a framework that was meant to take the Malampaya MMT on a learning journey. The framework begins with the intrapersonal aspect, where individual blindfolds, mental models, values, and aspirations are surfaced and examined. This prepares the individuals for more effective and productive interpersonal relationships in the sectoral team setting. Improved interpersonal relationships then allow for bringing the entire MMT organization through cross-team encounters.

IMPLEMENTATION STEPS

The two-phased engagement was implemented over a period of more than a year and a half, with the first phase commencing in mid-2004. The first phase centered on extracting lessons through face-to-face interactions, done through a three-day LLM.

Design of the LLM

The design of the LLM considered the unique nature of the MMT and the differences among the subteams. Prior to each SMT-level LLM, a simple stakeholder analysis³ was con-

³ The simplified output of the stakeholder analysis is a sociogram which is similar to the graphical output of a social network analysis (SNA) popular among many KM practitioners. However, because MMT members meet only a few times a year and come from a wide variety of interest groups, the focus of the sociogram used is not

structed for each team by interviewing the Executive Assistant, who knows the nature and extent of interaction among team members intimately. At the SMT level, the LLM started with an activity that introduced the members to the systems way of viewing the MMT. This was necessary because the subteams operate independently, and members may therefore have had very little appreciation of subteam relationships and of how the MMT functions as a whole. With this as the context, the LLM then proceeded with the identification of gaps that existed among the actual functions of the MMT and the ideal, the perceived, and the actual performance by the team.

The heart of the LLM focused on surfacing good practices, or what worked, and areas of improvement, based on what did not work or what went wrong. While the former was easy to identify, the latter proved to be a challenge. It was at this point that the members went through workshop activities on introspection or intrapersonal examination to enable them to see how their own blindfolds, mental models, and attitudes can affect the way they assess what did not work. It was stressed that mistakes are acceptable when honestly examined and learned from; what is not acceptable is repeating the same mistakes.

The SMT-level LLM then culminated with the identification of the next steps. Because of a difference in the levels of team maturity, the next steps had a different focus for each SMT. For the BSMT, which still had to develop in terms of synergistic thinking and having a sense of group interest, the next steps were identified in three levels: individual, team, and recommended steps for the ExeCom. The third level had to be incorporated because of the BSMT's perceived lack of communication lines with the ExeCom. For the PSMT, which is characterized by shared goals and more mature communication lines, the next steps focused on addressing three main concerns: improving stakeholder engagement during the project's operational phase, improving project operations, and addressing the remaining issues and problems.

At the level of the ExeCom, the LLM had a more strategic approach. Of 10 activities or modules conducted over a three-day period, four had an innovation slant in order to prepare the ExeCom members to identify the "next practices"⁴ for the Malampaya MMT. The outputs of the BSMT and PSMT LLMs, particularly those that resulted from the activity on the next steps, were used as starting points for the identification of these next practices.

The three LLMs pointed to two major needs:

- 1. The need to improve current operations through the incorporation of learning processes, starting off with a documentation of current procedures; and
- 2. The need to explore the expansion of MMT functions (what the ExeCom calls MMT+) to better serve its stakeholders.

Formulating a Learning-oriented Manual

To respond to the needs identified in Phase 1, a number of interventions were initiated as part of the second phase. The major output would be a "Learning-Oriented Management Systems Manual (MSM)" that would not be static but would reflect continuing improvements, embodying the learning orientation of the organization. It will also contain initial steps towards building an MMT+.

on communication intensity but on affinity of interest and magnitude of power. It portrays, via a $2x^2$ diagram, the similarity of interests and the extent of power or influence of each member.

⁴ Documenting and transferring good or best practices was stressed in the SMT-level LLMs. However, copying best practices means always catching up with somebody who is ahead. Because Malampaya MMT wants to be the leading MMT in the Philippines, the concept of innovating "next practices" was stressed in the ExeCom LLM, where other MMTs in the Philippines will follow from the Malampaya MMT experience.

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Process Documentation and Improvement: Administrative Processes

The first intervention in the second phase centered on discussing and documenting the finance and administrative processes within the Malampaya MMT. While it was recognized that the other processes served as the core of the MMT's operations, these two processes are the most standardized because they are governed by guidelines written in the ECC. There is also only one person per sectoral team directly involved in performing these processes, thereby making them the easiest to document.

The activity was a one-day workshop where the participants, mainly the secretariats of the SMTs, were introduced to process documentation and process improvement. In the process documentation sessions, the particulars of the support services were threshed out. The participants were asked to detail their tasks and activities in performing their mandated roles and responsibilities. The different guidelines, criteria, processes, and procedures for each of their activities were carefully discussed, clarified, and documented. Most finance and administrative activities were similar for all the SMTs and were therefore standardized as much as possible. However, because of the peculiarities of each SMT, differences were also noted and distinct steps arising from these differences were maintained, provided that these did not violate the ECC or any higher guideline. Templates were made for forms and documents that were commonly used. Inevitably, as a result of the amount of scrutiny of Malampaya MMT operations during the process documentation, the group was able to identify some process improvements and innovations.

Process Documentation and Improvement: Core Processes

After the finance and administrative processes, the MMT moved to examine their core processes. Some implementation issues had to be addressed at this point. If the objective was to standardize processes, how would the two sectoral teams, including all their members, be brought together, given their geographic, logistical, and financial constraints? Realizing that this was not a viable option, Malampaya MMT Executive Assistant Mr. Dennis Tojos opted to define a core group comprised of select members from the two subteams, the PSMT and BSMT, representatives from the ExeCom, and the proposed Mindoro SMT, to perform the documentation and improvement. A set of criteria then had to be defined to serve as basis for the selection of the core group members. Considering the objectives of the project, the following criteria were set:

- Degree of involvement and participation in the processes to be examined.
- Potential contributions in the improvement process given the insights and ideas they had shared during Phase 1.
- · Attitude and potential contribution to team building.

These criteria led to the identification of 23 members who were to comprise the crosssectoral core group. Through a series of process documentation, improvement, and validation workshops similar in nature yet significantly more extensive than the one that the finance and administration group went through, the core group was able to slowly build the foundations of their learning-oriented MSM.

Cross-learning Via the Cross-SMT Core Group

During the cross-SMT workshops, the core group members were encouraged to share existing procedures that worked well and to think of improvements for processes that were shown to be problematic. With their shared goals, vibrant discussions ensued on effective procedures and simplified strategies for how to perform their tasks. The exchanges proved to be an enriching experience for the members of the core group who not had the chance to perform any cross-

learning activities at the beginning. In other words, in addition to the tangible output of documenting the existing and improved processes, the cross-SMT workshops provided a venue for enhancing cohesion among the different SMTs, with each member now seeing how each SMT uniquely contributes towards the performance of the MMT mandate. The workshops also served as a good venue for team building, with "team" now viewed as the entirety of the MMT and not just the individual SMTs.

The need to further explore the idea behind MMT+ was also addressed during the core group workshops. One major step towards building the MMT+ was achieved in the discussions on monitoring the proponent's socioeconomic development (SD) projects. With an environment of openness, core group membersmincluding the SPEX representative and ExeCom member, Ms. Caymo—agreed on the inclusion of identified criteria and guidelines in monitoring SD projects. This was a significant development, since the MMT was mandated to monitor only the presence or absence of SD projects without regard for quality, effectiveness, impact, or appropriateness.

Due to limited time and the geographical vastness of the operations of the MMT to be covered, however, process documentation and improvement were not completed during the scheduled workshops. But instead of this being a deterrent, it became a challenge for the different SMTs. Armed with a systematic approach to document their existing processes, each SMT conducted its own process documentation and process improvement sessions to accomplish all the necessary components for the MSM. The output of the different formal cross-SMT sessions and the individual SMT workshops contributed to the first complete draft of the learning-oriented MSM.

Widening Ownership of the MSM

The succeeding interventions focused on validating the initial draft of the MSM, identifying and addressing gaps, and formulating the necessary next steps. This validation exercise had to be done in two stages—first at the level of the core group and then at the level of the SMTs. This exercise is critical because it serves as a venue to generate the needed support and ownership among all SMT members. Validation at the core group level proceeded smoothly and quickly, since most of the inputs to the draft of the MSM were provided by the group itself. Validation at the SMT level, on the other hand, required more strategizing, since several factors had to be considered. First, the validation had to be done as part of a regular meeting of the SMT, which happens over a one-day period after the conduct of the monitoring activities in order to save time and resources, particularly for the Palawan SMT, whose members are islands and hours of travel time apart. Second, because of the amount of information contained in the MSM, first-timers such as the non-core group members may become overwhelmed and may therefore have an unfavorable reaction, without having had opportunity to examine the content in greater depth. Third, members of the SMT have different natures, characters, and advocacies arising from its multi-partite nature, and varied reactions that might derail the process can be expected. Given these considerations, the core group agreed as a body to do a swift but complete presentation of MSM highlights per section, with each section to be presented by the core group member with an experience most related to the section. To build the skills and confidence of the presenters, a prior presentation workshop was conducted that was used not only to improve the presentation materials but also to anticipate and plan for questions and concerns that might arise from the MSM validation.

While gaining ownership from ordinary members of the MMT is important, getting support from the top is even more critical. The draft MSM cannot be implemented without the Exe-Com's approval. This has in fact been a concern of key people and KM champions from the ExeCom, including EIA Chief Rey Alcances, from the start. The inclusion of key ExeCom

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members in the core group was one approach towards getting buy-in and enlisting more supporters from the ExeCom. Inviting ExeCom members to witness and participate in SMT-level meetings was another. These two approaches generated an appreciation for the SMT work among the participating ExeCom members, since they had first-hand experience of how the SMTs perform their functions. As a result, by the time the draft of the MSM was presented to them for input and approval, ExeCom members were already prepared and were in favor of the outputs and activities. With the ExeCom giving its seal of approval, the MSM released its first version in July 2006.

Through the series of interventions and workshops that brought together the different members of the SMTs, seeds of developing the team learning orientation of the MMT were sown and nourished. During the workshops, members of different teams were thinking together and focusing their energies on how their processes could be improved. Outside the workshops and in actual monitoring work, the SMTs were testing out improved processes and noting what works and what does not. During SMT meetings, such lessons are brought up as inputs for further improving their processes. These improvements formed part of the series of drafts of the MSM prior to release.

The institutionalization of learning in the operations of the BSMT and PSMT has benefited the Mindoro SMT, which at the time of the KM program was just preparing to start operations. Tasked to perform activities similar to other SMTs, Mindoro has gained from the knowledge of what works and what does not work from the two older SMTs. The orientation workshop of the new SMT was attended by key people from the SMT who shared with them the improved guidelines, processes, and procedures of performing monitoring work.

Today, the learning orientation is quite well embedded in the procedures of the MMT. For instance, regular features of MMT meetings are "reviews of current practice and suggested improvements" and "next steps" and a short post-meeting LLM.

SELECTION AND ADAPTATION OF TOOLS AND TECHNIQUES

As the main methodology used in the interventions centered on surfacing lessons and embedding learning, various tools were adapted to suit the different phases of Malampaya MMT's learning journey.

Lessons-Learned Meeting

Phase 1 was carried out primarily using the LLM as the main tool. A lessons-learned meeting is a tool that is part of a KM cycle to maximize/multiply benefits from the capture/codification of tacit knowledge of what works (good or best practice) and the reuse of that knowledge through adaptation/re-contextualization by the same team or by other teams doing identical or similar tasks (Figure 3).

An LLM is a potent tool that can be used to enhance a team's ability to continuously learn and improve its effectiveness. As such, it is seen as a critical element of team learning, a concept that embraces both team-building, which focuses on cohesion and relationships, and team productivity, which in turn focuses on results or outputs.

The basic purpose of an LLM is to elicit, capture and document the learning of a team gained from the performance of a project or a time-bound activity. Much of this learning is un-expressed or even unrecognized consciously. Thus the LLM converts tacit individual knowledge, which is not accessible to others, into explicit group knowledge, which can be more accessible and useful to many others. It is also a way to enable learning at different stages of the activity. LLM is conducted to gather the "learning after" each activity, although its output serves as the input for the "learning before" and even "learning during."



Figure 3. Building the Learning-Oriented Manual

The LLM serves as a tool for reflective learning while facilitating team-building and team learning. The design for the three-day LLM and the sequencing of some 10 activities therein had to be adapted to each SMT to ensure optimum results given their peculiarities.

Appropriate team-building exercises and structured learning exercises were also incorporated into the LLM design in order to facilitate team building in a learning context. These team learning activities took the form of games and interactive activities that sought to make participants internalize the nature of the team and of team learning and appreciate the dynamics involved therein.

Mind Mapping

Another tool that was utilized to present the outputs of the different LLMs in an integrated fashion is the mind map. This diagramming technique is a means by which the tacit knowledge of each individual is combined into an explicit knowledge of the group. It was used to illustrate the concept of and generate appreciation for the idea behind the MMT+.

Process Documentation and Mapping

During Phase 2, process documentation and process mapping tools were employed. These tools were adapted to the needs of the MMT through the incorporation of improvement mechanisms. In data flow diagrams, for instance, an object in the form of a blue cloud was introduced to serve as the container for possible improvements and next steps that should be tested on the ground and assessed later on for possible inclusion in the revised manual. Templatizing was likewise employed, and forms that are used separately by the BSMT and the PSMT but serve the same purpose were standardized.

Manualization

Another tool that was used is manualization, with the MSM serving as the main tangible output of Phase 2. The technique for creating the manual involved a combination of straightforward listing of steps and procedures and the presentation of diagrams, tips, and cases. The MSM is designed with 10 components that allow for capturing different kinds of lessons and for teaching through a variety of approaches. For instance, structured learners can consult the "Pro-

cedures" section, visual persons who are more comfortable with illustrations and diagrams can examine the "Diagram of Improved Process" sections, and individuals who learn more by example will find the "Case in Point" and "Reminder" boxes most helpful. The manual is kept updated through a systematic method of gathering suggestions through regular LLMs.

Thinking Together, Learning Together and Deciding Together

A key Malampaya MMT staff member is Mr. Tojos, who has been the Executive Assistant from the start of the organization. He has intimate tacit knowledge of the members and their personalities, the dynamics of relationships within each team, the administrative and technical processes they have been performing, and the intricacies of the problems at hand. It is essential that he understand, appreciate, and participate in shaping the direction of the KM journey of the organization within the basic parameters set by the ExeCom. Team learning is thinking together, learning together, and deciding together. Recognizing this, the planning and execution of detailed activities were closely coordinated between the lead KM consultant and Mr. Tojos during Phase 1, and between the Managing Director of CCLFI.Philippines, its senior KM consultant, and Mr. Tojos during Phase 2. Numerous pre-activity coordination meetings, often extending almost to midnight, were held among them.

INTEGRATION OF KM INTO EXISTING WORK PROCESSES

Advantage of LLM

To have a successful KM system in place, it has to be integrated into the organization's way of doing things. Implementing a simple yet effective tool such as the LLM enables the infusion of knowledge-sharing into the organization's core processes without noticeable disruption. LLM is learning from doing while doing, not learning away from doing.

In the case of the MMT, the LLM has been adopted as a regular feature of any meeting or gathering, where a mini-LLM is performed at the end of each meeting or on any topic, activity, or process scheduled for review.

Starting New Organizational Habits

The system or procedure for revising the manual is likewise incorporated in the processes of the SMTs. Prior to engaging in knowledge management and organizational learning activities, SMT activities basically follow this sequence:

- Committees monitoring different aspects of the ECC meet to have a briefing on their monitoring activity, schedule, approach, etc.
- Actual monitoring activity is performed.
- Committee receives, collates, integrates and/or processes data gathered and meets, if necessary.
- Report preparation ensues.
- SMT meets as a whole to present results of monitoring and discuss needed actions.
- SMT submits its quarterly monitoring report to the ExeCom for information and action.

After the KM engagement and the resulting "living" MSM, learning processes have been incorporated in the existing activities of the SMTs. During the pre-monitoring briefing, heads of committees consult the MSM and run through the current steps that are to be followed. Improvements and innovations that are to be tested during the monitoring are then discussed. After the monitoring activity, mini-LLMs are conducted to discuss the results of the new processes, steps, systems, or templates that were tested. These are then brought up to the SMT level

and discussed during their quarterly post-monitoring meeting. After this, the suggested improvements that constitute revisions to the manual are elevated to the ExeCom level for approval.

ENABLERS

The successful institutionalization of KM practices into the operations of the Malampaya MMT can be attributed to a number of factors.

First, and most importantly, there is endorsement and support of the management or the ExeCom. The buy-in of the top executives in implementing a KM system within the organization provides not only financial resources but also overall direction and guidance. In the case of the ExeCom of the Malampaya MMT, the vision of making the organization a best practitioner MMT that can be emulated by all the other MMTs in the country guided the actions and recommendations made in the implementation of KM.

Second, the commitment, passion, and attitude of the core group members provided much impetus in institutionalizing KM in the operations of the MMT. Their dedication allowed for the completion of the needed inputs to the MSM, weathering long and tiring workshop sessions that extended through the night. Their strong sense of ownership of the MSM allowed them to discuss and facilitate validation and acceptance of the manual at their individual SMTs. Their zest provided the inspiration and encouragement to the ExeCom to seriously consider their outputs and carry them through to completion.

The contributions of certain individuals are worth noting, as they provided the push for the accomplishments of the core group. With their complementary roles, each contributed to the success of their activities. Espousing the real essence of a team, DENR provincial representative Arthur Palatino always gave reminders that widened the viewpoint of his colleagues. The passion of NGO representative Cleofe Bernardino of the Palawan NGO Network Inc. provided the push to always take just one more step forward during activities and achieve a little more than what can be done. The knowledge and expertise of the technical people such as Briccio Abella of the Palawan Council for Sustainable Development Secretariat and Esperanza Sajul of the EIA Division of EMB helped in making the group understand technical aspects of monitoring work that contributed to more accurate documentation. The support and the empowering approach of representatives from national agencies such as Mr. Ramon Dones and Mr. Jason Villegas from the Department of Energy enhanced the confidence and enthusiasm of members who are based in the localities of Batangas and Palawan.

Third, the significant and critical role of the Malampaya MMT Executive Assistant allowed for the success of the entire KM engagement. Although always in the background and not often recognized, Executive Assistant, Mr. Dennis Tojos, acted like a glue holding the entire organization together. He was the bridge between different roles and personalities particularly in the ExeCom, providing encouragement to individual members to finish their tasks and appeasing those who express dissatisfaction over certain implementation concerns. Mr. Tojos provided the needed support in project conceptualization and design, liaising with the consultants and providing them with needed information, ideas, and insights. With his good knowledge of MMT operations, Mr. Tojos contributed in the birthing of the K-Loop framework, which depicts how knowledge should flow across the different processes of the MMT if it is to become a learning organization. The framework was conceived during extended hours of meetings with consultants from the CCLFI.Philippines.

It must be noted significantly that this is a KM journey where ICT or information and communication technology was not used as an enabler, although the idea to eventually convert the MSM into a web-based manual has been broached.

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KNOWLEDGE PROCESSES

While undergoing the transformative process of becoming a learning organization, the members of the Malampaya MMT were guided by a framework called the Knowledge Loop (K-Loop). This framework provides a map of the different processes of the MMT and how these processes relate to each other (Figure 4). The three main process groups are those in colored boxes—finance, admin, and activities. The two other boxes, labelled "stakeholders," show the two groups or levels of stakeholders that the MMT is accountable to. The arrows show the flow of knowledge from one process to another.



Figure 4. K-Loop (Knowledge Loop) Across All MMT Activities

Tracing the flow of the arrows, one can see two loops. The first is the loop of knowledge in the form of lessons and improvements that come from the internal operations of the MMT which are processed, committed to the knowledge base (which in this case takes the form of the MSM), and get fed back into its different processes and activities. The second is the loop of knowledge that comes from internal stakeholders (organizations that are members of the MMT) who, after being provided with the results of the MMT's operations through what is called an internal information and education campaign, share these results with the external stakeholders and gather feedback that will be addressed and considered in the different activities and processes of the MMT.

LESSONS LEARNED

Although the surfacing of knowledge for operational improvement, knowledge-sharing, and reuse in the Malampaya MMT's experience was a slow process, it was undoubtedly very successful. Crucial to this undertaking was the internalization of the learning processes by the team. As in the case of the MMT, this was best accomplished by working with a select group of people who have very good attitudes towards learning and sharing and a good understanding of the

team's purpose. They served as advocates of the KM program and acted as the force propelling the organization forward.

Having someone to manage people and relationships while implementing a KM program is necessary since interventions and operational changes may challenge existing systems and entrenched ways of doing things, thereby putting different levels of pressure on the members of the organization. In the case of the MMT, this role was performed well by the Executive Assistant.

Appreciation from both the top and the bottom is needed for a successful program. Management support will allow for the sustainability of the KM program through the adoption of enabling policies, while membership support will allow for robust program implementation and the continuous practice of newly acquired skills, attitudes, and habits even after the program ends.

Complex technologies and ICT systems are not necessary for KM to work. What is more critical is that the tools or techniques that will be employed are understood by the people and implementable given the realities of the organization. Nuances have to be considered if subteams or subgroups make up the organization, since it will often be the case that these subgroups have different realities as well. Because of this, tools must be adapted in the most appropriate and useful manner for each subgroup. Working at the level of the smaller entities that make up the organization is necessary because each of these elements must be a learning entity in itself before the whole organization can develop as a learning organization.

The steps towards developing a learning organization need not be large, difficult ones. Smaller units can start off by employing simple tools and techniques that can be integrated into their existing systems in phases. Such was the case in the series of process improvement activities done by the SMTs, where simple improvements were tried out one at a time. Hence, a new template was successfully tried out without the burden brought about by a new process, and vice versa.

Lastly, it must be noted that the journey towards organizational learning and KM requires that learning systems and processes be embedded in the organization and be internalized as part of its culture. Procedures, structures, and documents are easy to have, but it is only through people who are willing and able to utilize what the organization has that greater value can be created for its stakeholders.

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COMPANY PROFILE

The Philippine TQM Foundation, Inc. (PTQMFI) is a non-profit, non-government, private organization whose mission is to help small and medium enterprises (SMEs) implement total quality management (TQM). Its vision is to become a primary catalyst in the growth and development of SMEs by providing assistance in quality and productivity improvement and in the enhancement of competitiveness in the world market. It was set up in August 2003 under the supervision of the Bureau of Product Standards (BPS) of the Department of Trade and Industry to continue the dissemination of TQM in the Philippines under a project called the TQM Integration Program.

The TQM Integration Program began in 1995 under the ASEAN-Japan TQM Project (Phase I), where two model companies from each ASEAN country were chosen to implement TQM under the guidance of Japanese experts. The Japanese experts used 21 TQM handbooks that were developed at the Japanese Standards Association by Japanese TQM experts and practitioners that cover roles and responsibilities, from the CEO down to the rank-and-file workers, in the basic TQM system, the production system, the sales and design system, and the improvement activities.

The second phase of the ASEAN-Japan TQM Project began in 2000 with the start-up of the TQM Project in Cambodia, Laos, and Myanmar. The project was also disseminated to more companies in the ASEAN member nations that had participated in the first phase. This phase ended in 2004, but even with the termination of the project, the Philippines continued the dissemination of TQM with the creation of the Philippine TQM Foundation. To date, the foundation has 18 member companies who have undergone the training using the 21 TQM handbooks, with three more companies currently undergoing training.

Through May 2006, the TQM Integration Program had been ongoing for two years, with one handbook taken up each month. Two weeks after the handbook seminar and workshop, the participants are coached for a more effective implementation of the handbook contents. Plant audits are then conducted every six months to evaluate the implementation of TQM in the participating companies.

Beginning in August 2006, the program was shortened to one year based on feedback from participating companies. Some of the handbooks were combined to form the 12 modules that can now be taught in only one year. The number of plant audits has also been increased from two to four for better monitoring of the implementation of TQM activities in a company.

The PTQMFI has been given the mandate to promote and disseminate TQM nationwide. Long-term plans have been drawn up for setting up TQM Centers in Northern Luzon, Central Visayas, and Southern Mindanao. This plan can be accomplished if the PTQMFI is successful in its current efforts to strengthen the TQM Center in Metro Manila and if participating companies create value in their implementation of TQM.

KEY DRIVERS FOR THE ADOPTION OF KM

PTQMFI as a Facilitator of Knowledge Transfer

The objective of PTQMFI is to enable the transfer to and adoption of TQM philosophy, tools, and techniques based on Japanese practices by member companies that belong to the SME sector. If the adoption of TQM practices does not immediately result in the creation of value, business owners often stop their implementation due to the limited resources available to them as SMEs. Hence, it is important that the technology transfer be made effective in the shortest possible time.

PTQMFI as a Developer of Philippine/Local Benchmarks and Best Practices

Another objective is to compile Philippine best practices in TQM implementation that can supplant Japanese examples that may not be appropriate in the local setting. For instance, justin-time (JIT) practices that originated in Japan are based on the premise of the existence of clusters of suppliers with close relationships to their customers and with nearly equal operational capabilities. Philippine SMEs do not have access to such suppliers; clusters are almost non-existent, and a wide capability gap exists among and between SMEs and their suppliers. With globalization and intense competition, there is no time to develop a situation similar to the one that took years to establish in Japan. Hence, an appropriate but effective practice in supplier management for SMEs, for instance, becomes a major consideration.

PTQMFI as a Developer of Philippine/Local Expertise

A third objective is the training of Philippine experts who will take over for the Japanese expert in guiding TQM implementation in the SMEs. This training requires the transfer of both tacit and explicit knowledge by Japanese experts to their local counterparts who will one day take over the job of the former.

PTQMFI as a Repository of Knowledge

The last objective is for the PTQMFI to become the repository of knowledge on the implementation of TQM among Philippine SMEs. The member companies expect the PTQMFI to provide them with assistance and expertise in their implementation of TQM. To do this, PTQMFI needs to capture TQM knowledge from different sources and then share and distribute this knowledge to its members.

These four objectives are the key drivers for the adoption of knowledge management (KM) at the PTQMFI. Since the intangible assets of the PTQMFI far outweigh its tangible ones, KM plays a significant role in enabling the foundation to meet its objectives.

The above objectives pertain to facilitating beneficial sharing of best practices and other useful knowledge across SMEs, the training of experts to serve SMEs, and the building of PTQMFI as a knowledge repository to benefit SMEs. In other words, the above objectives are about KM applied at the level of the PTQMFI.

Starting in late 2006, the PTQMFI undertook initiatives for using KM at the level of SME members of PTQMFI or for using KM to complement TQM initiatives to improve internal operations of an SME. This KM initiative consists of:

- 1. Applying a rapid KM assessment methodology on the core business of an SME.
- 2. Analyzing the results and using them as a basis for identifying the most cost-effective KM tool or intervention for the particular SME.

Knowledge Management at the Philippine TQM Foundation

It is a more focused or customized approach in applying KM tools for an SME. The assessment methodology adopts a broad framework that includes technical as well as behavioral factors and factors both internal and external to the organization that affect productivity. It involves assessment by SME personnel performing the core business process of around 60 factors along the following five categories:

- 1. Human capital: technical competency, training, culture of productivity, and innovation.
- 2. Structural and process capital: manuals and work templates; clear policies, guidelines, schedules, and outputs; data, reports, and other needed information; procedures for feedback and improvement; computerization.
- 3. Stakeholder capital: customer loyalty, relationship with suppliers and partners, support from the government and community, network of cooperating organizations.
- 4. Tangible assets: production equipment, raw materials and supplies, building and equipment, telecommunication and Internet access, safety equipment, access to transportation routes and parking, access to services such as medical/health, sports/recreation, and food.
- Motivational factors: support from superiors and peers, personal interest/enthusiasm, morale and teamwork, shared vision in the organization, incentives, and recognition of superior performance.

The importance or impact and the adequacy or availability of each factor are quantitatively assessed pertaining to the core business process, and the highest demand-supply gaps are identified for appropriate KM and other management solutions.

STRATEGIES USED

To become an enabler of technology transfer, PTQMFI uses training seminars and workshops to transfer knowledge on TQM implementation to companies participating in the program. This top-down approach using Filipino local experts is the preferred mode of the Japanese experts in teaching TQM because budgetary constraints do not allow them to stay in the Philippines for extended periods of time. This strategy was also the impetus in creation of the 21 TQM handbooks that have become the basis for teaching TQM. Because the 21 TQM handbooks were distributed and deployed to all participating companies in ASEAN, they have become the standard knowledge base for all ASEAN TQM practitioners under the ASEAN-Japan TQM Project. The use of standard handbooks allows an evaluation of the effectiveness of the program and an apples-to-apples comparison of results through benchmarking.

Capturing best practices in the implementation of TQM in the Philippine setting and sharing these practices with member companies is an objective that the PTQMFI accomplishes through a bottom-up approach. Through TQM forums that are held twice a year, best practices are created by member companies and presented and shared among themselves and the PTQMFI, usually in the presence of the Japanese TQM expert.

The strategy used in developing local experts who will one day take over the Japanese TQM experts' role is to invite the latter to visit the Philippines twice a year to train the local experts. While in the Philippines, the Japanese expert, together with the local counterparts, visits companies participating in the TQM Integration Program and conducts a diagnosis of the current situation of their TQM implementation. Through the use of diagnostic tools, such as checklists and radar charts and documentation of findings and recommendations through written reports, some of the tacit knowledge of the Japanese TQM experts is converted into explicit knowledge that becomes the basis for future implementation.

Sourcing of future local experts also involves a bottom-up approach, where member companies choose their best candidate for training at the PTQMFI. Training of local TQM experts begins with the identification of potential candidates from a company that has decided to join the TQM Integration Program. During the initial stage of the program, where the company is assisted in setting itself up for TQM implementation, a TQM steering committee is established with a secretariat that is headed by a TQM coordinator who is the prime candidate to become a local expert. The qualifications of a local expert include:

- 1. A graduate of any college with a degree or its equivalent.
- 2. Has either completed or started the TQM Integration Program.
- 3. Has attended a TQM training sponsored by the Association of Overseas Technical Scholars or its equivalent.
- 4. Has demonstrated application of TQM in an actual work setting.
- 5. Has TQM auditing experience and has prepared TQM audit reports.

With these qualifications in mind, the company is advised to choose a TQM coordinator who will be capable of meeting the requirements.

To become a repository of knowledge in the implementation of TQM in Philippine SMES, one of the strategies being pursued by the PTQMFI is the creation of a website that will act as a portal for knowledge-sharing and dissemination. As an initial foray, the PTQMFI is working with the BPS to appropriate a portion of their website for the activities of the foundation (the BPS website is being redesigned with a grant from USAID and the EU). The long-term plan is for the PTQMFI to create its own website that will allow the exchange of information among its members. In the meantime, the BPS acts as the custodian and distributor of all information related to the activities of the PTQMFI.

IMPLEMENTATION STEPS

The core processes of the PTQMFI include teaching, implementing, diagnosing, capturing, sharing, and improving TQM practices in Philippine SMEs. As mentioned earlier, TQM principles, tools, and techniques are taught to member companies using the 21 TQM handbooks. The companies are then assisted in their implementation, which is followed by a company diagnosis to determine the company's current level of implementation. Along the way, benchmarking visits to large and multinational companies with excellent TQM practices are conducted to enable member companies to capture practices that they can adapt in their own implementation. Best practices from the benchmarking visits are captured by the PTQMFI through written reports on the visits. Eventually the member companies through TQM forums. From these experiences, TQM practices are improved and revised for the next batch of companies that will be trained in the program.

Milestones and Measures

With the sponsorship of the Japanese TQM experts' Philippine visits by the Manila office of the Japan External Trade Organization (JETRO), the PTQMFI was tasked to identify and set measures and targets to determine the effectiveness of the assistance being rendered by the expert. These measures and the corresponding targets for March 2007 include:

- 1. The number of local experts recruited and trained (20).
- 2. New training handbooks with Philippine examples (4).
- 3. Website for TQM dissemination (static website).
- 4. Operations manual (documented procedures).
- 5. TQM Best Practices (25).
- 6. Certification scheme for local experts (handbook and examination).

Since these measures are inextricably linked to the effectiveness of how KM is being deployed, attainment of the targets also serves as an indicator of the level of KM performance.

Changes, Customization, and Adaptation

The TQM Integration Program has undergone continuous improvement since its dissemination under the second phase of the ASEAN-Japan TQM Project in 2000. Presentation formats during the seminars/workshops have been improved, and even the handbooks themselves have undergone revisions. A major change was undertaken in 2006 based on knowledge gathered from the first five cycles of program implementation. Because an increasing number of companies participating in the program come from the services sector, some of the 21 handbooks that were heavily focused on manufacturing were consolidated into fewer modules. This move resulted in the reduction of the length of the program from two years to one. The inclusion of Philippine examples of implementation in the modules is also a major change from the original handbooks, which featured all Japanese implementation examples.

Problems Encountered, Corrective Actions Taken

The creation of a web portal was identified early in the project as an important enabler of knowledge dissemination. Given the wide geographic range of implementation of the ASEAN-Japan TQM project, it was important to enable knowledge-sharing and exchange among all participating companies in ASEAN. Having a web portal will also make it possible for numerous Japanese TQM experts to be easily tapped through electronic exchanges for their knowledge that is often not documented in articles or books, without the need for them to travel. Even if their knowledge has been converted into documents, it remains inaccessible to English-speaking practitioners, since these documents are more often than not written in Japanese.

Despite its strategic importance and the numerous requests from TQM practitioners in ASEAN, however, an ASEAN-Japan TQM web portal cannot be set up because of budgetary constraints. The same constraints at the PTQMFI did not allow for the continuation of an earlier static website that was set up for information dissemination of its program. However, through a grant given to BPS for improving its own website, the PTQMFI will be allotted a space to disseminate its program under the BPS website. New programs such as the certification schemes for TQM practitioners, quality circle facilitators and 5S's will be introduced in 2007. These are projected to improve the financial status of the PTQMFI. With an improved fiscal position, a web portal may be created in the second half of 2007.

The major assets of the PTQMFI are the local experts that promote and disseminate their TQM knowledge among Philippine SMEs. Because of the small base of participating companies, however, another problem is the small pool of candidates from which local experts can be identified and trained. Consequently, there is a lack of local TQM experts that can be tapped for the eventual dissemination of TQM across the Philippines. To expand its knowledge base, local resource speakers highly knowledgeable in TQM have been tapped to supplement the existing group of local experts from the participating companies.

Cultural Change and Cultural Barriers before and after Implementation

The tendency to resist ideas from external sources and that of doing things by themselves rather than collaborating are some of the cultural barriers that needed to be overcome in the beginning. The realization, however, that certain knowledge cannot be found within the organization removes the cultural barriers that impede the adoption of knowledge from external sources.

Collaborations with the Development Academy of the Philippines on benchmarking and with CCLFI.Philippines on KM have been initiated with the common vision of helping Philippine SMEs become more competitive.

SELECTION AND ADAPTATION OF TOOLS AND TECHNIQUES

In the absence of a website, an e-newsletter entitled "Quality First" is published every quarter and distributed by email to inform member companies about current events and programs of the PTQMFI. Articles about TQM concepts and principles are also included in the newsletter. A limited library of materials on TQM is maintained by the PTQMFI, is supplemented by the BPS collection, to which members have access on request.

In addition to the core offering of the PTQMFI, the TQM Integration Program, selected resource speakers on different topics are also used to introduce other systems and tools such as benchmarking, project management, and KM in free two-hour seminars called "learning sessions."

ENABLERS

Several factors are in place that enhance the effectiveness of the core processes of the PTQMFI. Government support by the Bureau of Product Standards gives credibility to the program and access to resources not otherwise available to other organizations. For instance, its affiliation with the BPS enables the PTQMFI to conduct benchmarking visits to organizations that normally will not have allowed such an activity. Invitations to international training programs are often received through the BPS, which is the counterpart agency of foreign government institutions.

A company that wants to join the PTQMFI signs a Memorandum of Understanding that requires it to open its doors to other member companies for benchmarking purposes. This policy of openness to sharing of knowledge through company presentations and visits enables the PTQMFI to capture with ease best practices that are not published or available elsewhere.

Constant meetings, trainings, and symposiums initiated and sponsored by the PTQMFI allow relationships and networks to be built among the member companies that result in more openness, more sharing, and more learning. The exchange of experiences often leads to new insights and solutions to problems that could not have been arrived at if a company relied only on its internal resources. It is often tacit knowledge that is conveyed through conversations and dialogues that leads to these insights and solutions. For instance, new ways of carrying out training and making presentations have been discovered in member companies through exchanges of what worked or did not work in their training sessions and through conversations about shortcuts, tips, and guides in training material preparations.

KNOWLEDGE PROCESSES

Internal and External Sensing

An informal competitive survey of other institutions offering trainings on TQM was conducted to determine the relevance of the TQM program being offered by the PTQMFI. It showed that the trainings being offered elsewhere were only general descriptions or introductions to TQM. Some offer only stand-alone programs such as quality circles or 5S's that have attendant problems of sustainability when implemented. Only the PTQMFI offers a comprehensive TQM program that includes not only seminars and workshops but also ongoing coaching, diagnosis, and benchmarking. This comprehensive program offers a better chance of integrating TQM in an organization's daily activities and practices.

Knowledge Management at the Philippine TQM Foundation

With the PTQMFI's association with the BPS, it also has access to information about government roadmaps and strategies that are relevant to the operations of the foundation. For instance, PTQMFI has aligned its recruitment of companies with the priority industries of both the Philippine government and ASEAN. Doing so may yield benefits in the future, especially if budgets are allocated for training of industries in these sectors.

To determine the satisfaction of member companies with the services being provided by the PTQMFI, surveys of member companies are conducted. After each seminar/workshop, participants also evaluate the resource speaker, content, and administration of the training program. Through these surveys, the PTQMFI receives feedback used to further improve its offerings.

Creating or Capturing Knowledge

Knowledge is created through the application of TQM concepts, principles, and tools by member companies that are implementing them. Tacit knowledge is documented, best practices are codified, and manuals are compiled. Junior local experts are paired with senior ones during diagnosis to enable the latter to mentor the former in an apprenticeship arrangement. It is a practice made binding with a contract for participants sent for training abroad to submit copies of their training materials and give an echo seminar within a month of their arrival.

Organizing, Storing, and Sharing Knowledge

The foundation secretariat is responsible for the TQM knowledge repository. It maintains hard and soft copies of documents pertaining to TQM as well as email lists, directories, manuals, and books. It disseminates and distributes best practices through seminars, workshops, and forums.

Using Knowledge

Each batch of member companies undergoes training that has been improved based on best practices codified from the experiences of earlier batches. Best practices on the implementation of TQM principles from member companies provide the knowledge on the most appropriate and most effective step-by-step procedures that can be followed by a new member to ensure success in the adaptation of a practice.

TRACKING AND MEASURING RESULTS

The metrics that are used to track and measure results were discussed above. These measures are formally reviewed during project evaluations done at the end of the visit of the Japanese TQM expert. The evaluations are documented in written reports that are presented to JETRO, Manila. Japanese versions of the reports are written by the Japanese TQM expert and sent to JETRO Tokyo and the Ministry of Economy, Trade and Industry of the Japanese government. These measures and the corresponding achievements as of the end of 2006 were:

- 1. The number of local experts recruited and trained.
- 2. New training handbooks with Philippine examples.
- 3. Website for TQM dissemination.
- 4. Operations manual.
- 5. Documentation of TQM best practices.
- 6. Examination towards certification scheme for local experts.

Informal reviews are also conducted after each diagnosis of participating companies, leading to an evaluation of the effectiveness of the program with regards to its impact on quality and productivity improvement. A five-level diagnostic scheme is used to evaluate the effectiveness based on Hitoshi Kume's *TQM Promotion Guide*. Using this scheme, the 21 member companies of the PTQMFI score between 1.5 and 3.0 out of a maximum score of 5.0. The minimum requirement for a score of 3.0 is ISO 9000 certification; for a score of 5.0, a company needs to be the recipient of a Philippine Quality Award (based on the Malcolm Baldridge National Quality Award of the USA).

LESSONS LEARNED

A more formal adoption of KM beginning with the formulation of an explicit KM strategy and the designation of a champion will give focus to the KM activities of the PTQMFI. With such a focus, results can be generated that are aligned with the business objectives of the PTQMFI, foremost of which is the nationwide dissemination of TQM.

The policy of open sharing among members of the PTQMFI is important in enabling companies to learn from each other. Since this policy is enforced from the time a member decides to participate in the TQM Integration Program, each company knows its obligations and duties from the beginning, and that makes it easier for the PTQMFI to promote learning and sharing.

Since 1995, a considerable amount of TQM knowledge has been generated from the experiences of the Philippines and other ASEAN member nations. However, this knowledge base has not been fully tapped and its potential has not been maximized for the future deployment of TQM in different organizations across ASEAN. The value of best practices has been demonstrated in the Philippine setting, with its incorporation in the subsequent implementation of the TQM Integration Program. As such, networks and communities of practice may need to be established among the participating companies across ASEAN. This sharing of knowledge is best accomplished with the establishment of an ASEAN-wide web portal.

Dr. Thomas Menkhoff National Expert, Singapore

COMPANY PROFILE

Qian Hu Corporation Limited is a leading exporter of ornamental fish with export links to more than 60 countries worldwide. The company ships about half a million fish per month from a variety of over 1,000 species of ornamental fish. As a home-grown company, Qian Hu has significantly helped Singapore to propel its status to become the world's leading ornamental fish exporter and to be recognized as the world's ornamental fish capital. Singapore supplies more than 30% of the world's aquarium fish.

Operating in a knowledge-based environment, Qian Hu positions itself as an integrated ornamental fish service provider, offering domestic and international wholesalers, retailers, and consumers a one-stop service point as a breeder, distributor, manufacturer, and retailer. Initially begun as a pig farming business, it has since diversified to cover a spectrum of services to include the breeding of Dragon Fish, farming, importing, exporting, and distribution of ornamental fish, and the manufacturing and distribution of aquarium and pet accessories. Qian Hu is present in four countries: Singapore, Malaysia, Thailand, and China, and it has more than 550 employees. On the whole, its main business activities can be classified into three areas: ornamental fish, accessories, and packaging (plastic bags).

Key Products and Services

As far as ornamental fish is concerned, Qian Hu engages in the full ornamental fish process, covering import, export, breeding, quarantine, conditioning, and farming and distribution activities. The farm carries about 500 types of ornamental fish and imports fish from various parts of Asia, Africa, and South America for re-export worldwide. The company distributes more than 5,000 types of aquarium and pet accessories for more than 20 major manufacturers and principals to local retailers and wholesalers in Asia. In addition, Qian Hu has production facilities that manufacture accessories for itself and third parties. It has also created its own brands of aquarium and pet accessories, including some innovative products like a pet odor eliminator, a deodorizer made of pure natural ingredients. Qian Hu manufactures its own plastic bags, used to pack the ornamental fish at points of sale. The plastic bags are also supplied to third parties in the ornamental fish, food, and electronics industries.

Mission, Vision, Core Values, and Strategic Thrusts

Qian Hu's mission is to create shareholders' value by becoming a world-class ornamental fish and accessories company through innovative and quality products and services. Its overall vision is to be the world's biggest ornamental fish, and aquarium and pet accessories service provider. As a breeder, distributor, manufacturer, and retailer, its business model hinges on four areas of growth:

- 1) Export of ornamental fish and accessories.
- 2) Distribution of ornamental fish and accessories.
- 3) Manufacturing of aquarium and pet accessories.
- 4) Breeding of Dragon Fish.

The organization's foundation is built around the core values of integrity, value creation, entrepreneurship, and teamwork. Its four strategic thrusts, which it considers to be its drivers to success, are customer focus, people excellence, quality excellence, and financial strength.

KEY DRIVERS FOR THE ADOPTION OF KM

One of the key objectives in adopting knowledge management (KM) is to maximize returns on the organization's tangible and intangible knowledge assets and resources such as tacit knowledge, competencies, and experiences residing within the employees' minds, better known as customer-related information. The aim of KM is to create a "smart" organization that is able to learn from experience-based knowledge and subsequently transfer it into the creation of new knowledge, e.g., in the form of product and/or service innovations. A key enabler of Qian Hu's strategic KM systems is its Executive Chairman and Managing Director, Kenny Yap (Figure 1).

Executive Chairman and Managing Director – Kenny Yap

Qian Hu's Executive Chairman and Managing Director, Kenny Yap "The Fish," has actively spearheaded the adoption of KM in Qian Hu. Kenny was appointed Managing Director by his family in 1994 to head Qian Hu because of his high level of education, continuous and great interest in the ornamental fish industry, great ideas, and business savvy. Kenny's tertiary education in economics exposed him to different perspectives and viewpoints which made him more cosmopolitan and reflective, leading him to boldly embrace KM, a move yet to be taken by many other owner-managers of small and medium-sized enterprises in Singapore. One of Kenny's aims in adopting KM is to capture the knowledge, competencies and experiences of his employees in order to avoid knowledge losses in case an employee decides to leave the organization.



Figure 1. Kenny Yap, "The Fish"

Mission and the Need for Competitive Differentiation

Qian Hu's mission, the need to set Qian Hu apart from its competitors in terms of quality, innovation, and service culture, is another driver of KM. Qian Hu's mission to create share-holders' value by becoming a world class ornamental fish and accessories company, requires competitive differentiation through innovative and quality products and services. A major component of this is Qian Hu's intellectual capital, i.e., its industry knowledge and expertise as an ornamental fish breeder, distributor, and manufacturer. The management of the firm's intellectual capital is an important precondition for developing innovative products and services that add value to customers. Eventually, this approach towards systematic intellectual capital management will help to achieve its mission vis-à-vis the need for competitive differentiation.

Maximizing Customer Satisfaction

By capitalizing on intra-organizational knowledge assets, Qian Hu aspires to effectively deliver product knowledge, quality, timeliness, varieties, and good value for the money to its customers. These are strategic customer requirements Qian Hu has to meet as the company aims to maximize customer satisfaction and to provide its customers with a positive and satisfying experience whenever they interact with the firm (Figure 2). Maximizing customer satisfaction and exceeding customer requirements represent important strategic objectives of Qian Hu's KM system, which is closely aligned with the firm's customer-centered business model.

Corporate Standing and Relationship Goals

The goal of developing strong corporate standing and relationships is another KM driver at Qian Hu. Being a publicly-listed company with a worldwide presence, Qian Hu seeks to establish a strong public corporate standing for the company and to strengthen its relationships with its partners and the financial community. This aim requires capitalizing on corporate information and knowledge via systemic knowledge management.

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Qian Hu Voice Track Dragon Fish	Reward Redemption List	返利赠品清单		
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Figure 2. A webpage of Qian Hu's website, featuring a rewards scheme that enables customers to redeem reward points for Qian Hu products

VALUE CREATION THROUGH STRATEGIC KM

Since 2002, Qian Hu has embarked on a long-term top-down strategy to establish a technology-driven organization which maximizes its business efficiencies in all areas, fittingly codenamed FISH (an acronym for Fish, Intelligent, Strong, and Harmonious). The term suggests that Qian Hu should have a fast response in an ever-changing business environment, just like a fish. According to Qian Hu's top management, innovativeness, unity among its key stakeholders, and harmony represent key corporate requirements that the company needs in order to achieve synergies, value creation, and growth. As outlined further below, these elements have significant implications for Qian Hu's knowledge management processes, such as locating and capturing knowledge, sharing knowledge, and creating new knowledge.

CUSTOMER STRATEGIES

Due to its strong customer focus, Qian Hu adopts various listening and learning strategies to analyze and anticipate future customer and market needs. "Listening posts" include multiprong contacts and participation in conferences and exhibitions, as well as regular customer

surveys and feedback sessions. Customer-related information and knowledge are internally analyzed and transformed into actionable knowledge about (new) customer requirements. This is incorporated into strategic plans to ensure that they are met. Processes of determining customer requirements are constantly evaluated and improved to ensure that products and services add value.

Essentially, as Qian Hu ensures that its products and services create customer satisfaction, innovations prevail because of greater customer knowledge. For example, some of Qian Hu's export customers have orders from various aquarium retailers in their countries. With a shipment of fish of varying markings, they have to exert immense effort in identifying each customer's packing list and other details like weight per order. Having this customer knowledge, Qian Hu devised customized bar code stickers containing information such as weight per box, number of bags of fish per box, and the type of fish they contain. This solution—translated from customer knowledge—simplified the job for the customers, solved their problems, and is a fine example of Qian Hu's innovative customer service.

HR Strategies

People are Qian Hu's primary drivers of growth. Thus, it is important to have sound human resource management strategies in place to encourage employees embrace KM proactively and to make it strategically effective. To address the needs of its workforce vis-à-vis the desired outcomes, Qian Hu has developed HR strategies to become a competitive employer and to have competent resources in a learning and thinking workforce and a work environment highly influenced by family culture. Qian Hu implements and reviews its HR plans through regular meetings with line managers and senior managers and an analysis of relevant best practices.

Creating Value by Connecting KM to Organizational Goals

Qian Hu acknowledges that knowledge is integral to enterprise value-creation, a core value of Qian Hu. Implementing KM thus spurs improvements in enterprise decision-making and maximization of value creation. The company believes that value creation and innovation through good knowledge governance are preconditions towards achieving its mission as they set the company apart from its competitors.

In line with its goal to become a knowledge-enabled company, Qian Hu has optimized the organizational, cultural, and technological aspects of its knowledge-based business processes. It initiated external knowledge acquisition and collaborative research with other knowledge-intensive organizations, such as the Temasek Life Sciences Laboratory or In-One Technology Pte. Ltd., to create new knowledge which can be integrated into product innovations.

TESTIMONIALS

As Qian Hu constantly explores the attainment of business excellence, value creation, and innovation through effective knowledge management, it has garnered extensive support and recognition. During the Singapore Innovation Awards 2003 organized by SPRING Singapore, Raymond Lim, Minister of State for Foreign Affairs and Trade and Industry of Singapore, praised Qian Hu as an icon of innovation. In 2004, Qian Hu became the first small-to-medium enterprise (SME) to win the Singapore Quality Award (SQA), the most prestigious award conferred on organizations that demonstrate the highest standards of business excellence. In addition, Qian Hu has the distinction of being the first company to achieve ISO 9001 accreditation for the conditioning and export of ornamental fish industry in Singapore. In 2006, Qian Hu was certified and awarded the People Developer Standard by SPRING Singapore, also attesting to Qian Hu's best practices in HR. These are some of the numerous testimonials which indicate the effective implementation of KM at Qian Hu during the past few years.

IMPLEMENTATION STEPS

Measures and Milestones

The Yap family behind Qian Hu in Singapore started out in chicken farming in the late 1970s before embarking on pig farming in the early 1980s. When the government shut down most of the pig farms in the 1980s for public health reasons, the family converted the concrete pig pens into ponds, filling them with water, to raise guppies. However, the company's entire stock of guppies was wiped out in 1989 during a severe flood caused by heavy rains, resulting in a huge loss. The breakthrough came when Kenny Yap was appointed by his family in 1994 to head Qian Hu. Since then, Kenny has implemented several corporate governance reforms in the company while slowly embracing knowledge management and business excellence concepts.

The major reforms started with a Strategic Business Planning exercise in 1997. This later progressed to other upgrading projects, such as Corporate Restructuring in 1998 and the National Cost of Quality Program in 1999. Key organizational change measures were instituted that also helped to facilitate knowledge management, including a change in the organizational structure, a change in systems and work processes, the implementation of technological changes and information technology, and a change in people, including task behaviors, organizational culture, and the firm's strategic direction.

Changes, Customization, and Adaptation

Taking over the family business, his first challenge was to establish an appropriate structure that supports the implementation of company strategies. According to Kenny there are strong emotional issues to contend with in family-owned SMEs, and he had to ensure that his siblings understood that the company has to be run professionally and separately from the family members' individual interests. To create a balance, rules such as "no in-laws should interfere with family business" were installed. He established that he is the only person accountable for the welfare of his immediate four siblings and two cousins involved in the business. He made it clear to his family that if they want to hire their relatives, they will be responsible for their performance and welfare. In this capacity, Kenny has clearly defined the roles and responsibilities of each member so as to effectively balance family and company needs. Over the years, Kenny has implemented several technological changes in Qian Hu, investing more than SGD6 million in 1995 alone to upgrade farm infrastructure and to purchase stock. His positive attitude towards new technologies is a key feature of his entrepreneurial dynamism and his willingness to embark on new KM initiatives. For Kenny, technology is one of several key KM enablers.

To maximize the use of land and to optimize productivity, Kenny built a 4.2-hectare, hightech farm and also integrated breeding, farming, and import and export activities (Figure 3).



Figure 3. Breeding ponds at the 4.2-hectare Qian Hu farm

High-tech farming systems consisting of a temperature-controlled packing house, a computerized system of trading records, and a laboratory for fish examination and water analysis were adopted. Specialized equipment now forms part of the farm's infrastructure as well, ranging from the cold water mixing tank, automated packing system, and RFID tagging technology to the adoption of PDAs for Qian Hu's sales personnel. These systems greatly contribute to the operational efficiency at Qian Hu.

With its increased drive to use better technology, Qian Hu placed greater emphasis on (R&D), leading to the creation the world's first automated packaging machine for ornamental fish. It spent more than SGD200,000 to develop two auto-packing systems. Traditionally, nine people would work for nine hours to pack 300 boxes of fish. The new automated system, which packs fish into plastic bags before they are put in cartons for transport, is manned by just three workers who only need four hours to pack 500 boxes of fish. The bulk-packing machine further cuts the need for manpower. The company's willingness to invest in new technologies has kept it ahead of the game: "The only way you can survive is by improving productivity, upgrading skills, and equipping your employees with knowledge," Kenny has pointed out (Figure 4).

To ensure that Qian Hu's people management strategy supports business objectives, Kenny implemented a performance reward system, together with his brother Andy, who was the HR director then. Since 2003, Andy has transferred the HR function to their HR manager, Raymond Yip. The staff's performance is appraised on 20point criteria scale that awards points whenever employees meet performance objectives. During the annual dinner, the highest achievers are acknowledged accordingly, symbolically as well as financially.

Interviews with Qian Hu's staff indicate that the transition towards change was successful as Kenny accepted the necessity of hiring "outsiders" for the position of Qian Hu's General Manager (currently held by Teo Boon Hock and previously held by Dennis Koh). Dennis had no relation or friendship tie with Kenny. He was hired based on his credentials and merit. During his appointment as Qian Hu's GM, Dennis had seen changes from a traditional family-run company to a dynamic, professionally-run organization. Dennis summarized the change process: "See it—like it; it's good to change, so let's change!" In his role as general manager, Dennis sees himself as an agent of change, a psychologist,



Figure 4. Use of high-tech equipment (above) and skilled human capital (below)



and a sociologist all rolled into one. He also stressed the need to explain the whole process, the why and the what (benefits) of change, to all those who are affected by it.

PROBLEMS ENCOUNTERED AND CORRECTIVE ACTIONS

The structural balance Kenny implemented in terms of systems of authority and work flows required about two to three years before it was finally accepted. Initially, Kenny experienced some structural inertia from his brothers, as people are typically resistant to changes which tend to create uncertainties. One of his brothers was against the more structured ways of doing things and was hoping that they could all go back to the "good old days when everybody was doing everything together." His brother felt threatened when Kenny introduced formal titles and roles. It was then a real and difficult challenge for Kenny to confront his brother, although he understood that it was something which had to be done. "If he can't, you either accept him the way he is or you ignore him if you can afford to do so. Changing mindsets is only effective if the person

can accept change," Kenny said. Dennis feels that the most significant change in Qian Hu is its adoption of a "more professional practice, striving to be a competitive world class player in the market."

Cultural Challenges

Qian Hu's organizational culture has evolved from one which is predominantly based on family values to one which encompasses more professional practices by instituting so-called best employer practices. However, for more effective change management and knowledge-sharing, it is essential to retain some elements of the family culture. To monitor the prevailing culture, Qian Hu uses various diagnostic measures like employee opinion surveys (EOS), performance achievement, third-party feedback, employee involvement, and staff turnover feedback. Bridging initiatives include recreational activities, informal gatherings, training, and transparency. Staff feedback is gathered through informal get-togethers. Training enables individuals to lead projects.

SELECTION AND ADAPTATION OF KM TOOLS AND TECHNIQUES

Qian Hu utilizes various KM tools and techniques in line with its mission, vision, values, and strategic thrusts, which revolve around innovation, quality, value creation, and customer satisfaction. All tools are customized and adapted to suit Qian Hu's business model, with its emphasis on the firm's worldwide presence and its positioning as a one-stop shop for its customers.

Integrating KM with CRM and Supply Chain Management

Qian Hu's customer relations management (CRM) system is integrated with KM and provides a platform for global networking and knowledge-sharing among its various stake-holders: investors, customers, suppliers, experts, hobbyists, academics, and even competitors. Through knowledge-sharing, ideas, actionable knowledge, and best practices are exchanged among stakeholders. This leads to better management of customer relations. Qian Hu's supply chain management system is a suite consisting of the automated packing and delivery system and the comprehensive accounting system, which is integrated into a cohesive supply chain workflow. Through cohesive integration, an effective transfer of knowledge essential for optimized decision-making and management becomes possible.

KM Enablers: Technology and Leadership

To capture and transfer the knowledge from the operations of Qian Hu worldwide, each subsidiary has its own server, all of which are linked via a virtual private network (VPN). Data is sent daily to the central system in Singapore to allow for effective knowledge management. There are more than 60 computers in the local office, which also serves as a test bed for any new technology before it is rolled out to its offices overseas. Qian Hu has also tackled the world of e-commerce and capitalized on the Web revolution for its ornamental fish business-to-business (B2B) division because most of its customers in Asia and Europe are retailers rather than retail customers. The expansion of Qian Hu's website to cover all other explicit knowledge required by other stakeholders of the company is "interactive and educational," according to Kenny (Figure 5). The collection and storage of all the relevant knowledge for the stakeholders on the common platform allows further knowledge-sharing and transfer among the players in the company.

Qian Hu's senior management has set the strategic direction to create a service-oriented culture. This is supported by a clear vision, vision objectives, core values, and the four strategic thrusts. Business leaders are active in creating strategies, developing plans, systems, and methods to achieve excellence, stimulate creativity and innovation, and build knowledge and

capabilities. Through leadership and personal involvement in planning, communicating, reviewing performance, and recognizing and developing people, senior managers at Qian Hu serve as role models. As the firm's senior management proactively engages in KM initiatives, employees, customers, and suppliers are also motivated to participate in corporate KM activities (Figure 6).





Figure 6. Meetings at Qian Hu represent platforms for knowledge-sharing and knowledge transfer

Important mechanisms to ensure buy-in from stakeholders include the firm's numerous communication platforms and KM tools such as simple floor walks or tea sessions (Table 1) which are used to capture, disseminate, and create new knowledge.

Figure 5. Qian Hu's website is	s devoted to key
stakeholders: customers, employ	ees, and investors

Stakeholder	Communication Platform	Senior Executive Involvement	For Whom	Frequency
Internal			·	
Employee	Coffee breaks. Briefings. Informal gatherings. Focus groups. Floor walks. Committee meetings.	Senior management, managers chair meet- ings, briefs, present prizes, discussion, tea with staff, etc. Management by walk- ing about.	All employees, senior management, managers, executives, non- executives.	Daily. Quarterly, monthly. Quarterly and annually. As and when.
External				
Customers	Meetings, work plans seminars, surveys. Projects, meetings, progress/status meet- ings. Floor walks. Committee meetings.	Senior management, managers and line managers. Chair meetings, briefs, present prizes, discussions, coffee with staff, etc. Management by walking about.	Customer CEO. Senior manage- ment. Customer front line staff, customer con- tact staff.	Weekly, monthly, quar- terly and annually. As and when.
(continued on	next page)			

Table 1. Means of Communication between Senior	r Management and Key Stakeholders
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Qian Hu Corporation Limited

Suppliers	Negotiations.	Senior management,	CEO of supplier or-	Annually,
	Periodic meetings.	warehouse, operations	ganization, man-	project basis.
	Reviews.	manager.	agers, working level	Audits.
		Meetings, briefings,	staff, professionals	Annual BBQ,
		auditing, presenting	from supplier	games/sports.
		awards.	organizations.	As and when.
Investors	Results releases.	Senior management,	Analysts and	Quarterly/as
	Inquiries/feedback.	corporate communica-	shareholders.	and when.
	Analyst briefings/	tions.	Media/public	Bi-annually.
	press conference.	Briefings/responding.	analyst and	
			shareholders.	

Source: Qian Hu Corporation Limited 2004 Quality Award Winner Executive Summary

KM Enablers: HRM Practices and Culture

Qian Hu puts great emphasis on the need for continuous learning and skills upgrading as well as maintaining a culture of transparency, openness, and innovation backed by a system of performance-based rewards. These HRM practices motivate employees to actively acquire and share knowledge, allowing for the capture and transfer of knowledge.

Qian Hu's HR requirements and plans are deployed through five HR systems:

- 1) Manpower planning and staffing.
- 2) Employee involvement and commitment.
- 3) Education training and development.
- 4) Employee health and satisfaction.
- 5) Performance management and recognition.

HR plans and practices are regularly reviewed through meetings with line managers and senior management and through the study of relevant best practices. Some of the HR mechanisms to promote bonding help remove the barriers among the employees for knowledge transfer and a willingness to share knowledge. One such HR mechanism is the corporate newsletter, *Fish Matrix*, which is championed by a newsletter committee made up of HR and Operations staff. The newsletter promotes the corporate identity, bonding, and knowledge-sharing among employees.

Senior management at Qian Hu works hand in hand with specific committees to translate Qian Hu's values into policies, practices and behaviors in support of the organization's culture as illustrated in Table 2. As an aspiring knowledge-based company, Qian Hu places a strong emphasis on promoting teamwork and intra-entrepreneurship. Management has shaped Qian Hu fish farm into an ideal place for seeking and synthesizing new and greater knowledge in fish rearing skills. Qian Hu propagates a supportive and positive work environment in which achievers are rewarded while underperformers are mentored (and eventually penalized). In Qian Hu's work culture, there are also regular chill-out sessions, job enlargement, and job rotations, and training programs for the employees (Figures 7 and 8).

The firm also places a strong emphasis on innovation. Organizational behaviors and practices in Qian Hu's culture that stimulate innovation and knowledge management encompass the openness to new ideas and trust in all relationships in the organization, innovation, creativity, encouragement of risk-taking, teamwork, and the importance of quality achievement. Decisionmaking is allowed at all levels. Training and development are utilized on par with the innovation process as well, so that employees can keep up with innovations.



Figure 7. Birthday celebrations are good for bonding and represent an important HR mechanism.



Figure 8. Teamwork activities nurture Qian Hu's knowledge culture.

Values	Policies (Direction/Guidelines)	Behaviors	Practices
Integrity			
Is the way we do business with hon- esty, trustworthi- ness, dedication and responsibil- ity?	Compliance with: Policies, regulatory re- quirements and meet- ing customer require- ments. Accreditation and cer- tification bodies. Code of ethics and conduct. Equal employment op- portunities.	Being honest and responsible both as professionals and as co-workers. Keep promises and com- mitments and maintain confiden- tiality. Speak up when you feel some- thing is not right.	Periodic audits. AVA audit. Internal audits. QC checks. ISO internal checks. Regular reviews.
Value Creation			
Bring value to what we do con- sistently, each time more and better than the last.	All businesses to adopt SQC activities and innovation. All efforts to be direct- ed towards teamwork and synergy creation, to meet organizational objectives and goals.	Proactively listen to and understand the needs of our cus- tomers and partners. Seek consensus through teamwork. Look for ways to contribute, learn, and support. Seek and adapt best practices creatively.	Customer feedback. Supplier involvement. Short- and long-term plans and targets. Continuous training.

Table 2. Aspects of (Qian Hu's Organizationa	l Culture

Qian Hu Corporation Limited

Entrepreneurship			
To try the seem-	All entities are headed	Be adaptable to	CRM.
ingly impossible,	by entrepreneurial	changes. Admit	Stretch targets.
to break the mold,	managing directors	mistakes, build on	Benchmarking activi-
and to start over	who have creative	successes and learn	ties.
again.	thinking and an inno-	from failures. Be	Adapt best practices.
Entrepreneurship	vative mindset.	creative and inno-	
promotes out-of-	To learn from the best,	vate. Speak up	
box thinking and	adapt best practices, be	confidently, share	
hence innovation	industrious, and inno-	knowledge and	
and creativity.	vate new products and	ideas.	
	services.		
Teamwork	•		
Foster harmony	Value our diverse	Run Qian Hu as a	Organizational
and harness "Qian	workforce.	world-class company	performance reviews.
Hu Spirit" among	Every employee is	with "Qian Hu	Charitable activities.
employees.	treated with fairness	Spirit." We attain	Annual employee
Employees work	and all work together	customer satisfaction	awards.
together for com-	in building a "Qian Hu	by striving for excel-	Group activities/
mon cause and	Family."	lence in everything	sports/games.
purpose.		we do.	

Source: Qian Hu Corporation Limited 2004 Quality Award Winner Executive Summary

INTERNAL AND EXTERNAL SENSING

To ensure that the performance and recognition systems in Qian Hu are effective, an employee opinion survey (EOS) is used as formal mechanism to continuously review the company's performance management system. Through this survey, organizational culture and employee satisfaction can be assessed. It is an way for management to listen to employees and to check the firm's internal knowledge assets.

The HR Department champions the staff suggestion scheme, which encourages individual employees to submit improvement ideas and suggestions. This facilitates the transfer of knowledge from employees with valuable ideas to other parts of the organization that can use this knowledge for the creation and combination of new knowledge for Qian Hu. The HR Department is also the champion for staff dialogue sessions that promote two-way communications, and it fosters any common causes among all the employees on one hand and the management team on the other.

Qian Hu conducts comparative and benchmarking studies to improve its processes. The benchmarks for the various areas like customer and operation are shown in Table 3. As part of its benchmarking activities, Qian Hu identifies the companies it should compare itself with and seeks to learn from these external knowledge agents. To review its HR systems, best industry practices are utilized as another external knowledge pool.

Areas	Companies Benchmark	Explanations		
Customer				
Distribution	OSIM	Qian Hu is currently learning from OSIM's chain store strategy adapting strong points into its own chain store concept.		
Customer Service	Robinson	Qian Hu has adopted customer service standards and practices and continues to reinforce them through regular training of the retail staff.		
Operation				
Export of fish, includ-	Sunbeam (leading fish	Qian Hu learned much and adapted from		
ing sales and quaran- tine	exporter in Singapore)	export sales strategy and procedures in the past years.		
Financial				
Corporate governance	DBS, ST Engineering, Singtel	Qian Hu's adoption and creation of sev- eral good practices in these two areas has		
Transparency	ST Engineering	won several recognitions at the national level. Consistent action towards these is reflected in the awards given.		
People				
Training/development	Attending information- sharing best practices seminars.	Qian Hu is adopting the People Developer framework, incorporating appropriate best practices from other companies.		
Compensation issues	Learning from other companies that have implemented better systems.	Implemented flexible bonus system tied in to sales/profit performance for subsid- iaries' management. Will be looking at other flexible wage issues such as those used by Phillips Singapore.		

Table 3. Benchmarking and Learning Activities

Source: Qian Hu Corporation Limited 2004 Quality Award Winner Executive Summary

Capturing and Creating Knowledge through COPs and R&D

To incorporate new and future customer requirements into strategic plans at Qian Hu, a special committee was formed encompassing subsidiary directors, senior management, and managers. The committee is a kind of managerial community of practice (CoP) used to gather knowledge workers for sharing and creating new knowledge. This internal community of practice captures all relevant knowledge and integrates it into effective plans and strategies. Within Qian Hu, there are several other CoPs that create knowledge through sharing and combination.

To create new knowledge and new technologies, Qian Hu puts a great deal of emphasis on R&D and collaborations with external consultants and knowledge brokers. The firm was able to cut costs for water and manpower by designing a filter system that helps to keep the fish "happy" with less water and fewer workers. It has also made great strides in the area of fish medicine. An internal system of medication has enabled their fish to be healthier and more likely to survive the trip to local fish retailers.

A prominent research collaborator of Qian Hu is Temasek Life Sciences Laboratory. The research collaboration has yielded several noteworthy results; they completed the genotyping of

all the brooders of Qian Hu by polymorphic DNA markers and have set up an efficient method of identify breeding pairs. Qian Hu made history in the area of Arowana breeding when it became the first company to be able to assign offspring collected from the mouth of brooders to both of their parents. Simple and non-invasive methods to determine the sex of the brooders have also been developed by the research team.

Organizing, Storing, and Sharing Knowledge through a Web-Based KM System

To facilitate locating and capturing knowledge, knowledge-sharing, and the use of knowledge, Qian Hu developed a web-based KM system that captures and disseminates the working knowledge of individuals within the organization, providing features such as access control, info approval, info subscription, automated reminder, and mass broadcast capabilities.

The system is a voice extensible markup language (VoiceXML) application which provides the latest stock quotes, members' reward points information, and a feedback channel with a multilingual, fully-automated phone hotline, developed through a



Figure 9. Measurements of different parts of the arowana are used to determine the gender of the arowana brooders

joint collaboration between Qian Hu and In-One Technology Pte. Ltd. (Figure 10). A pioneer in the industry, the voice application combines leading internet and telephone technologies.

The web-based KM system stores corporate information and documents the company's expertise and best practices, which can be accessed securely via email and short message service (SMS), facilitating the transfer and sharing of knowledge from employees to a knowledge network. "Previously, a lot of physical documents were lost or misplaced when an employee quit the company. With the KM system, data can be stored in various file formats, such as Excel, Word or JPEG, and shared by anyone who logs into the network," said Kenny.



Figure 10. Illustration of Qian Hu Voice, a web-based KM system

Besides the involvement of employees, the application engages the shareholders by enabling them to obtain Qian Hu's latest stock value from the SGX (Singapore Exchange) website in real-time via the phone. The system is intelligent enough to prompt the caller to repeat the query if the speech is too soft or unclear. It will then suggest that the caller try the keypad option after

repeated failed attempts. It also allows messages to be recorded and sent as email attachments. The implementation of this system has consequently improved Qian Hu's customer relationship management and positioned Qian Hu as a knowledge company which utilizes cutting-edge technologies to grow shareholder value (Figure 11).



Figure 11. Webpage of Qian Hu's website explaining the rationale of Qian Hu Voice to stakeholders.

There are plans to link the voice system with the company's database to provide access to a wider range of information, including "death on arrival" reports or stock availability to widen the scope of knowledge for effective KM. Death on arrival refers to the death rate of the livestock at the time of delivery. Kenny said, "As long as technology can help create value and increase customer service, I'll try it."

Utilizing Knowledge through Best Practice Transfer and CRM

As the company's expertise and best practices are documented in the web-based KM system, employees can access information about these best practices securely via email and short message service (SMS). This allows the transfer of best practices and knowledge internally. Qian Hu also intensively studies best practices of other companies and adapts the appropriate ones for value creation, entrepreneurship, organizational culture, and the training and development of its people.

CRM reports are frequently reviewed and evaluated by senior management with marketing or project managers as Qian Hu works toward the objective of long-term customer retention and a win-win formula. Inputs to this review consist of the customers' overall satisfaction results, letters of praise, customer service standard results, including responsiveness to queries, quality standards, and number of warranties and complaints. Thhis knowledge and knowledge from employees with customer contacts are then used to model best customer relations practices.

To enhance customer relations, proper customer handling skills are imparted to customer contact employees on an ongoing basis. These staff members are also empowered to deal with customers professionally as they may deem fit for service recovery. Training courses on "Customer Service Excellence" are conducted for customer contact staff. In addition, rewards and recognition are given to deserving staff displaying a customer-first mindset.

Qian Hu conducts systematic analyses of the information it has using a combination of traffic analysis software, reporting tools, and business intelligence tools available on a webbased platform integrated with the customer care information, supply chain data, corporate data, and intellectual capital information. Employees can instantly access the measurements of its local and overseas operational, inventory, financial, and sales performance that affect the organization's bottom line. The data and key performance indicators are then analyzed to deepen insight. The results of the analyses are used not only to make faster crucial decisions, but also with higher precision and better quality. Trends and demand forecasts can be predicted with the combination of information as well. All these help in the innovation or improvement of processes to raise effectivity and efficiency while maintaining operational costs below the current levels.

TRACKING AND MEASURING RESULTS

To track and measure KM results and to ensure a positive impact on productivity and innovation, the company's key performance indicators (KPIs) are tracked, monitored, and reviewed at various platforms: monthly management meetings of the various business sectors and functional groups, corporate management meetings, and the like. The various boards are also updated periodically on developments and progress at their meetings.

Qian Hu also conducts performance reviews of key management support processes such as quality assurance or information system (KM) to evaluate and ensure process effectiveness. The various requirements and performance indicators for each process are documented in Tables 4 and 5. Performance variances, if any, are then examined, and changes are made to the relevant organizational components to ensure that corporate knowledge processes are effectively managed and add value to Qian Hu.

Key Processes	Requirements	Key Performance Indicators
Marketing	Customer requirements	Sales and new customers.
		Customer complaints.
		Customer retention rate.
		Customer satisfaction survey.
		Competitors rating.
Purchase	Quality	Vendor performance.
	Timeliness	Wrong items sent.
		On-time export collection.
		Import rejects.
Packing and	Accuracy and operation	Wrong item packed.
warehousing	standards	Wrong item picked.
		Customer returns.
Quarantine/production	Quality and	Deaths on arrival.
	effectiveness	Daily losses.
		Export shipment return.
(continued on next page)		

Table 4. Key Performance Indicators for Key Processes

Arowana breeding	Quality and effectiveness	Deaths on arrival. Daily losses. Number of harvesting.
Delivery	Efficiency	Export shipment returns. Number of late deliveries. Customer returns. On-time delivery.

Knowledge Management in Asia: Experiences and Lessons

Source: Qian Hu Corporation Limited 2004 Quality Award Winner Executive Summary

Table 5. Key Performance indicators for Management Support Processes		
Management Support Processes	Requirements	Performance Measures
Finance	Accuracy and timeliness.	Accurate and timely financial reporting
	2	Cash and cash equivalents.
Quality assurance	System effectiveness.	Certification to ISO 9000, ISO 14001.
(integrated in	2	OA audits.
operations)		
Human resources	Staffing.	Employee satisfaction index.
	_	Staff turnover rate.
	Training.	Average training hours/places.
	_	Utilization rate.
Product	Meeting customer needs.	Number of new products.
development	_	_
Public relations	Visitor satisfaction.	Visitor feedback.
Publication	Timeliness.	On-time delivery.
	Meeting requirements.	Originality of design ideas.
Information	Responsiveness.	Speed and quality of response.
dystem	Competence of staff.	Reliability of service.
Maintenance	Availability of resources.	Downtime frequency.
	for operations	

Table 5 Kay Danforman as Indicators for Management Symmet Drasses

Source: Qian Hu Corporation Limited 2004 Quality Award Winner Executive Summary

Lessons Learned

Qian Hu Corporation Limited is the prototype of a risk-taking local enterprise that has achieved organizational success and effectiveness through the adoption of strategic knowledge management (KM). In Qian Hu, leadership, technology, people, and the intention to exceed the expectations of external stakeholders such as customers represent key enablers and drivers of KM. Customer knowledge, the firm's internal intellectual capital resources, and technological know-how are indispensable for Qian Hu's profitability. Learning from other companies, such as OSIM or Robinson, and collaborating with external parties, such as knowledge-intensive R&D centers, represent distinctive features of Qian Hu's KM approach. By doing so, the firm looks beyond its internal resources and stakeholders to acquire actionable knowledge from all relevant sources in line with its business strategy to ensure organizational effectiveness. On the whole, Qian Hu's case demonstrates that knowledge management is meaningful and profitable in local enterprises provided it is properly enabled and value-adding in nature. Qian Hu's leadership has achieved a very high alignment of its business model, performance management system and

strategic KM framework approach that other globalizing SME owner-managers might be inspired to adopt.

Dr. Thomas Menkhoff National Expert, Singapore

COMPANY PROFILE

JTC Corporation (JTC) is Singapore's leading master planner and provider of industrial space solutions, established in 1968 and tasked to develop and manage industrial facilities in Singapore. JTC offers a wide range of industrial and business facilities tailored to suit all types of manufacturing and related operations. Business facilities range from land preparations to ready-built factories that are fully serviced with basic infrastructure, quality finishes, innovative designs, functional layouts, and easy accessibility. Some of the new-generation products include stack-up factories, technopreneur centers, and incubators for start-up technology companies, business parks, and science hubs (Appendix A). JTC owns specialized parks, such as Jurong Island, wafer fab (fabrication) parks, biomedical parks, and an airport logistics park. Over the past 39 years, JTC has helped to power the growth of Singapore's economy by developing 7,000 hectares of industrial land and four million square meters of ready-built factories for more than 7,000 local and multinational companies.

JTC has a staff of about 800 and places great emphasis on customer satisfaction and holistic talent management, as indicated by its involvement in the so-called FIREfly¹ alliance. JTC has one of Singapore's most dynamic statutory boards, led by Chief Executive Officer Ow Foong Pheng. The JTC Board includes senior government officials and representatives from leading private sector companies and unions. The Chairman of the Board is Soo Kok Leng. Other experienced board members include Tan Gee Paw, Chairman of the Public Utilities Board, Cheong Koon Hean, Chief Executive Officer of Urban Redevelopment Authority, and Chua Sock Koong, Group Chief Executive Officer of Singapore Telecommunications Ltd. JTC's CEO leads a panel of senior managers from different operational departments in the organization. These units include specialized business functional units such as industrial parks development, specialized parks development, customer services, and corporate planning. Other critical departments include finance, information technology, and the legal department (see organizational chart, Appendix B). The Deputy Director of JTC's corporate planning group is Leow Thiam Seng, and his Deputy Director, Lee Yee Fung, leads the corporate research & KM department.

JTC first started as a builder of industrial land and facilities but then placed a stronger emphasis on the creation of entire industry clusters, in line with Singapore's cluster development approach. As new challenges arose, it expanded its business activities by including master planning and the development of industry-centered work communities that cater to the needs of neweconomy workers to "work, live, play, and learn" within the same area.

JTC closely collaborates with other Singaporean government agencies to develop attractive urban designs for different industry clusters that enhance the business environment of its customers. In recent years the organization has introduced several pro-business policies and e-initiatives to help customers. JTC leaders have recognized the need to review existing planning approaches, policies, and guidelines to meet the demands of the knowledge-based economy (KBE), moving away from the traditional "one size fits all" approach toward customer segmentation and customized space solutions.

¹ A human resource collaboration among seven statutory boards under the Ministry of Trade and Industry (MTI) to strengthen capabilities in attracting, developing, and retaining talent.

Like many other statutory or government-linked companies in Singapore, JTC's objective is to achieve organizational excellence. Important milestones in the journey towards a worldclass organization include the achievement of the Singapore Quality Class Award, Singapore Innovation Class, Singapore Service Class and People Developer Standard. JTC places emphasis on innovation and encourages employees to proactively embrace new ideas and change.

STRATEGIC ASPECTS OF ADOPTING KNOWLEDGE MANAGEMENT

JTC's adoption of knowledge management (KM) as a corporate management tool reflects the importance of knowledge as a new factor in the production and development of Singapore's economy and society. Due to its lack of natural resources, the city-state has proactively embraced the KM agenda as reflected in the KM experimentation program initiated by the Prime Minister's Department in 2001, which coincides with the beginning of JTC's KM journey. As a statutory board, JTC has spearheaded several broad knowledge-related initiatives aimed at supporting the achievement of Singapore's vision of becoming a knowledge-based economy. It has undertaken significant strategic industrial developments that require massive investments with a long payback time, such as Jurong Island, One-North, Tuas Biomedical Park, and other specialized business parks, to attract strategically important industries and to direct foreign investments. It has also introduced leading-edge real estate solutions in Singapore, such as underground caverns and specialized research facilities, that serve as the foundation of strategic activities critical to the future growth of Singapore's economy.

JTC's knowledge management goals are closely aligned with its organizational objectives and business strategy. One strategic business goal is to maintain JTC's position as leader in the real estate industry, i.e., to increase productivity and to exceed customer needs. The ability to gain leverage on experiences with its industrial development projects is a key competence in this respect. As a statutory board, JTC shares its KM-related experiences with both private and public sector organizations to support Singapore's k-economy vision.

IMPLEMENTATION STEPS

JTC's dynamic KM activities can be traced back to the KM Department established in early 2000. The constant need for data and information from other JTC departments and external stakeholders served as an essential motivator. Answering this need was considered crucial in improving work plans and organizational effectiveness. Long before KM became a strategically important tool, JTC had implemented an electronic document management system to facilitate the sharing of data, information, and knowledge.

A key driver to the adoption of KM by the organization was the need to effectively transfer and transform existing business-related data and information into actionable knowledge (e.g., in the form of managerial recommendations) to support corporate decision-making processes. Over time the KM Department became a crucial lubricant of this transformation process, which led to speedier execution of business functions and greatly enhanced JTC's competitiveness as a whole. From the beginning of JTC's KM journey, leadership support has been a key enabler of JTC's knowledge-related management activities. Being a statutory board whose mandate is essential to Singapore's continuous prosperity, JTC's organizational goals and strategies should be in tune with the national vision for the country to become a fully developed knowledge-based economy. As such, there is a clear synergy between JTC's KM approach, corporate objectives and business processes, and Singapore's national development aspirations.

JTC'S KNOWLEDGE MANAGEMENT SPECIALISTS

A recent JTC reorganization merged the KM and corporate research functions into a new unit called the corporate research and KM department (CRKMD) and created two dedicated positions in KM. Like managers in other units, JTC's KM team members continuously upgrade their KM capabilities through training, research, and exchange with external parties, for example, international consulting houses, and other statutory boards, such as the International Enterprise Singapore (IE Singapore). By learning from others and sharing ideas with those who have also embarked on the KM journey, JTC fine-tunes its own knowledge processes, such as capturing and disseminating knowledge, more systematically. As a result, a needs-based KM system is in place. This adds great value to the organization, its people, and the various stakeholders.

MILESTONES

The KM department's objective during the first phase of JTC's KM initiative was to develop a system to capture and share information within the organization. JTC developed more broad-based programs to encourage information inputs from all departments. Respective program initiatives included the following components:

- 1. Implementation of change management and outreach activities to enhance staff awareness and commitment.
 - Initial focus on groups that had implemented or were implementing customized workspaces (with Sharepoint as the platform).
 - Facilitation work aimed at kick-starting initiatives to start new workspaces, to enhance the participation of users, and to recruit new ones.
- 2. Sharing of expertise and experiences among workspaces.
- 3. Exploring the feasibility of "incentivizing" knowledge-sharing.

JTC's senior management strongly encouraged the building of a relevant database system by working hand-in-hand with the KM steering committee and the information technology department.

When KM was first initiated, all departments were required to endorse their project plans and to communicate these plans to the rest of the organization. Department representatives then updated the information through a template, for example, "teamsites." Teamsites are a standard feature of Sharepoint for the exchange of information and collaboration, e.g., with regard to discussions and their outcomes, document retrieval, contacts, events, and other components. They are key pillars of JTC's dynamic workspace system.

Over time, the added functionality of the system and KM tools via continuous software improvements and upgrades encouraged greater usage and buy-in. As this process was included as part of the employees' job scope, more and more organizational members became aware of the benefits of KM. They realized that a wealth of useful information was available electronically. In addition, employees began searching for useful and actionable information and knowledge once they understood the benefits of the new system and realized the ease of communication it provides.

Instead of answering emails on such things as policy-related queries from the staff across the organization, users are able to direct the inquirers to designated websites where relevant information can be found. Gradually, JTC's staff members began to appreciate the information and repositories provided by the system, which help them to cut down the amount of time they spend answering emails.

Since 2001, JTC has invested enormous time and manpower resources in developing a system for capturing and sharing information internally. However, there are still areas for im-

provement. These include developing a sound measurement system for KM and implementing similar KM initiatives with a focus on integrating external stakeholder knowledge into the system. By sharing knowledge and interacting with external developers, for example, JTC can create new knowledge assets which might eventually contribute to the success of the organization.

ENABLERS AND KNOWLEDGE PROCESSES

The initial phase of JTC's KM implementation involved mainly the management level. For KM to permeate the entire organization, various implementation blueprints were developed. As JTC's leaders have stressed, the success of its KM initiatives rests on JTC's knowledge strategy, the sustainability of the various KM enablers, and implementation of needs-based KM practices in the form of knowledge-enabled business processes that add value to the organization. A key strategic KM goal of JTC is to create a knowledge-sharing culture within the organization. This is important in driving new knowledge and value creation processes.

Knowledge Strategy: Technology

JTC emphasizes web technology to support capturing, sharing, and creating knowledge. To date, JTC has launched several employee portals: Platinum (JTC's intranet), Krypton (net for customers), and Titanium (for partners and suppliers), the corporate website for the general public, and virtual online communities for various industry clusters within JTC's clientele. The Platinum portal has gone through several enhancements.

Using information technology heavily as leverage, Platinum I (launched in October 2001) was designed to be a one stop-portal for JTC's employees. In it, several functions such as "Policies and Procedures" and "News and Announcements" were incorporated as repositories, the latter created to inform employees on the latest developments within JTC and on information about specific knowledge resources, such as training and development courses (e.g., "Application of Net Economic Value Capital Budgeting Model for Investment Decisions and Evaluations"), tours, etc. The Policies and Procedures repository is intended to update employees on the latest Human Resource developments and issues such as leave entitlements and compensation-related information. A link to "Knowledge Management" was also provided to enable the staff to keep abreast with the most recent developments in the field of KM.

Platinum IIA was an enhanced version of Platinum I launched in November 2002. High web page sourced sites such as "News and Announcements" and "HR News" continued to be part of the contents. New functions were added, including a calendar function featuring all recognized public holidays in Singapore and other information, for instance, the actual number of days of leave that an employee has applied for or spent. As part of realizing the vision of a learning organization, the system also featured information about relevant talent development programs, such as courses on interpersonal skills management, that are sourced and partially subsidized by JTC. The respective link is entitled "Courses Open for Registration."

In order to fully participate in a knowledge organization supported by an extensive IT infrastructure, employees must be comfortable using the technology. To achieve this purpose, JTC ensured that the needs of employees were incorporated into their portals. For example, leave application forms are posted in the Platinum Intranet for easy access. FAQs revolving around job-related day-to-day issues are also posted online, and employees are directed to these web pages if they have questions. IT-related courses are offered periodically to help employees use IT solutions effectively.

JTC's knowledge management initiatives took a significant step forward when Platinum IIB replaced Platinum IIA. Unlike its predecessors, Platinum IIB no longer focuses merely on internal events. The latest news is brought to employees' computer screens through subscriptions

to websites such as "Factiva," ensuring access to timely information about current affairs. Userfriendly functions such as staff-related links were also enhanced. "Knowledge@Work" is a new column that features various business operations within JTC that have successfully implemented value-adding KM concepts.

JTC envisions an enhanced KM infrastructure that has moved beyond the current collaboration platform through the implementation of new initiatives:

- A corporate-wide taxonomy and metadatabase² aimed at developing a structure that better organizes JTC's knowledge assets and contents.
- A common platform, in the form of a "common contribution template," to simplify and standardize knowledge capturing and sharing processes.
- A powerful enterprise search engine which allows efficient and effective access to JTC's knowledge assets.

Knowledge Strategy: People

While technology must be in place to facilitate and support a knowledge-sharing environment—for instance when face-to-face communication on a daily basis is not possible—it is human input, in combination with interests and perceived benefits, that drives any knowledge initiative. One of the ways by which JTC has attempted to kick-start and nurture the development of a knowledge-sharing culture is to encourage members to participate in different types of Communities of Practice (CoPs), in which every member is connected by JTC's extensive IT infrastructure.

The focal point of members of Communities of Practice revolves around specific workrelated topics (e.g., product development). Online facilities such as discussion forums are provided, with an online coordinator to organize contributions and opinion pieces and to post the latest news to all community members. Apart from online discussion forums, mini-project rooms are available in-house for discussion purposes. Through active participation in these communities, management hopes that employees will be encouraged to voice their opinions, a first step toward a more interactive environment as well as the creation of a knowledge-sharing culture with effective intra-organizational knowledge flows.

Members of Communities of Practice are expected to assist each other by sharing experiences and suggesting strategies to further improve business functions. Efforts are made to bring people from different departments together to nurture the cross-fertilization of ideas and to avoid silo mentalities. Some of the communities have evolved into workspaces, in line with the strategic imperatives of JTC's KM approach. The work of JTC's product developers, for example, is facilitated by an online stage-related process which automatically pulls in required information and knowledge resources as and when they are needed. Templates of design briefs (documents outlining the criteria for the design of a new development on a particular site), past design briefs, and other materials are available online as illustrated (Figure 1). JTC's marketing staff similarly has access to online workflows, documents, forms, templates, policies, and guidelines, which makes the marketing of industrial land and standard factories more effective (Figure 2).

Some examples of Communities of Practice that focus on issues are Five-year Roadmap, Benchmarking, Crisis Management, Project Portfolio Management, Enterprise Workflow Engine, and Facility Management.

 $^{^{2}}$ A metadatabase is typically a database for storing metadata (data that describes data) for a specific purpose, such as enabling data, information, and knowledge management across a large organization with diverse types and sources of data.

Human Resource Management Practices

The effectiveness of KM initiatives can be greatly improved through relevant, needs-based, up-to-date HRM practices. Through meaningful reward systems, employees can be motivated to engage in knowledge-sharing activities on a regular basis. At JTC, the Knowledge Activist award promotes and rewards employees' knowledge-sharing behavior. The objective of the award is to promote a knowledge-sharing culture and practices in JTC and to recognize staff members who have made outstanding contributions to knowledge-sharing initiatives. JTC's knowledge experts have come up with several Knowledge Activist awards: the Commendable Knowledge Activist (awarded on a monthly basis) and the Outstanding Knowledge Activist (awarded annually to encourage employees to share their ideas with management).

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Figure 1. Documentation Available Online for Product Developers

Dynamic Workspace

Noteworthy in the case of JTC is its so-called Dynamic Workspace³ solution, which builds upon JTC's corporate culture. This encompasses several other KM tools and encourages KM practices in various ways:

 Learning Before Doing: With the Dynamic Workspace, research into previous similar projects can be made before a new project starts. Employees are able to make use of

³ Dynamic Workspace solutions typically deliver built-in expert knowledge about work-related correlation data and information in the form of context-sensitive on-screen links, enabling users to navigate with the click of the mouse to specific entries in relevant workspaces.

templates (Figures 1 and 2) to understand what has already been done, enabling them to concentrate only on those parts of a new project that had not been previously researched. It also enables employees to talk with other employees who have completed similar projects, avoiding duplication of work efforts and repetition of mistakes and thus cutting down research costs while letting employees focus on other areas of work.

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Figure 2. Documentation Available Online for Marketing Staff

- Learning During Execution: The system contains different KM tools which assist employees in their work. For example, they are able to make use of Knowledge Discovery Points in the system to assist them in reflecting on the process and suggesting future modifications. Reflection on the work process is possible through conscientious documentation of project progress. Key learning points are documented throughout the life-span of a project (Figure 1).
- Learning After (After Action Review): This system encourages employees to review and provide feedback on what was achieved compared to the goals which were set at the beginning and allows them to share their experiences and learning points with others immediately after a project is concluded. This avoids repetition of mistakes and improves work performance.

Strategic Knowledge Leadership

KM in JTC is effectively driven and nurtured by top management via the CRKM department, which is linked to the corporate planning group.

TRACKING AND MEASURING RESULTS

JTC Corporation's knowledge strategy, supported by various enablers and sound KM practices, has produced significant results for the company, which has made considerable progress in moving toward a truly knowledge-enabled (smart) organization. Since the beginning of the KM initiative in 2001, more than 20,000 documents have been uploaded to Platinum Sharepoint and are now available for easy reference and downloading. One hundred collaboration teams, with 22 department webs, more than 80 Communities of Practice, and eight workspaces, have been formed. One hundred percent of JTC's announcements and bulletin news are posted in their intranet. Ninety percent of application forms and services are available online, and the KM initiative has received 100% department participation—quite an accomplishment for a program that was implemented less than six years ago.

JTC has also achieved remarkable results in terms of producing viable and outstanding knowledge products. One prominent example is the One-North project, strategically located in Buona Vista near the National University of Singapore and the Singapore Science Parks. This research hub is targeted at the biomedical, infocom, and media industries. In Biopolis at One-North, wireless connection is built in to enable rapid communications between One-North and the outside world. Sky bridges were constructed at Biopolis to allow for easy movement from one building to another and to facilitate intra-organizational knowledge flows. Cafes with Internet connectivity provide a comfortable venue for knowledge workers to hang out and to discuss their work during breaks or after office hours to ensure a constant exchange of opinions, tacit knowledge, and innovation through a cross-fertilization of ideas. An innovative knowledge-sharing environment is critical for the creation of new knowledge, which is the ultimate purpose of One-North as a one-stop research center.

While some companies find it important to quantify the value of knowledge capital and to put a price tag on KM, JTC has not yet fully embarked on systematically tracking and measuring the value added of its intra-organizational KM measures. A proxy indicator used to assess the usefulness of information and knowledge stored in their repositories is the hit rate of a certain portal. Respective data points help the KM department enhance popular sites and remove repositories which are underutilized.

PROBLEMS ENCOUNTERED AND HOW THEY WERE APPROACHED

KM met with a certain amount of resistance at JCT in the beginning. Employees perceived the capturing of information and knowledge in repositories as a chore over and above their job scope. In addition, older employees felt that it was a lot easier to work without the need to externalize their experiences for later use by another generation of job holders. Alarmingly, the old culture of protecting knowledge for personal use and advancement in the company represented a crucial stumbling block with regard to the integration of an organization-wide knowledge management system.

JTC approached these issues in a number of ways. The task of capturing information became part of routine job scopes. An example is seeking budget the approval. An e-application template was created for employees to submit their budget and to get it approved online. To further ensure user-friendliness, previously approved and non-approved budgets were posted on the site for reuse and guidance. This detailed information about what should and should not be done helped save JTC's knowledge workers precious time in putting together budgets. It also reduced the potential delay from rejecting erroneous submissions, making buy-in easier.

JTC also ensured that the use of its system was as simple and as user-friendly as possible, encouraging greater self-sufficiency as employees sought information and knowledge on their own because they had learned where to look for relevant resources.

CHALLENGES AHEAD

Measuring the effects and benefits of implementing KM represents a challenge for the KM department. Although everyone understands that KM is useful, JTC's KM managers have to justify expenditures and are expected to produce tangible KM results in order to legitimize continuous financial support for the implementation of KM initiatives. The literature on KM suggests that there are few scientifically valid and reliable indicators available at present that would show how much knowledge management actually contributes to the organization's bottom line.

Despite widespread buy-in, some employees may find entering information into the system cumbersome even as part of their jobs. The process may be perceived as time-consuming, and employees may choose to deal first with more urgent jobs at hand.

Another challenge is data privacy protection. JTC is obligated to protect the data and information from external parties such as developers and customers. Hence there are limits when it comes to sharing information and knowledge with other agencies and project partners.

CONCLUSION

As indicated above, the establishment of JTC's KM Department in June 2001 was driven by the need to align both broad strategic goals and business goals at the organizational level with the aid of a centralized system to enable the seamless transfer of data, information, and knowledge from department to department. As interviews with JTC's KM experts suggest, the successful KM journey continues. In contrast to many other organizations, JTC has managed to create a motivational organizational culture characterized by caring leadership that supports active questioning and allows for mistakes. Employees are thus able to trust each other and to share their opinions about work-related issues more freely. Furthermore, the integration of KM into the employees' daily workflows has increased the acceptance of KM in the organization. In this way, KM is not seen as an additional burden on a heavy workload but as a competitive weapon which supports individual, team-related, and organizational effectiveness as well as the achievement of Singapore's national industrial development objectives.

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APPENDIX A. PORTFOLIOS OF JTC

Some of the JTC's principal projects:

Industrial Land Sites

JTC is an innovator when it comes to finding ways to lease land sites to promote a more vibrant enterprise ecosystem. It has industrial land sites that are available for lease on long-term or short-term tenures to companies to set up their manufacturing plants. In addition, JTC has been proactive in getting private developers to take up its industrial land sites for the development of generic industrial



land sites for the development of generic industrial facilities. For example, United Engineers Developments (UED) took up a site at Paya Lebar iPark to develop a print media hub where it will build, own, and manage several small and medium print/media companies under one roof.

Ready-built Facilities

Besides industrial land sites as mentioned above, JTC also provides ready-built factories for companies to set up their manufacturing operations very quickly. It has a wide range of low-rise facilities such as standard factories, warehouses, and workshops, as well as high-rise facilities, such as stack-up and flatted factories, situated in prime locations and supported by nearby amenity facilities.



One-North

This 200-hectare hub is the main icon of Singapore's knowledge economy in development by a multi- government agency effort under the guidance of a special Steering Committee, with JTC as the appointed master developer. One-North will be developed in phases over the next 20 years, integrating tertiary and research institutes and commercial hubs with residences and sports facilities.

Business Parks

JTC has two business parks that are dedicated to high-tech and knowledge-based companies. These are the International Business Park (Jurong) and Changi Business Park which were developed with quality facilities set in beautifully landscaped environments.

Start-up Spaces

JTC's start-up spaces are hot spots for technopreneur start-ups. These units are equipped with facilities such as broadband connectivity, meeting rooms, business centers, and cafes. Existing facilities include The Enterprise and iHUB.





Specialized Parks for Industry Clusters

- Biomedical parks: There are two biomedical parks located in Tuas that cater to manufacturing-related activities for pharmaceuticals, biopharmaceuticals, biologics, vaccines, and untritional-related companies.
- Jurong Island: currently there are more than 90 companies with a total investment of SGD26 billion.



• Wafer fabrication parks: JTC has four wafer fabrication parks and an advanced display park. The parks support Singapore's vision to become a world class semiconductor hub.

Housing Facilities for Foreign Talents

In line with Singapore's aim to attract and retain foreign talents, the scheme for housing of foreign talent (SHiFT) provides quality housing for foreign professionals.

Eclectic sets

JTC subsidiaries have also been involved in other projects in the region, such as master planning and consultancy works in India, China, and the Middle East as well as the development of ready-built facilities in China, India, and the Philippines.



APPENDIX B. JTC ORGANIZATIONAL CHART, DECEMBER 2007

Dr. Boondee Bunyagidj² National Expert, Thailand

ORGANIZATIONAL PROFILE

The Siam Paper and Packaging Business (SCG Paper) is one of the five key strategic business units of the Siam Cement Group (SCG) (Figure 1) which has been recognized as the largest and most advanced industrial conglomerate in Thailand. It was founded under the Royal Decree of His Majesty King Rama VI in 1913. Since its inception, and through the successful takeover by Kraft Paper in 1976, it has become the largest integrated local producer of paper products and the industry leader in terms of market share, customer satisfaction, technology, and reputation. The company has a combined annual production capacity of more than one million tons, 20% of which are exported to various countries in Asia, Europe, and North America.



Figure 1. Five Key Strategic Business Units of SCG

Currently, three core products that account for almost 80% of products produced include pulp, printing and writing paper, packaging paper, and corrugated containers, with advanced technology support from Rengo Co., Ltd. and Toppapan Printing Co., Ltd. for corrugated containers and offset folding cartons, respectively (Figure 2). The company has overseas plants in the Philippines and Vietnam and more than 20 subsidiaries located in different parts of Thailand, such as Bangkok, Chonburi, Saraburi, Rachaburi, Songkla, and Khonkhaen.

Aligned with its four corporate business philosophies—adherence to fairness, belief in the value of the individual, concern for social responsibilities, and dedication to excellence—SCG Paper's more than 6,000 highly competent employees produce world-class quality products using eco-friendly production processes; continuous improvement and management efficiency are emphasized within the company. This commitment aims for sustainable development at the corporate, industrial, and national levels. This philosophy has won SCG Paper many prestigious

¹ SCG Paper represents the paper and packaging business unit of SCG (formally called PPB).

² The author would like to acknowledge the kind assistance and cooperation of Mr. Chaovalit Ekabut, President, and Mr. Chaweewan Wichupanan, Knowledge Management—Technical Training Center Manager, of SCG in the preparation of this paper.

awards, including the Deming Application Prize, the Thailand Quality Award, and the TPM Excellence–First Category 2004 from the Japan Institute of Plant Maintenance.



Figure 2. SCG Paper's Core Products

Key Drivers for the Adoption of KM

For nearly three decades, the company has continuously built its intrinsic technology on the latest pulp and paper technology by awarding scholarships to qualified employee engineers to pursue a master's degree in pulp and paper technology, mostly in the U.S.A., since this degree is not offered at any of the local universities. More than 40 scholar engineers who have developed and accumulated intrinsic knowledge about pulp and paper technology over the years now hold senior positions in various company plants and have played very important roles in making SCG Paper's products the best in the local market and highly competitive in the regional and world markets through continuous improvement and innovation. Some of these employees will retire in the next few years.

SCG Paper aims to become an industry leader in the international arena, as set forth in its vision statement:

To be a world-class paper company with a strong presence in ASEAN, driven persistently to innovate value while being committed to sustainable development and betterment of the environment.

To achieve its vision of being a regional and a world leader in pulp and paper products, SCG Paper needs to maintain and improve its unique and intrinsic technology from generation to generation and to continuously utilize and create new knowledge in this sector to foster innovation. The company has to ensure that it can keep abreast of customers' rapidly changing requirements and keep pace with an evolving environment for sustainable competitiveness.

In this regard, the technical development committee (TDC) (Figure 3) was set up in January 2003, consisting of managing directors and directors of production and related functions based on its main business processes from the three key plants (Ban Pong, Wang Sala, and Pra Padeng). Its purpose is to articulate the company's vision, mission, and roadmap aimed at strengthening production employees' competency on intrinsic technology to sustain the company's competitive advantage. In addition, the TDC is responsible for setting up the technical training roadmap, the follow-up and evaluation systems, and the motivation and communication system to ensure the effectiveness of the training and development programs. Committee members were



appointed based on their positions to ensure their commitment as well as the security and sustainability of core production competencies.

Figure 3. SCG Paper's Main Business Processes

Following intensive brainstorming sessions, the committee came up with a vision:

Create a technologically advanced workforce (TAW) to foster organizational competency and competitiveness in the global arena via a continuous improvement of quality and productivity through a profound understanding of paper and packaging-related technology.

To achieve it, the TDC clearly defined the company's mission:

Promote employees' awareness, understanding, and continuous learning on paper and packaging-related technology for self-development and improvement in line with PPB's vision through the integration of people management and knowledge management.

As a result, four key strategies, the so called "Four Creations," were identified—system creation, virtual center of technical excellence creation, media creation, and motivational system creation—with these roles:

System Creation

The systems to be set up include the curriculum, testing materials, training evaluation, and score report, as well as the reporting system.

Virtual Center of Technical Excellence Creation

The intrinsic technology owners are key to the success of this center, as they are the ones who own, share, use, and create knowledge. These scholars will virtually transfer their knowledge and mentor other employees in production-related processes. The center will network within the same and across business units as well as with other outside stakeholders, such as universities specializing in paper and packing technologies and suppliers within and outside Thailand, as well as serving as a research center for the production of new SCG Paper products.

Media Creation

Various media for training and learning are to be developed in Thai. Best practices from various plants will be collected or acquired from outside sources and disseminated virtually to all employees, with different levels of accessibility.
Motivational System Creation

Various motivational systems must be set up, including facilities and a supportive learning environment, a timely reporting system that is consistent and closely monitored by superiors, and projects that promote and encourage process improvements and innovation leading to patent registration.

Implementation Steps

To actualize the above strategies, the committee formulated a roadmap to build up the technologically advanced work force (TAW) for sustainable competitiveness so that all stakeholders will understand the developmental phases, with specific milestones for each phase and the role of each to ensure that each phase is implemented successfully. The roadmap consists of three phases, as shown in Figure 4.



Figure 4. Implementation Steps towards a Technologically Advanced Workforce

Phase I. Foundation (2003-04)

The objectives of this phase are:

- 1. To strengthen manufacturing employees' ability and knowledge of the production technology and related knowledge used in each production area (technology fit).
- 2. To enable manufacturing employees to work as a team, with systematic and analytical thinking, while engaging in a life-long learning process (cultural fit).

The knowledge needed is grouped into 1 modules based on four key business processes and requisite relevant knowledge, as shown in Figures 5 and 6. The training is divided into basic, intermediate, and advanced levels. The basic level consists of technical knowledge which is generally found in public sources, the intermediate level consists of knowledge originally created within PPB (Siam Paper and Packaging Business), and the advanced level consists of knowledge considered to be trade secrets. A technical training roadmap for each position involved in production is then set up to help in capacity-building.

At this stage, all scholar engineers, managers, and supervisors who have specialized in each area ("knowledge owners") play important roles in identifying, acquiring, codifying, and creat-

ing knowledge for each training course. With a great deal of effort from these knowledge owners, 53 courses were developed for the basic and intermediate levels (the addition of more courses is ongoing at the intermediate levels), and more than 2,000 man-days of training had been carried out by the end of 2004.



Figure 5. Eleven Technical Training Modules





The preparation/creation of technical knowledge content was successful due to the excellent cooperation from all knowledge owners. The next challenge is to develop an efficient and effective method of storing, retrieving, using, sharing, and updating this knowledge. To overcome these challenges, it was agreed that a centrally managed IT support system be established due to the fact that existing knowledge transfer practices and IT support systems vary from company to company, which might make it difficult to ensure that all employees within and across companies will receive the knowledge they need, even though such knowledge has

been created, captured, and codified at the right time. The TDC decided to launch an IT system called the PPB Knowledge System (PPB_KS)³ in 2004. The PPB_KS is an intranet that serves as a repository for four key knowledge areas: technical excellence (eleven technical knowledge modules), management excellence (modern management articles), management reports (financial data, business plans, and performance reports), and productivity improvement (best practices within and across companies in SCG Paper, as well as information from marketing, research reports, etc). The system also serves as a central site for news, announcements, and employee activities. Besides serving as formation and knowledge bases, the PPB_KS also supports organization-wide collaboration and human networks, For example, knowledge captured from communities of practice (CoPs) or discussion rooms is stored in the PPB_KS after being reviewed and verified (Figure 7).



Figure 7. PPB_KS Structure

Specifically for the technical excellence knowledge base, which is the key focus area of the technical development committee, KM working groups were set up in 2004 to ensure that the technical knowledge stored in the PPB_KS was complete and updated, easy to access and retrieve, and used as a means for performance improvement as well as for continuous learning and innovation.

The structure of the KM working team was well designed around the PPB_KS to ensure the quality, validity, and security of knowledge. There was one working team, the so-called "module team," for each module, consisting of a champion, several associate champions, mentors, site administrators, and members (Figure 8).

The champions and associate champions are appointed based on their positions, and the mentors and site administrators are invited by the champions based on their area of expertise. The roles and responsibilities of the members of each module team are clearly defined:

³ Note: PPB, the former name of SCG Paper, is still being used for the Knowledge System, as in PPB_KS.

Champion

Fosters knowledge creation and promotes knowledge-sharing, validates knowledge quality before storage, ensures the completeness and updating of knowledge, approves or terminates membership of users, manages complaints from users, discovers innovative projects, and ensures codification of knowledge into the PPB_KS; formulates a promotional plan for PPB_KS utilization, etc.



Figure 8. Organization of the PPB-KS

Associate Champion

Assists the champion in promoting knowledge-sharing among members, verifies knowledge before storage, participates in knowledge-creating activities such as a technical or knowledge-sharing forum, etc.

Mentor

Answers questions in the community sites, recommends sources of knowledge for extensive study, participates in knowledge creation activities.

Site Administrator

Manages the module site, ensures knowledge security, advises and supports the respective module champion in promoting and developing the module site as well as promoting the use of the site, etc.

Members (Assigned Members and General Members)

Actively share their knowledge with others through various activities such as discussion groups, communities of practices (virtual or face-to-face), publications, etc. as well as use the knowledge to improve performance, add opinions, publish, and share their own information.

Technical Site Administrator (under the supervision of the technical information and training center)

Provides central support services for PPB_KS users, protects PPB_KS from systems breakdown, viruses, and unauthorized access, manages and monitors the use of the server area and level of knowledge inventory, coordinates with all site administrators, trains all target

employees on the PPB_KS regarding news and regulations, promotes the use of the PPB_KS, facilitates knowledge-sharing throughout the PPB, etc.

This well-designed module team structure with clearly defined roles and responsibilities worked quite well, since people clearly understood their roles and, more importantly, were recognized for the success of their module group as a team. The formal appointment of champions and associate champions by position ensured the continuity and sustainability of the PPB_KS, whereas the mentors (who are mostly supervisors and managers) play a key role in promoting the interaction between members both in the PPB_KS site as well as in face-to-face meetings. They also provided feedback to members on questions in their areas of expertise through sharing experiences, best practices, and lessons learned.

By the end of Phase I, more than 10,000 MB of knowledge content had been uploaded into the PPB_KS and more than 2,000 man-days of training on basic courses had been carried out, covering 100% of the target employee group, primarily supervisors and managers. To date 94 training modules have been developed and 100% of target employees have been trained on basic knowledge through e-learning. The intermediate, carried out as a project-based learning for engineers and supervisors, is still going on. In regard to the level of utilization of the PPB_KS, the number of cumulative visitors had exceeded 25,000 as of July 2006.

Phase II. Impact (2005–06)

Throughout Phase I, the focus was mainly on identifying, acquiring, creating, codifying, storing, and accessing technical knowledge (through the PPB_KS) as well as training target employees, whereas the focus during the second phase was on enhancing the sharing and capturing of tacit knowledge relevant to the 11 knowledge modules, such as tips, tactics, in-depth experience, lessons learned, etc., to create new ideas or knowledge. The aims were for productivity enhancement in strategic technical areas:

- Sustainable forest productivity.
- Reduction of manufacturing costs via breakthrough technologies.
- Superior environmental performance at minimal cost.
- Superior product performance.

In this regard, the Communities of Practice (CoPs) have been used as a means for enhancing knowledge-sharing and creation. Each module champion initiated CoPs in which facilitators and members were assigned based on their respective areas of expertise. In some CoPs, external stakeholders, such as technical suppliers, were also invited. Although all CoPs were self-managed, they were fully supported by senior management in terms of time, place, and budget, with administrative assistance from the technical site administrators. In fact, CoP implementation plans must be approved, implemented, monitored, and evaluated by senior management just like other production plans. In other words, CoPs were part of the employees' jobs for the creation of new knowledge. Each module team was responsible for the success of the CoP as part of job performance. This unique top-down approach, in contrast to that used in typical CoPs, which are generally voluntary, has so far been quite effective at SCG Paper in terms of participation.

There are currently more than 60 CoPs actively sharing and creating knowledge through face-to-face or virtual meetings through the PPB_KS (Figure 9). CoPs are categorized into four types based on their objectives: problem-solving, method/process standardization, best practices identification, and innovation. The knowledge captured is verified by the module champion before being stored in the PPB_KS.

Module	COP's Names
Industry	Purchasing Marketing Plan Engineering
Plantation & Pulping	Plantation
	Pulping & Bleaching & Pulping Drying
	Chemical Recovery
Paper Recycling Plant	Paper Recycling Plant
Paper Making & Converting	Paper-making for Kraft Paper
	Paper making for Printing & Writing Paper
Coating & Surface Treatment	Coating & Surface Treatment
Box-Making	Corrugator
	Converting
	Production Planning
	Maintenance
	Marketing
	Production Design
	Logistics
Product Application	Lab & QA
	Printing Paper
	Publishing Paper
Environment	Environment
Energy	Boiler & Turbine Generator
Engineering & Maintenance	Trouble Shooting
Statistical & Decision Making Tools	Statistical tools for 5 specific functions

Figure 9. Examples of CoPs

In addition, the technical development committee established a reward scheme which was automatically rated by knowledge users: for "The Great Contributor" who contributed most by answering the highest number of questions on the web board or discussion forum and "The Great Content" for the author of the knowledge item that was downloaded the most number of times by PPB_KS by users. All course directors and trainers were given exclusive, specially-designed T-shirts for their contributions. Both monetary and non-monetary reward schemes were available for CoPs: gift vouchers, attendance at technical symposium and study missions, free luncheons, etc.

As mentioned earlier, the aim of knowledge-sharing in Phase II, the so-called Impact Phase, was to discover the positive impacts of KM on the effectiveness of production and relevant systems, customer satisfaction and, more importantly, innovations (Figure 4). Although impact evaluation was still in is early stages, some improvements in production and related processes were apparent as a result of learning derived from the CoPs.

An example is a CoP on the pulp making module where members shared their experiences on troubleshooting and preventive measures for leaking water tubes in the recovery boilers. The selected topic was in line with a key company policy: reducing machine downtime and improving overall plant effectiveness (OPE). Knowledge gained from this CoP resulted in the inclusion of additional inspections in the preventive and maintenance plan: measurement of tube thickness using ultrasonic equipment, testing of the emergency system of the steam drum level prior to shutdown, calibration of the steam drum level transmitter during shutdown, etc. In addition, the special testing equipment for tube leakage was included in the annual procurement plan, as well as the improvement in the timing of repairing the cracked mica sheet. Another example was a cost reduction of THB5–10 million on equipment and engineering for the pre-bleaching stage due to the application of lessons learned among CoPs members.

More importantly, some important qualitative results were observed after CoPs were introduced, including an increase in efficiency after knowledge needed was located and accessed, avoidance of "re-inventing the wheel," fostering of cross-company collaboration due to the expansion of social networks across companies within SCG Paper, an increase in innovative ideas for new products and services, and additional opportunities to share across companies. In other words, CoPs have assisted the technical workforce in learning more rapidly and expanding their sources of knowledge and in learning beyond company borders through virtual and people networks. This is certainly supportive of its vision to "Innovate value for stakeholders" and is in line with SCG's crucial emphasis since 2005 on becoming an innovative organization. CoPs in particular have encouraged employees to be more open-minded and eager to learn—key characteristics of SCG's "Inno-People."

An early indication of this change could be seen at the end of Phase II in the fact that not only the number but also the quality of SCG Paper projects submitted for the SCG Innovation Award in 2006 had significantly increased as compared to 2005 (the first year this award was offered). Among the innovative projects submitted, hydroponics culture (a technique for growing plants without soil [Figure 10]) began in R&D and was developed into a large-scale project through knowledge-sharing among CoPs members. It is now being implemented at a subsidiary of SCG paper.



Figure 10. Hydroponics Culture

SCG Paper has moved ahead in innovation through its technical excellence initiatives, which came out in time for the recent corporate movement on innovation. In SCG's concept, innovation is driven by technology management consisting of three key elements: the technology roadmap, R&D, and intellectual capital management (Figure 11). The technology roadmap was what SCG Paper used in Phase I. R&D was facilitated through intermediate and advanced technical training/learning and CoPs were carried out in Phase II. Finally, intellectual property management is what is planned for Phase III.



Figure 11. Key Elements of Technology Management

In fact, SCG is now in the process of setting up an Intellectual Property (IP) center to assist business units in the patent filing process and to leverage patents within a group.

Phase III. Sustain (2007 and beyond)

The objectives of this phase are to institutionalize learning in the PPB business management model, linking learning with the company's strategic business mission and performance measurement system. The focus will be on:

- Creation of an environment for life-long learning.
- Establishment of an assessment center.
- Building industry-academe partnerships.
- Performance appraisal and potential evaluation.

PROBLEMS ENCOUNTERED AND CORRECTIVE ACTIONS TAKEN

The implementation of Phase I—focused primarily on creating a technical knowledge inventory through identification, creation, capture, and codification of tacit knowledge as well as organization of explicit knowledge—was highly successful due to the excellent cooperation and contribution of the module champions, associate champions, and mentors. They were well aware that the workforce's technical competency is critical in achieving SCG Paper's vision. There was an urgent need to capture tacit knowledge from retiring scholar engineers and to set up systems for storing, accessing, and updating the existing explicit and codified knowledge. The PPB-KS has served this purpose well.

However, one of the challenges in promoting the use of PPB_KS was disparities in the level of computer literacy, particularly on the part of the frontline employees. There was a need to provide training on the use of PPB_KS and the manuals, for both users and site administrators. A call center was set up to help users in a timely manner.

Although knowledge-sharing was not new to SCG Paper employees, most sharing, through small group activities and other productivity improvement initiatives, had been within the same company, and sharing in CoPs had been across companies. Some members were uncomfortable talking freely because they werent acquainted with their counterparts. Facilitators helped build social relationships through break-the-ice activities, creating a relaxed atmosphere. In addition, members (membership is based on one's position or by invitation only) were informed about the objectives, rules, and regulations of sharing. If CoP members hoarded their knowledge due to a

knowledge-is-power mindset or were not able to see the benefits of sharing knowledge, they would be divided into smaller groups of 3–4 persons, where it would be easier to build trust and thus facilitate sharing. The ongoing challenge is to make knowledge-sharing part of the job and ultimately part of the organizational culture.

KEY SUCCESS FACTORS

Compared to most Thai organizations implementing KM, SCG Paper's KM journey has been quite smooth as a consequence of the following key success factors:

Visionary and Committed Leadership

SCG Paper was among thousands of companies seriously affected by the economic downturn of 1997. However, with a strong leadership and through ongoing communication with the employees, with sincerity and caring, good governance, and a change of its key strategies, its employees pulled together and worked with the leaders, supporting unconditionally all the measures that were undertaken—in particular the focus on productivity improvement—to survive the crisis. The aim was to be competitive among world-class players in order to increase its export markets. This effort paid off, anad the company returned to its position as a core business of SCG within four years without any laying offs. The company's position in the international market is now even stronger. The experience of the crisis resulted in increased confidence in and respect for their leaders on the part of employees.

Through good or bad times, the SCG Paper's senior leaders have been role models to employees, particularly in their commitment to the four corporate business philosophies and to whatever changes are needed. Without exception, the introduction of KM required changes in employees' mindset and behavior in order to foster an organizational culture of openness and trust and thus facilitate knowledge-sharing, learning, and innovation.

The leadership showed commitment by setting forth a clear vision and strategies and providing the necessary infrastructure as well as the resources needed to support KM initiatives. A KM Committee was set up, with defined responsibilities and structure. In addition, commitment was demonstrated by leaders at all levels when they contributed, created, shared, and trained target employees. Senior leaders also became role models by personally participating in CoPs.

Clear Linkage of KM Objectives with the Business Direction

In order to become a world-class paper company as stated in its vision, SCG Paper must have a technologically advanced workforce that can utilize knowledge for improvement and innovation of products, processes, and the business model. There is a need for systematic processes to identify, collect, create, store, and access core technical knowledge and to enable sharing and use of knowledge to enhance employees' learning and innovation to achieve SCG Paper's vision/mission. KM serves these purposes. The technical development committee responsible for competency development policy appointed the KM committee with clear directions and defined responsibilities in order to manage and facilitate competency enhancement and innovations. All stakeholders involved have a shared vision and direction with defined responsibilities, and this results in the creation of synergy.

Supporting Organizational Culture

SCG has been recognized as one of the leading Thai groups of companies not only in terms of business success but also in its supportive culture. A visible commitment to its four corporate business philosophies—adherence to fairness, belief in the value of the individual, concern for social responsibilities, and dedication to excellence—is reflected in the organizational culture as well as in the management style and way of thinking of virtually all of its subsidiaries, including

SCG Paper. Examples of this unique culture are seen in the employees' loyalty and commitment as well as in strong teamwork—key success factors for Phases I and II of KM implementation. All key stakeholders brought their full efforts to bear to meet the vision and goals laiad out by the TDC and KM committees. For example, the structured and top-down approach used for CoPs (different from the traditional CoPs, which are normally voluntary and driven by members' interests) seems to work quite well due to the strong commitment of employees. So far, the desired impact on cross-company collaborations as well as a more open working environment had been already seen by the end of Phase II, and this undoubtedly paved the way for even more innovations.

Supportive Human Resource Management System

The commitment to the value of the individual is underscored when the company is recognized as a leader in human resource management systems among local Thai companies. SCG Paper is a preferred employer in the local market, with the reputation for conducting an extensive, transparent recruitment process. Once on board, employees are well taken care of physically, mentally, and spiritually and are developed to their full potential. This is reflected in a comparatively low employee turnover rate and a high employee satisfaction level. This capability-building of the workforce is considered to be one of SCG Paper's strengths because of the intrinsic technology accumulated over the years. The establishment of a technical training roadmap has provided improved direction for technical competency development in response to the company vision/mission. The transfer of tacit knowledge among employees within the same company is a common practice, accomplished through, for example, regular job rotation (every three to four years), buddy systems (coaching), cross-functional group activities, etc. Employees are thus quite used to being mentors or coaches, as this has always been part of their regular responsibilities. In fact, many see it as an honor. If motivation is needed, various motivating schemes, both monetary and non-monetary, can be used to energize employees.

Continuous Improvement and Learning

SCG Paper's vision of being a world-class paper company is in line with one of its corporate values: dedication to excellence. SCG Paper, like other SCG subsidiaries, has implemented various management systems in its quest for excellence: ISO9000, ISO14000, TIS (Thailand Industrial Standards) 18000, total productive maintenance (TPM), total quality management (TQM), etc. Numerous productivity improvement initiatives that have been continuously implemented over a long period of time are now fully integrated into the work systems and have become a way of life for all employees. For example, every employee is required to be involved in small group activities, including four QC projects, seven suggestions, and four problem-solving projects per year, as part of their KPIs. This dynamic learning process through continuous improvement serves as an excellent foundation for breakthrough improvement, facilitated by knowledge-sharing across companies, business units, and outside stakeholders implemented in Phase II.

LESSONS LEARNED

The Importance of Knowledge Management Processes

Although there is no consensus on necessary processes for putting KM into practice, it is generally accepted that there are several key processes involved: identifying, creating, capturing, storing, accessing, sharing, and using knowledge. Using knowledge results in learning and thus creates new knowledge. The more knowledge is used, the more learning and new knowledge will be created. This is a never-ending cycle of knowledge creation. The more dynamic the cycle is, the more learning and innovation will happen. Gaps or weakness in KM processes will have a

negative impact on knowledge creation. In addition, key success factors such as leadership and strategy, organizational culture, IT, and measurement have critical roles in making this cycle effective. In this regard, SCG Paper's KM processes consist of all key processes in the knowl-edge creation cycle as described above (Figure 12).

Before KM initiatives were officially launched in SCG Paper, some KM processes were practiced but might not have been systematic and effective. The establishment of the champion module and the PPB_KS filled in the gaps and weaknesses. The key success factors mentioned above play important roles in making the knowledge creation cycle effective.

It is also critical that senior management be aware of the importance of KM processes and key success factors in knowledge creation. In particular, the measurement of learning and innovation is still at an early stage; more attention should be given to establishing monitoring and evaluation of outputs and outcomes of the knowledge creation cycle to identify areas for improvement.



Figure 12. Knowledge Management Process in SCG Paper

Adapting KM Tools and Techniques

Since KM implementation is very context-based, most organizations have to apply or adapt the KM model, tools, and techniques or create models or tools to fit their own context. The approach to CoP implementation is a good example of a unique adaptation of CoP development. In the Western culture, CoPs are generally driven and sustained by members' interests (bottom-up approach). Interestingly, CoPs in SCG Paper use the top-down approach, that is, all members are appointed or invited (no voluntary members), CoP implementation is clearly documented in the annual plan, and the results of the CoPs are part of the champion module's KPIs to be reported to senior management. This top-down approach works out very well in the early stages, particularly in an organization in which employees have a high level of commitment and discipline as well as a strong performance measurement system. Studies should be undertaken to see if this top-down approach would be effective in other organizations with a similar culture.

In addition, early signs of cultural change resulting from the CoPs were observed, thus confirming the hypothesis that CoPs, if carried out effectively, can drive cultural change in the organization.

Balance between Virtual and Face-to-Face Approach

Based on the fact that majority of the knowledge that exists in the organization is tacit, a good knowledge repository should make both explicit and tacit (people-based) knowledge available on demand to the entire organization. It should create a dynamic locus of learning that is partly physical and partly virtual. Although the PPB_KS has significantly enhanced the efficiency of storing, sharing, accessing, retrieving, and using explicit knowledge, it is also important for SCG Paper to provide physical space for face-to-face meetings that can foster openness and trust among employees and are the most effective approach for sharing tacit knowledge. An organization needs to find the balance in both approaches that will work best based for its particular unique context.

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ORGANIZATIONAL PROFILE

The Faculty of Medicine Siriraj Hospital, Mahidol University (hereinafter referred to as "Siriraj"), consists of two main institutions—the Siriraj Hospital and the medical school—with approximately 11,000 and 3,500 employees, respectively. Siriraj hospital, named after HRH Prince Siriraj Kakutabhundu, the beloved son of King Chulalongkorn (King Rama V), who died of dysentery, was commissioned in 1888 by the King in memory of his son and out of his strong desire to establish a hospital for the well-being of the Thai people. The medical school was founded in 1900 as part of the hospital in response to the shortage of physicians and demands for better medical care. After over a century, the faculty has developed into one of the leading medical facilities, widely acclaimed for its medical services, medical education, and research. Specifically, Siriraj Hospital is now recognized as one of the largest hospitals in Southeast Asia, with more than 1.5 million outpatients and 70,000 admissions per year (Figure 1).



Figure 1. Organizational Chart

For over a century, the hospital has strongly upheld the efforts of King Chulalongkorn, HRH Prince Mahidol Songkla (the present King's father, recognized as the father of modern Thai medicine), and the royal family to improve the quality of life for the Thai people. Siriraj's philosophy, vision, and purpose are:

- *Philosophy*: true success is not in the learning but in its application for the benefit of mankind.
- *Goal*: to extend knowledge and technological advancement via research in a way that will be the most beneficial for the people
- Vision: to be an excellent medical institute in Southeast Asia.

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 Mission: to produce quality graduates and medical staff, to provide ethical and up-todate medical services in accordance with international standards, and to conduct research and create a supportive academic atmosphere.

The mission statements are integrated with the common goal of ensuring the well-being of patients.

KEY DRIVERS FOR THE ADOPTION OF KM

Although currently recognized as one of the leading medical institutes in Thailand with its long-term reputation of providing high-quality tertiary medical services and producing highly capable medical graduates, Siriraj has been continuously and aggressively moving towards being a leader not only in the country but also in Southeast Asia, as stated in its vision.

Recognizing that quality is one of the most important success factors in achieving its vision, Siriraj initiated its organization-wide total quality management movement in 1998. The deputy dean of quality development was tasked to oversee all quality-related matters in the faculty. It has successfully gone through almost three periods of quality improvements and is well on its way towards achieving excellence.

- First period (1999–2001): quality development.
- Second period (2002–04): emphasis on quality care processes for patients.
- Third period (2005–07): development towards excellence.

Knowledge management (KM) came into the picture in 2002, during the second period, after Siriraj Hospital received its hospital accreditation (HA). It was among the first public hospitals to be were accredited. The hospital accreditation standard is an integrated patient-focused management standard that helps hospitals to systematically and continuously improve health care quality as well as personnel and organizational capabilities, learning, and effective-ness. The implementation of HA has given rise to significant positive changes in various aspects of the institution, particularly in the organizational culture, including a commitment to quality, openness among the employees, motivation, teamwork and collaboration across work units, etc., which are, in fact, contributing to their journey to excellence.

In line with its quality policy during this period, which focused on raising the quality of patient care processes, the expansion of quality development, and continuous improvement initiatives, Siriraj was searching for appropriate tools or techniques to maintain the enthusiasm generated during the HA and to strengthen its quality culture, particularly collaboration among employees, through the sharing of good practices that lead to better quality patient care processes. It was decided in 2003 to participate in a pilot project on the implementation of Knowl-edge Management,² with the primary aims of learning about KM, building up institutional capacity through KM implementation methodology, and determining whether KM can be used as a means to enhance the quality of patient care and, in the long term, result in performance excellence.

Based on the experience gained from the pilot project, the Community of Practice (CoP) approach was found to be practical and effective in establishing a knowledge-sharing network in the area of continuous clinical quality improvement (CQI) to facilitate best practice identification and sharing in patient care. A significant increase was seen in awareness of the importance and benefits of knowledge-sharing and of having a knowledge-sharing culture across work units.

² The pilot project "The Implementation of Knowledge Management" is an 18-month project implemented by the Thailand Productivity Institute (FTPI) with support from the Asian Productivity Organization.

Faculty of Medicine Siriraj Hospital, Mahidol University

Although measurable outcomes in patient care are not yet evident, the satisfactory results from the pilot project have prompted Siriraj's senior management team to include KM as one of the strategic tools in developing the institution into a learning organization—one element in the learning and growth perspective of Siriraj's balanced scorecard (Figure 2).



Figure 2. Strategy Map of Siriraj

Another significant move towards excellence in the third period of the quality journey is the adoption of the Thailand Quality Award (TQA) Framework³ as a way of improving organizational performance. Out of the seven categories in the TQA criteria, KM is a key requirements in Category 4: Measurement, Analysis, and Knowledge Management. This category seeks to answer the question of how the organization builds and manages its knowledge assets. The KM implementation efforts being carried out respond favorably to this requirement, and KM has now become part of Siriraj's management model, serving as a step towards Siriraj becoming a learning organization as well as supporting other strategies related to the management of knowledge assets of medical education, services, and research and supporting processes.

IMPLEMENTATION STEPS

Since its inception as a pilot project, KM has now evolved into a key strategic approach for Siriraj to become a learning organization as well as in supporting other quality development initiatives leading to innovations. Siriraj used the bottom-up approach to implement KM initiatives

³ The Thailand Quality Award (TQA) is a nationally-recognized quality award administered since 2002 by the Thailand Productivity Institute. TQA criteria have been adopted from the Malcolm Baldrige National Quality Award criteria (Reference 2).

(pilot project), with the full support from the dean. However, following the success of the KM pilot project, the senior management team set up clear directives for all employees to embrace KM at all levels through strategies with clearly defined goals.

Retrospectively, there was no formal long-term written roadmap on how KM would be developed as senior management reviewed the results of the KM implementation periodically during senior management meetings. Decisions were made to ensure its applicability within the Siriraj context and its alignment with other ongoing organizational needs and directions. Thus the KM plan is carried out on a yearly basis together with the faculty's other annual plans. Implementation, monitoring, and evaluation were conducted just like any other plans. However, based on the activities carried out since 2003, Siriraj's KM journey can be divided into three phases:

- Phase 1: pilot project (development of methodology and capacity building).
- Phase 2: evaluation and setting directions.
- Phase 3: adjustment, expansion and integration.

Phase 1. Pilot Project

To build up its capacity on KM implementation methodology, Siriraj decided to participate as one of four organizations in the pilot project "The Implementation of Knowledge Management" organized by the Thailand Productivity Institute for the years 2003–04 under the supervision of the Technical Expert Service (TES), supported by the Asian Productivity Organization (APO). Its objectives were to develop practical KM implementation schemes, build up the institutional capacity, and to create KM awareness among the participating Thai organizations. The six-step model, a change management process of the Xerox Corporation (Figure 3), was used as a framework for implementation.

KM Cycle of Implementation



Figure 3. The Six-Step Model⁴ (KM Implementation Model)

This model can be used to help an organization successfully introduce changes within the company. Knowledge management requires many of changes—employee mindset, company

⁴ Introduced by Mr. Robert Osterhoff, advisor of the pilot project and former vice-president of Xerox Corporation, U.S.A.

culture, way of working etc.--within the organization, and is achieved through the following steps.

First, the objectives for making the change, defined as the "desired state," must be made clear. Once the desired state has been defined, the organization can then proceed to the transition and behavioral management step. This involves setting up the infrastructure to put the plan in place—a flexible organizational structure, support from senior management, determination of critical success factors—and initiating interventions to change personnel behavior—role models, openness, out-of-the-box thinking, etc.

The second step is to communicate to all stakeholders the what, why, when, and how of the changes (KM implementation) using appropriate means. The organization then proceeds to the third step, processes and tools, involving the selection of KM tools or processes to be used for KM implementation, for example, the self-service approach: building a database using IT technology, establishing a knowledge-sharing network through Communities of Practice (CoPs),⁵ facilitating the transfer of knowledge, using an open forum for knowledge-sharing through seminars, etc.

The next step is training and learning in KM concepts. The how to's on selected tools and techniques are provided to relevant and key stakeholders. A measurement system with defined key performance indicators (KPIs) is then set up to monitor and evaluate the progress and outputs/outcomes of implementation versus plans and/or the desired state (measurement step). To facilitate and encourage participation in KM implementation, the recognition and reward step is carried out through provision of incentives for knowledge-sharing and recognition of positive behavior and activities that support KM initiatives. It should be noted that the six steps need not be taken in order and can be carried out in parallel with various degrees of focus.

After the first workshop, in which general KM concepts and the principles of the six-step model were provided by the TES expert, Siriraj's first KM team, with the Deputy Dean of Quality Development as team leader and members from various departments, was set up to handle this project. Based on the hospital's focus on improving patient care quality and on the observation that most quality improvement initiatives, particularly through the continuous quality improvement (CQI) of patient care teams (PCT),⁶ are not shared across teams and work units, senior management identified the desired state: Effective establishment of a knowledge-sharing network in clinical CQI for the best practice in patient care.

Action plans were then formulated based on the six-step model and were continuously adjusted or improved based on the results obtained from measurements focused mainly on the KM activities such as number of CoP members, number of visitors to the KM website, interaction on the web-board, and the number of knowledge assets uploaded on the KM website. For example, virtual sharing did not fit in with the Siriraj culture, so more emphasis was placed on face-to-face knowledge-sharing. This adjustment contributed to the success of KM implementation at Siriraj.

Phase II. Evaluation and Setting Up Directions

Upon project completion, the project evaluation results indicated that the benefits gained (besides satisfactory results on KM activities) from participating in the pilot project were:

- Understanding KM objectives and the implementation process through practicing them.
- Buy-in and support from senior management.
- Increase of KM awareness and level of participation from employees.

⁵ CoPs are groups of people who share a passion for something that they know how to do and who interact regularly to learn how to do it better.

⁶ A patient care team (PCT) is a patient-centered multidisciplinary team which cares for patients directly.

- Establishment and facilitation of CoPs.
- Development of an IT system that supports KM.
- Development of directions and strategies for KM using experience gained.
- Being a role model for KM implementation in Thailand and sharing the experience with others.

Based on the benefits gained, senior management decided to adopt KM as a means to support its key strategies, including that of being a learning organization. A strategic map was drawn up, and KM has become an important approach for excellence (Figure 4). In addition, KM has become a part of the management system based on the TQA framework adopted by Siriraj. Some key actions were undertaken at this stage.

Setting Up a KM Policy

In addition its continuous support, senior management set up a policy at the inception of KM implementation requiring senior managers to understand the concept and application of KM within their areas of operation as well as to be KM role models. Moreover, faculty and staff are allowed to participate in KM initiatives during working hours (KM is part of their job). Several workshops on KM were organized for senior management personnel such as deputy deans, the hospital management team, the heads of departments, and the senior management of the nursing and pharmaceutical divisions.

Establishment of a KM Division and the Faculty KM Committee

During the implementation of the pilot project, there was no unit responsible for KM. All activities were carried out by the KM committee specifically appointed by the Dean for this pilot project only. KM committee members have full-time jobs, and sometimes it was difficult to get their full commitment due to time constraints. Therefore, upon completion of the pilot project, the KM division was established within the department of quality development with the mission of promoting KM implementation and moving Siriraj in the direction of becoming a learning organization. To fulfill its mission, the division had three main units: the KM facilitator development unit, responsible for KM capacity-building, the KM assets development unit, responsible for the design and management of the knowledge repository, and the KM supporting unit, responsible for promoting, monitoring, and coordinating various KM-related activities, with four full-time staff members. With its defined responsibilities and full-time staff, the KM division has played a vital role in driving, facilitating, and supporting knowledge management initiatives and their expansion and sustainability in Siriraj.

The KM committee that had originally been set up specifically for the pilot project was reorganized and institutionalized as a faculty KM committee consisting of senior representatives from key departments/units appointed to provide direction, policy, and action plans for KM as well as to monitor the effectiveness of the implementation. Both infrastructures are critical foundations for KM implementation, since Siriraj is a very large organization with more than 10,000 employees and KM is quite new to most of them. Responsible units are needed to drive, encourage, and facilitate the implementation of KM to ensure that all key stakeholders will understand, embrace, and integrate KM into their work.

Phase III. Adjustment, Expansion, and Integration

Having realized that CoP was an effective approach for bringing about key cultural changes, particularly the knowledge-sharing culture essential for becoming a learning organization, the KM committee decided to review and systematize CoP implementation methodology prior to its organization-wide expansion. A CoP roadmap (CoP implementation model) with 10 steps was

developed based on the experiences gained from the pilot project and the existing Siriraj culture and context (Figure 4). Each step has gone through many adjustments, since CoP as a social network is very context-specific.



Figure 4. CoP Roadmap

This roadmap helps to foster more effective communication and standardization of the understanding and implementation of CoP on a larger scale. It was developed under a clear policy on CoP direction and resource allocation, which is crucial for success.

After it became clear that KM would be used as a means of becoming a learning organization, the nursing department designated KM as one of its focus areas. Policies that would encourage nursing staff to participate in CoP were set up: allowing nurses to use one to two hours of their time to participate in CoP, provision of a budget for meetings, etc. The KM committee on nursing services was set up to formulate, deploy, and evaluate the progress of KM plans. A key to the success of this step was the composition of the committee members: they were from all levels, operational to managerial, of key functional units. This enables KM committee to communicate and get feedback from all levels. In addition, members were selected through informal and personal contacts to recruit people with open minds and enthusiasm.

The third step was to analyze what knowledge was needed by answering the following questions:

- What knowledge is critical for the achievement of the institutional vision and mission?
- What knowledge is needed for the improvement of value creation processes?
- Do we have such knowledge? If so, where?

Based on the information obtained, 13 knowledge domains were identified, each of which was used as topic for each CoP. This is quite different from the typical CoPs' practice, since the key knowledge areas to be shared were determined before the CoP was formed. The use of the 13 knowledge domains as shared topics ensured that knowledge-sharing would focus only on critical knowledge.

After the key domains were identified, a core team was organized for each domain consisting of a sponsor, a facilitator, an historian, and an IT administrator. The core team, made up of volunteers, had defined responsibilities. The sponsor was responsible for the logistics of CoP

meetings. The facilitator was responsible for motivating, energizing, and facilitating knowledgesharing within the community. The knowledge shared was captured and stored on the CoP website by the community historian. The IT administrator was responsible for designing and improving the website to meet users' needs. This core team was intended to be self-managing to ensure that CoPs can be expanded and implemented widely and become self-sufficient with only minimum technical support from the KM Division. The key to the success of this step was having the skills and experience of the core team. For example, the facilitator should have the ability to communicate, convince, motivate, and build relations with members, analyze and interpret issues shared, etc., while the community historian should be good at notetaking, capturing knowledge shared, and content management.

To equip the core team with the required skills, capacity-building (Step 5) was carried out through a learning-by-doing approach, as there was limited classroom space. Experience-sharing meetings for core teams were held every three months to enhance their learning curve. Lessons learned from core team sharing were documented and shared on the KM website.

The sixth step is the recruitment of CoPs members, which was systematically carried out according to defined policies and procedures. Recruitment announcements were first circulated through various communication channels, after which applicants were selected on a first-come-first-served basis. Only those who had hands-on experience on the CoP they applied for were selected, since the number of members was limited to 40 per CoP to ensure maximum inter-action within the group. It is the responsibility of the core team to provide a correct understanding of the concepts and objectives of CoP as well as of members' responsibilities. The formation of CoP in Siriraj is highly customized because the demand exceeded the supply. This is different from typical CoPs, where members voluntarily gather to form CoPs to share their experiences.

A formal launching of the CoPs—Kick-off Day (Step 7)—was organized on a specified date to make all faculty and staff members aware of the CoPs' existence and their support from management. After the kick-off, each CoP started sharing knowledge face-to-face (biweekly sharing) or through the KM website. The facilitator was a critical success factor in ensuring the efficiency and effectiveness of sharing within the communities, where all members participate in the sharing of insights or tactics from different perspectives and in the utilization of knowledge shared in the CoP for improvement.

Based on the sharing of experiences among the facilitators, a set of guidelines was developed covering the steps required in preparating for and conducting CoPs. In addition, various approaches to sustaining the CoP were also recommended: the need for continuing recruitment of new members, the use of appreciative inquiry (success stories vs. problems), cooperation from stakeholders to allow the use of knowledge with patients, motivation using rewards and recognitions, CoP participation, and outputs as part of employee performance evaluation. For example, these consisted of the number of CoP members and meetings, the number of articles (knowledge) uploaded on the KM website, the number of innovations that resulted from CoP sharing, etc., and a continuous flow of communications on the importance of KM in becoming a learning organization. In addition, a policy of not allowing senior management to attend CoP meetings unless invited was a key adjustment, predicated on the strong influence of seniority prevalent in Thai society.

Each group was provided with a space on the KM website to create a virtual CoP knowledge base and encouraged to use the web board for sharing among members. Rewards and recognitions were used to motivate participation. Those who were not selected as CoP members can keep up with current events in the CoPs via the website.

The CoP core teams had to ensure that working (tacit) knowledge of members was shared; storytelling was used for this purpose, a very effective technique for extracting tacit knowledge. It was then the responsibility of the historian to capture, analyze, synthesize, and codify the knowledge being shared with consent from members (Step 9). Codified knowledge was converted into electronic files or VDO and shared on the KM website. These experiences point to some critical success factors for capturing knowledge:

- The historian's knowledge on the issues shared, necessary skills (intense listening, accuracy in capturing issues, notetaking, content management), and both mental and physical alacrity.
- Positive attitude of historian towards the task.
- Time management.
- Continuous support from senior management.
- Mentoring and advice from an experienced historian.
- Feedback from members.
- Defined responsibilities and teamwork of core team.

The final step, of considerable importance, was to develop the codified knowledge into procedures/work instructions or to use them for innovations. Such procedures/work instructions might evolve into best practices if they consistently produce better outputs/outcomes when compared with the existing ones.

Since Siriraj is a large organization, there is a need for a Chief Knowledge Officer (CKO) to provide directions and plans. Within the Siriraj context, the chair of the faculty KM committee, the deputy dean of quality development, is the faculty CKO who oversees overall directions and KM policies. However, at the implementation level, the chair of the interdepartmental KM committee, in this case the chair of the KM committee of nursing services, is the CKO who leads and, together with committee members, drives the KM movement in nursing services.

The CKO's role in supporting CoP includes participation in setting up CoPs, setting directions and objectives, recruiting qualified core team members, being a role model, and fostering an environment conducive to knowledge-sharing, resource allocation, and alignment, and the responsibility for building a broad base of support on all levels, empowering staff members, motivating and rewarding teams, mentoring, problem-solving, connecting CoPs across work units and organizations, and encouraging self-managed CoPs for long-term sustainability. Having a highly skilled CKO at the implementation level is critical for the success of KM implementation, since this position serves as the link between the faculty CKO and KM practitioners. In other words, KM policy deployment is led and driven by the CKO at the implementation level and supported by the KM Division.

It should be noted that clearly-defined CoP implementation steps and a clear statement of the responsibilities of key stakeholders have greatly helped Siriraj to standardize the understanding and practice of CoPs among all staff members and, more importantly, to systematically and effectively expand CoP practice throughout the organization. However, the breadth and depth of CoP implementation is very context-specific, and thus the CoP roadmap will need to be periodically adjusted as appropriate. Presently, Siriraj has continuously strengthened CoPs in clinical CQI and expanded their implementation to non-clinical CQI, such as the improvement of document control systems.

Another key development during this stage is the integration of KM into health research one of Siriraj's missions. Based on the strategy map (Figure 2), one of the key elements in building human capital in the area of learning and growth perspectives is the enhancement of a research environment within Siriraj. To achieve this goal, the R2R (Routine to Research) program was initiated with the objective of building up the faculty's capacity, specifically the capacity of the patient care teams (PCTs), in the development of research methodology and research proj-

ects from the routine care of patients or from daily work routines that lead to quality improvement, best practices, and innovation in the patient care process.

Although achieving HA has helped Siriraj in enhancing quality improvement of patient care processes through CQI, most of the improvements were only incremental. Benchmarking and research are needed to achieve breakthrough improvements or innovations. Benchmarking, if done right, can result in breakthrough improvements by identifying best practices across the organization, regardless of current industry practices, whereas research will lead to new knowl-edge or ideas. Thus innovations are often seen in PCTs that excel in CQI and benchmarking. The R2R program is thus intended to enhance and facilitate the research development process in PCTs, even those with differences in their CQI and research-oriented competencies. Siriraj is now using KM as a strategic means towards both becoming a learning organization and developing a research environment (Figure 5).

To make things even better in terms of alignment, PCTs are focusing their research and CQI projects within the areas of excellence in clinical practices specified by each department. Areas of excellence are the core competency of Siriraj, in line with Siriraj's quality policy in the third period (2005–07), in which patient safety, customer satisfaction, and areas of excellence are given top priority for improvement. The identification of areas of excellence helps in aligning research and improvement efforts and in prioritizing projects for resource allocation (Figure 6).

Ongoing KM activities to support and promote the R2R program are:

- 1. Establish an R2R website to provide a virtual space for knowledge-sharing on research methodology, lessons learned, and success stories of PCTs, build a knowledge base of the latest in patient care procedures from internal and external sources, and provide a web blog for discussions among cluster facilitators,⁷ PCTs, and R2R project officers.
- Provide various knowledge-sharing fora, for example, academic meetings and conferences on topics related to R2R such as decoding R2R, developing daily work routines into research, R2R projects presentations, and CoPs on areas of concern such as diabetes, etc.
- 3. Organize a knowledge-sharing forum specifically for cluster facilitators and specialists from inside and outside Siriraj to enhance the efficiency and effectiveness of the research development process for PCTs.

⁷ Cluster facilitators are appointed mentors responsible for advising and supporting PCTs in improving the patient care process.

Faculty of Medicine Siriraj Hospital, Mahidol University



Figure 5. KM Strategic Roles Towards a Learning Organization and Research Environment



Figure 6. All R2R and CQI Projects Are Focused on Areas of Excellence

In addition to KM applications to the R2R program, other techniques commonly used in KM—after-action reviews, dialogues, etc.—are also being used to facilitate knowledge-sharing in other activities, including general group meetings at all levels and supporting processes,.

The direction of KM development is clearly defined in the three-year plans (2007–09) for KM development. The three key strategies are:

- Use of KM to support other strategies through high-level networking for the three main missions: clinical practice, research, and supporting functions.
- Application of IT in the development of a knowledge repository.
- Creation of KM awareness throughout the organization by fostering a knowledge-sharing culture with rewards and recognition.

KM has now become an integral part of Siriraj's management system, from the strategic to the operational levels, and is seen as a means of enhancing learning from the organizational down to the individual level.

ACHIEVEMENTS

Following its inception as a pilot project, KM evolved into one of Siriraj's key strategic approaches in fulfilling its vision. Measurement is one of the steps in the six-step model, and thus the results of KM activities and outputs were continuously monitored and effectively used to achieve even more improvement and adjustment throughout its implementation. These achievements, based on key indicators, are shown in Table 1.

Table 1. Achievements Based on Key Indicators

Measurement Indicator	Results*
Development of KM core team	~ 150 people
Facilitators	
Historians	
IT administrators	
Coordinators	
KM Trainers	
KM members	~ 4,800 (internal 3,700;
	external 1,000)
Knowledge sharing network	
F2F (or face-to-face)	
CoPs	24 CoPs
Virtual	
KM website	
CoPs' websites	
R2R website	
Visitors to KM website	70,000 visitors (cumu-
	lative)
	2,500 visitors per month
	(average)
Utilization of information/knowledge on the	3,200 downloads per
KM website	month (average)
Knowledge uploaded on the KM website	More than 500 issues
CoPs (320)	
Outstanding innovation projects (~90)	
PCTs (30)	
KM concept (20)	
Other (50)	
Visitors from other organizations	30 (cumulative)

* As of 31 December 2006

Most of the results obtained so far are from the process (KM activities) and output indicators. Although tangible outcomes related to patient safety, learning organization, or innovation are not yet evident, there are some intangible outcomes—an increase in self-satisfaction and pride among staff members, more openness and respect among staff across units and levels, better teamwork, enhancement of individual and group learning, and recognition from external organizations. These are some important performance indicators for becoming a learning organization.

PROBLEMS ENCOUNTERED AND CORRECTIVE ACTIONS TAKEN

Notwithstanding the success of its KM implementation, Siriraj encountered various problems and obstacles during pilot project actualization and afterwards. However, the measurement carried out as part of the six-step model assisted the KM core team in making appropriate and timely improvements and adjustments.

Time Constraints

One important obstacle which still exists is the time constraint on KM members, particularly nurses, who are on duty and sometimes cannot attend the CoPs because of the day-to-day responsibility of patient care. A supporting policy from the Dean addressed this by allowing staff to spend two work hours attending CoP and providing a budget for the administration of CoP. In addition, the KM core team clarified to the nurse supervisors the benefits their unit could gain from KM and thus convinced them to allow their subordinates to participate in CoPs.

Organizational Culture

Another major adjustment was a change of emphasis from virtual to face-to-face (F2F) knowledge-sharing as a result of:

- The preference of Siriraj staff to share knowledge through personal interaction rather than through electronics means.
- Insufficient computer facilities in some units.
- Some staff were not very knowledgeable on computer utilization.

This approach has proved to be the right one, and an IT system was designed that supported the creation of a knowledge repository. Training in computer use was provided to front-line staff so that they could maximize their use of the KM website.

Infrastructure

Although the KM pilot project was successful, most KM core team members spent personal time, usually after their full-time job responsibilities, working on KM activities. In order to expand KM implementation throughout Siriraj, there must be a unit with full-time staff to carry out KM tasks, considering its size in terms of work units and number of employees. The KM division was set up for this purpose. In addition, KM is implemented through two levels of committees, the faculty level and the cross-departmental level, responsible for setting up KM directions and KM deployment, respectively. Accordingly, the chairs are CKOs in their respective committees. This will ensure the alignment of KM initiatives and its extensive deployment across all units and in every level.

Skills of Middle-level Management

Another area for improvement is the mindset and skills of middle-level management, personnel who have been working in Siriraj for at least 15 to 20 years. Although they are very loyal and willing to participate in improvement initiatives, they may not fully understand KM benefits and concepts and cannot see how KM could be applied to their units. They are reluctant to participate or to encourage their teams to participate. In addition, some may be supportive but are not good at modern management skills like translating strategies into action, empowerment, communication, motivation, etc. They do not know how to create a knowledge-sharing environ-

ment within their units. The KM core team is working hard to change this mindset and to enhance the competency of these personnel in modern management tools.

KEY SUCCESS FACTORS

In the four years since its inception, KM in Siriraj has now been embedded into the management system. Considering the culture of typical government offices ("knowledge is power"), the type of work (dealing with life-and-death issues), and the day-to-day workload of the professional staff, the actual time devoted for KM has actually been very short for such an accomplishment. This success is based on the following factors:

Visionary Leadership

Senior management have been very supportive, particularly the Dean, who saw the benefits of KM for Siriraj from the beginning. He has provided full support in terms of visible and personal commitment as well as resource allocation, including the establishment of the KM division, with four full-time staff. In addition, he has continuously communicated to leaders at all levels the importance of implementing KM at Siriraj and his commitment to the institutional vision and mission.

Supporting Organizational Culture

Contrary to general belief, the century-old custom of seniority and loyalty at Siriraj has turned out to be the most important key success factor for KM initiatives within the institution. This was confirmed by a study conducted by Siriraj Hospital and the Thailand Productivity Institute after the completion of the KM pilot project to study the cultural barriers against KM implementation in the four pilot organizations that participated in the project. Interestingly, the seniority and loyalty of the staff contributed positively (statistically significant) to the success of KM in Siriraj. In Siriraj's context, seniority means that senior staff members take good care of, help, and advise junior staff, while junior staff members listen and follow the senior staff's advice. This relationship is more like a family than supervisor/subordinate. In addition, the dedication of the professional staff to excellence and to people's well-being is the key to anything that they do at Siriraj.

The attainment of HA paved the way for KM in terms of supportive cultural changes: better teamwork, more openness among staff, a more quality-oriented mindset, etc. This is confirmed by the observation that most accredited hospitals are quite successful in introducing CoPs or other KM related initiatives in their organizations.

Capable KM Core Team

The KM core team has played an important role throughout the implementation process. The selection and development of core team members is critical to KM success. The CKO at the implementation level was selected based on commitment, leadership ability, and recognition from other staff. Selection of team members was carried out informally through a personal network based on defined qualifications. All team members must understand KM concepts and its application in different settings. Therefore, the KM core team was continuously developed based on respective responsibilities, either through formal or informal training, and experience-sharing with other team members or external KM practitioners. This has shortened the learning curve and enhanced efficiency.

One of the KM core team's responsibility is to serve as coordinator or middleman between senior management and the operational staff so that senior management's policies can be better understood by the rank and file and at the same time feedback from the latter can reach senior management through the KM core team.

Facility and IT Support

Although the emphasis on knowledge-sharing was more on F2F than on the virtual network due to its culture, an efficient IT system is needed to support storage and accessibility of the knowledge captured. In this regard, there has been full support from senior management in terms of budget, manpower, and technology. In fact, the IT team has worked closely with the KM core team. Further development of the IT support system has been included in the three-year KM plan. As for the F2F CoPs, the CoP implementation (more than 20 CoPs) went quite smoothly because of the logistics support from functional units in terms of rooms, audiovisual equipment, communication channels for CoPs, etc.

LESSONS LEARNED

Siriraj is an excellent model for a successful KM implementation in the public sector. With its reputation as one of the best medical institutes in Thailand, its complexity in terms of structure (the biggest public hospital in Southeast Asia, with more than 2,600 beds, more than 1.5 millions outpatients, and 70,000 admissions per year), and its more than 10,000 employees, its KM experience has provided many important learning points for other organizations:

- There is no "one-size-fits-all" prescription for KM; it is very context-based, particularly in the organizational culture. Organizations need to adjust the approaches they will use to fit their organizational culture. For example, the 10-step CoP roadmap has been customized to fit Siriraj's culture, including its very structured recruitment and management processes (due to a large number of CoPs in Siriraj), selection of CoPs core teams and members instead of participation being on a voluntary basis as in other typical CoPs, a fixed CoP meeting schedule to fit the nature of members' work, and emphasis on F2F interaction due to the behavior of the staff. However, even such structured steps in the CoP roadmap are still open for adjustment based on the needs and culture of the communities' members.
- Siriraj started KM as a pilot project using a bottom-up approach in a very focused critical area (clinical CQI, which is a key means for improving patient care quality) and then built on the success of its pilot project to obtain buy-in from senior management. Subsequently the top-down approach was used, involving directions and policies from the senior management committee. KM has become a key strategy is to be deployed in all units. Siriraj's success confirms the concept that organizations should initially implement KM initiatives in a critical area (important for its vision and mission) with appropriate breadth and depth for deployment and use the success from this initiative for further expansion.
- The design of the KM infrastructure is very important for its implementation. Its effectiveness in a large organization like Siriraj lies particularly in the organizational structure which is responsible for KM implementation, whether it be through KM committees, a formal KM unit, or both. The composition, qualifications, and responsibilities of the members must be clearly defined. The roles of other stakeholders, such as senior management and staff in all levels, should also be clearly defined and communicated.
- The six-step model (Figure 3) is a very practical framework for KM implementation, covering all the necessary dimensions to be considered for effective KM implementation regardless of the level of KM maturity in the organization. Organizations can choose to focus on any of the steps as KM evolves. For example, during the early stages of implementation, Siriraj placed more emphasisis on transition and behavioral management as well as communication, since most employees were not aware of KM. How-

ever, after management's buy-in, this step received less emphasis, whereas communication was still carried out continuously, but with a different content.

- Measurement is considered to be an important step in implementation, providing the organization with a data-based evaluation so that improvements in methodology, tools, or activities can be made continuously as KM develops. Although its measurement system is still at an early stage compared to organizations with more mature KM systems, Siriraj has made good use of measurement. Various indicators were set up to measure KM activities and outputs, and the results were used for promotion (especially using success results as motivation) and for more effective adjustment of direction and approach. For example, whenever the attendance rates of a CoP decreased, the KM core team would step in and discuss the matter with the CoP core teams to solve the problem. In fact, the KM core team assigned color codes for each CoP to indicate their success status (green for active, yellow for progressing, red for in trouble) to help them monitor CoPs closely. Indicators are continuously reviewed and adjusted as KM implementation evolves.
- The integration of KM initiatives (CoPs) into its existing systems or processes, in this case the clinical CQI, has made it easier to communicate and convince key stakeholders (PCTs) to participate, since CoPs were simply added to what they had already been doing. Moreover, CQI is a cross-functional improvement team by nature, which is a good foundation for CoPs. Therefore, the selection of key areas for KM initiatives is crucial for its success from the beginning.

Siriraj's success on its KM journey is a result of the institutional ability to adjust KM to meet its contexts. KM implementation has gone through numerous cycles of improvement and is still ongoing. The ultimate goal of KM in Siriraj is not only to establish a knowledge network but also to link knowledge resources to knowledge users so that those who need knowledge get what they in time. KM is also used for learning at all levels, leading to innovation and to becoming a learning organization.

Vu Hong Dan National Expert, Vietnam

COMPANY PROFILE

Techcombank (TCB) is one of the largest and fastest-growing full-service joint-stock banks in Vietnam. Headquartered in Hanoi, it has opened 67 branches in 15 provinces and cities throughout Vietnam during its 13 years of operation, aiming to reach a target of 200 branches nationwide by 2010.

As of 31 May 2006, TCB had a registered capitalization of VND830 billion, total assets of nearly VND13,000 billion, and a total staffing complement of over 1,300.¹ In terms of total assets and revenues, its annual growth rate has been more than 30% over the last three years. Within the next three to five years, TCB plans to become one of the largest joint-stock banks in Vietnam, with a registered capitalization in excess of VND1,500 billion and total assets of over VND22,500 billion.

Every person or organization doing business with TCB has access to TCB's extensive range of banking products and services, provided by friendly, well-trained, efficient staff members and fully supported by the automatic and customized features of its online Globus system.

TCB now services nearly 100,000 individual customers who represent about 27% of the Bank's total loan portfolio.² TCB provides a full range of products and services to meet the particular needs of this customer group at various stages in their lives, including demand deposit accounts, savings, loan payments, credit and debit cards, investment, guarantees, and safe custody facilities. The key products and services for these customers are cards, consumer loans, and house mortgages.

TCB also provides its comprehensive range of services to over 10,000 small- to mediumscale enterprises (SMEs) throughout Vietnam, which represent about 65% of the Bank's total loan portfolio and 90% of its non-credit revenues.³ Services include accounts, term deposits, loan facilities, including working capital and fixed asset financing, factoring, financial and operating leases, trade finance, and cash management services. TCB also provides businesses with competitive treasury and derivative instruments as well as financial assistance schemes in cooperation with international service providers.

For state and large-scale private enterprises, which currently represent 8% of the Bank's total loan portfolio and 8% of its non-credit revenues,⁴ TCB provides key products and services including cash management services, fixed-asset financing arrangements, and international settlements and electronic banking services.

In the treasury market, TCB is proving to be one of the most dynamic enterprises in the industry when acting for or on behalf of large corporations and financial institutions. In cooperation with large international institutions and trading floors, TCB provides a comprehensive range of products, including foreign exchange, money market and securities trading, hedging, and derivative products for many domestic customers.

TCB believes that good corporate governance is a fundamental element in achieving the Bank's vision: to become one of the most favored banks in Vietnam. Hence, corporate gov-

¹ Techcom, 31 June 2006.

² Ibid.

³ Ibid.

⁴ Ibid.

ernance is an important focus and has provided the platform for the Bank's growth thus far. Its corporate governance—built on key components such as harmony of interests among all of the Bank's stakeholders, active participation of the Board of Directors in the operations of the Bank, a timely Management Information Systems, advanced Human Resource policies, and a code of ethics to act honestly, fairly, diligently, and progressively in accordance with the law and in serving the interests of all stakeholders—has been implemented successfully under the strategic guidance and supervision of the board of directors and the board of management and has given the Bank its competitive edge.

Risk management is also receiving attention. TCB's business controls are governed by an ongoing focus on risks in compliance with its overall strategy. Risks are grouped under three main categories: market risks, credit risks, and operational risks. TCB integrates risk management processes not only into all of its business planning, execution, and monitoring procedures, but also into the establishment of branch-wide independent risk management frameworks and infrastructures in the form of documented credit policies and handbooks, an industry monitoring system, a customer rating system, bad debts alerting and monitoring systems, and liquidity and daily interest rate fluctuation supervision systems.

Since the end of 2003 TCB has developed one of the most advanced information technology banking systems in Vietnam. Its Globus online network now connects all branches and transaction offices.

In September 2004 the Quality Management System ISO9000:2000 was implemented by the Head Office and certified by BVQI, and it is now being applied in all branches. Its quality management is clearly customer-focused and helps to improve service quality and more effectively manage risks.

Striving for innovation and high-quality customer service, TCB has also developed and implemented many projects in knowledge management (KM) and customer relationship management (CRM), and it is preparing to launch new products in the investment and asset management areas.

Looking ahead, there are still many challenges facing TCB in its quest to become one of the largest and most successful banks in Vietnam. The confidence, commitment, and decisiveness of its employees underpins this aspiration. They are committed in their thoughts and actions to the future development and success of the Bank. This in turn will provide more benefits for customers and added value for shareholders. Its vision is: "TCB for empathy and reliability." TBC's mission:

Techcombank: a leading urban commercial bank in Vietnam providing a full range of diversified and highly competitive financial services to individual and corporate customers aimed at customer satisfaction, shareholder value creation, employee benefits and development, and contribution to economic growth.

Vision 2010: Techcombank aspires to be the leading commercial bank in Vietnam for its high reliability, profitability, and quality. Techcombank CRM is a customer-focused service to provide the best service quality in Vietnam banking circles by utilizing customer information gathered at all customer contacts including the advanced Internet system. Techcombank changes the corporate culture to enforce customer value service quality for sustainable business growth and profitability.

Core values:

- Customer-driven organization
- Harmonization of mutual benefits among customers, shareholders, and employees—factor of success.

- Learning organization.
- Communication is the key point for change management processes within the Bank.
- Trust and commitment, professionalism and accountability, transparency and innovation.

Key Drivers for the Adoption of KM

- Fast changes in banking: products and services are always changing, exchange and interest rates change daily, and the customer database is evolving every minute—even every second. It is necessary to update and share information on products, services, and customers consistently throughout the whole system.
- The banking sector requires intensive labor with high mobility. Especially at TCB, the number of knowledge workers is growing. Their knowledge, experience, and skills are valuable properties that need to be harnessed, used, and managed effectively.
- Data/information/knowledge becomes the competitive edge for an organization, especially in the financial and banking sector. To enhance its competitiveness, TCB needs to have good solutions via effective exploitation of knowledge from each TCB employee as well as the whole organization.
- In today's information technology area, there exist many different tools that can support the management and sharing of knowledge and experience among the staff of TBC without geographical limitations.

For these reasons, with the same vision to become a leading urban bank in confidence, quality, and effectiveness, TCB pays great attention to KM, from creation, storage, updating, and systemization of data and information to usage, sharing, and development of knowledge within the entire organization.

STRATEGIES USED AT TECHCOMBANK

In order to implement, step by step, the Bank's mission and vision, the leaders of TCB developed the following strategies:

Overall Strategy

- 1. Give priority to providing different kinds of financial services with quality and a competitive edge to customers, especially to customer groups such as high- and average-income families and young, successful people who can easily adapt to new banking and financial services.
- 2. Implement a strategy of full development of financial service packages for SMEs and FDI, especially for businesses in the industrial zones.
- 3. Strengthen monetary transaction activities in domestic and regional markets, succesfully, implement its role a key market mover, provide support for policies aimed at private business, investors, and financial organizations.
- 4. Develop services of investment banking, business financing via the management of its investment funds, business restructuring and purchasing, and capital market services.
- 5. Establish a strategy for creating difference, one that is implemented primarily via the effectiveness of business procedures, the diversity of products and services, the professionalism and friendliness of TCB staff, and the development of a unique business style.

Special Strategies

Organizational Strategy

Bank Structure

- 1. The Bank's structure focuses on the marketing and customer support system, with its branches and front offices at the core, based on the mixed model between business management and product management.
- 2. Services are designed in teams/groups for marketing, selling, and transaction or category of target customers (population, SMEs, etc.).
- 3. Business support and control systems are managed consistently at the central office and in the branches.
- 4. Product research and development systems are organized vertically, with their focus on new product development and enhancement of TCB competitiveness.

Network Development

- 1. Data is treated consistently at the central office to fully support activities at the branches.
- 2. The network is divided into regions and localities with a flexible empowerment.
- 3. Network development is linked with the effective control points at the four major cities: Ha Noi, Ho Chi Minh, Da Nang, and Hai Phong.
- 4. Network development is linked with a long-term, cautious investment approach in the localities and cities where there is a development potential.

Procedural Structure

- 1. Design procedures are undertaken with the adoption of advanced technology in mind.
- 2. Enhance the automatic transaction rate, reduce transaction time and labor costs, and minimize opportunity costs.
- 3. Fully support professional activities and strictly control the business network at the front offices, including risk and information management and internal audit.
- 4. Credit treatment:
 - Concentrate high-value credits at the central office and branches.
 - Concentrate small and medium-scale value credits at the regional branches.
- 5. Concentrate accounting activities at the central office and regional branches.

Personnel Strategy

- 1. Aim to put "the right people in the right job."
 - Implement a strict recruitment procedure and an on-the-job-training program for new staff.
 - Supervise and share experiences among junior and senior staff via team work.
 - Plan and provide training for potential managers onsite to meet the needs of development and network expansion.
- 2. Make remuneration in accord with business results (TCB, group, and individual).
- 3. Make incentives and rewards harmonize with benefits among stakeholders, TCB and all staff; encourage people to give their best services and contributions with strong support from the TCB managing council and stakeholders.
- 4. Develop a TCB culture as a learning, professional, creative, transparent, and trustworthy organization.
- 5. Develop an internal training program with participation from external experts to improve employee skills and their professional development, including managerial skills.
- 6. Combine on-the-job training with projects to practice and discover staff competency.

- 7. Implement a stock option scheme with commitments from the TCB managing council to be awarded to the managing board and key staff.
- 8. Implement a favorable credit scheme for senior staff with a special interest rate.

Technology Strategy

- 1. Invest in the Core Banking–GLOBUS system and other software in line with international standards to fully support the business strategy.
- 2. Fully integrate the technology system as a whole; have links to Core Banking-GLOBUS software.
- 3. Develop the basics of advanced banking technology aimed at the development of new products with effective costs and easy access to the distribution network.
- 4. Implement a strategy of using external technology resources with internationally experienced consultants.
- 5. Always update and implement the IT system with the latest applications for maximum benefit.

Targets for 2010

- 1. Good business results (ROA: 1.3%, ROE: 20%-22%).
- 2. Large scale (USD1.5 billion in assets, USD100 million in capital of owner, more than 100 branches and transaction points, 1 million customers, 2 million bank cards).
- 3. Registered in the security market by 2008. Price of the share: among highest PE index group in the banking sector.
- 4. Service quality: among the leading groups based on the quality of service at the four biggest cities in Vietnam.
- 5. Service for credit fee: 40% of net income.
- 6. 90% of the employees satisfied with the working environment and their well-being.

KM IMPLEMENTATION STEPS AT TCB

As mentioned in the company profile, a quality management system in line with the standard ISO9001:2000 has been developed and implemented within the entire TCB system. This is TCB's commitment to provide its customers with premium quality and stable products and services. In order to better meet the needs of its customers and to provide new and outstanding services, TCB has decided to implement a KM project within its system in 2006, in two phases:

- Phase 1: develop awareness, exploit, store, and share knowledge within TCB.
- Phase 2: apply IT solution to KM.

Key Activities Implemented during Phase 1

Step 1: Preparation

- Set up a KM team and assign a team leader. At TCB, the KM team consists of representatives from all units and sections; the team leader is a quality management representative (QMR).
- Provide training on KM awareness, KM in the banking area, the role and responsibilities of individuals in project success.
- Conduct diagnosis of the current situation at TCB, with the following issues to be examined and reviewed:
 - Development orientation, strategy and targets.
 - Key service providing processes and supporting processes.

- Requirements on information and data for jobs via interviews with TCB representatives at all levels.
- The current status of IT infrastructure and the solutions applied by TCB.
- Propose a work plan and implementation modes for the project to the TCB managing board.

Step 2: Determine KM Targets and Implementation Measures

It is necessary to determine the KM targets and measures for each period and to link them to the strategic aims and business targets of TCB. TCB decided that during the first period of the project it should collect knowledge about customers and products and link them closely with the targets and overall strategy of TCB, as mentioned above.

- a) For knowledge on customers and the business process, TCB selected the CRM (Customer Relation Management) approach.
 - Redesign business processes.
 - LOV (Line Of Visibility)-focused process flow.
 - Customer data flow and timeline analysis.
 - Process linkage across the business function.
 - Customer Value-focused Methodology (CVM).
 - MOT (Moment Of Truth).
 - Customer value.
 - VOC (Voice Of Customer).
 - Utilize data analysis tool.
 - Statistical data analysis.
 - Multi-dimensional data analysis.

CRM building blocks and components (Figure 1). The customer contact point—and maximizing value at this point—is only one of the aspects to be considered. The important thing is how to maximize the value at the contact point by altering the entire process across the enterprise. This is the reason why CRM has many building blocks and components.

- Contact point.
- Front office.
- Back office.
- Customer database.
- Measurement.
- IT infrastructure.

Objectives for 2005:

- Profit up 28%.
- Gain on credit up 17%.
- Revenues on international payments up 46%.
- Revenues on domestic services up 50%.

Techcombank



Figure 1. CRM Building Blocks and Components at TCB

Table 1 shows milestones and measures of the CRM project.

Milestone	Measures
Building a contact center for one TCB voice	Develop a customer database from existing information sources. Create a data warehouse from other databases and data marts. Determine role and responsibility of all units within TCB for devel- oping databases and determine the data collection points. Implement storage, use, and sharing of data at TCB's call centers and transaction points.
Develop customer value- focused standard business process	Standardize key business processes and those at the front and back office to reduce transaction time at each step and to enhance responsi- bility and rights for process owners. Design business procedures based on technology; describe in clear detail the role and responsibility of all concerned parties. Enable customer database to be accessed by all internal and external processes. Share and digitalize all business information from source. Closely merge business procedure at TCB with those of big cus- tomers.
Develop a customer segment base marketing by CDB	Develop customer database so that transaction information and de- velopment history of each customer can be stored and updated. Via a customer database, TCB can understand the needs of its customers and study and categorize customers for suitable marketing strategies. Integrate customer information with procedures of product de- velopment and marketing.
(continued on next page)	

Table 1. Milestones and Measures of the CRM Project

Develop a reliable CRM IT infrastructure	Determine IT requirements for options or develop in accordance with existing IT infrastructure for better management. Strengthen net security.
	Ensure flexibility and safety of the technology system.
Develop human resources	Determine requirements for competency, new skills for each job
to carry the CRM system	position in order to develop a suitable plan and training modules.

b) Knowledge of Products and Services

At present, TCB has about 100 products and services to provide to its 15,000 business customers and 15,000 individual customers. In order to provide accurate and consistent information, TCB has posted information on its products and services on its website and distributed information in the form of brochures and catalogs for the marketing and customer service staff. TCB provides them with periodic training courses on product knowledge and enriches their experience in dealing with customers. Through experience, TCB has found that training modes should be diverse to meet individual needs, especially those of newly hired staff.

TCB has developed and implemented activities for creating and sharing knowledge on products offered by the company, for example:

- Develop product manuals to be used by marketing staff that clearly describe the features of each product or service and their applications and advantages in comparison with the same products and services offered by others in the market.
- Develop a digital database on products.
- Develop FAQ sites on the web; establish an e-forum for exchange and discussion of professional issues by TCB staff, based on frequently asked questions, information gained from e-forum and call center, or internal feedback. TCB selects priority issues for further discussion and improvement.
- Invest in infrastructure for easy online access to the database to support employees who travel on business.
- Organize internal resource experts to support customers and junior staff and respond to the difficult issues that arise during a business process.

In addition to the above-mentioned issues, TCB sets up databases for customer groups on banking regulations and laws to provide knowledge and information to its staff.

Step 3: Implementation, Evaluation, and Improvement

In order to implement these items, Techcombank decided that the KM project would be a strategic, long-term undertaking. It was designed as a five-year project, with contents and activities detailed in each annual plan. For on-time monitoring and adjusting purposes, in addition to the QMR is responsible for the project as a whole, TCB set up a number of subprojects to control and evaluate project implementation. Outcomes of the project are reported periodically to the directing board and managing council for appropriate directions.

IT Application Study for Better KM

IT plays a very important role in business activities at TCB in general and in the KM project in particular. In order to identify the IT requirements for the KM project, TCB conducted a survey of its current IT infrastructure and interviewed employees on their IT requirements in order to create a knowledge-sharing environment within the whole organization. The study includes:
- Analysis of the current Biz and IT system.
 - Analysis of current business protocol.
 - Analysis of current IT system.
 - Analysis of current IT Infrastructure.
- Breakdown "Innovation Point"-Enabler.
- Design Customer Information Database-CID and Product Information Database-PID.
- Design data analysis tool environment.
- Design data sharing tool environment.
- Design IT infrastructure.
- Design contact centers and call center.
- Requirement definition.
 - Process/standard requirements.
 - Data requirements.
 - IT requirements.
 - Skill and organization requirements.
- Build process model.
 - Build front office process flow.
- Build back office process flow.
- Build CID and PID models.
 - Build E/R chart.
 - Build CRUD chart.
- Assess benefits and risk.
- Develop IT and business system.

PROBLEMS ENCOUNTERED, CORRECTIVE ACTIONS TAKEN

- Awareness of benefits derived and KM significance is not quite clear within the whole organization, especially among middle-level managers and professional staff.
- Difficulty in selecting the appropriate technology: for the time being, too many supporting tools for KM solution have been developed and offered by providers. How to select a suitable solution in terms of the financial and technical issues is aconcern.
- Confidentiality: data/information/knowledge is an intangible property of TCB. When shared, confidentiality and security related to this issue should be seriously considered.
- Consistency and accuracy: it is very important to ensure the integrity of information updated and shared within the whole TCB system, from the head office to the branches and transaction points.

IMPACT OF ORGANIZATIONAL CULTURE ON KM IMPLEMENTATION

TCB has young employees who are highly motivated to learn, share, and absorb new things. Introduction of a new system at this time is thus quite advantageous. The staff have quickly adapted to the changes.

At TCB, the working environment encourages innovation, creation, and sharing. The reward and punishment system is carefully managed to bring up promotion opportunities for individuals who contribute well in terms of knowledge for TCB.

SELECTION AND ADAPTATION OF TOOLS AND TECHNIQUES

IT is very important in the creation, storage, updating, management, and use of knowledge. In banking, data and information are very important. Being fully aware of this, TCB has en-

deavored to be the leading bank in technology application in Vietnam. To date TCB has applied many IT tools:

- The Globus software for core banking administration was updated to T24R5 by Temenos at the end of 2005. The T24R5 application at TCB has allowed the system to implement more than 1,000 banking transactions/second, 110,000 customer can have access at the same time, and over 50 million customer accounts can be managed. The T24r5 also supports the operations of 24h/day transactions and avoids system interruption during payment time according to the traditional day closing mode. The whole technology system is integrated with the core banking system.
- Compass Plus switching and card management software provides TCB with many advanced technology applications that meet international standards. It helps TCB proactively build up its diversified card product system to meet the complex requirements of customers in this field.
- The call center system is a channel that can receive and respond to customers' needs and then analyze and access them to develop and improve products and services. At present, the call center receives and treats about 60 calls and six mails from customers per day, mainly related to inquiries about their bank cards, POS, credit payments, home banking, or other needs. In the future, the call center will be developed into a contact center and will become a direct marketing channel as well.
- LAN and email are supporting tools for sharing knowledge among TCB employees as well as with customers and counterparts.
- The TCB website at www.techcombank.com.vn provides general information on TCB and its products and services, along with other banking information (currency exchange rates, interest rates, etc.). In the future, TCB's website will be capable of online transactions, and a communication channel will allow customers to carry out e-transactions and communication needs via an e-forum. This is the predicted trend in the IT era.

Together with its strong support for IT solutions, TCB uses many other management tools to enhance the effectiveness and efficiency of the KM system: a brainstorming tool for collecting individual ideas at meetings and discussions, statistic tools in management (cause and effect, Pareto, affinity), radar charts, and a suggestion scheme to solicit new ideas.

INTEGRATION OF KM WITH OTHER TOOLS AND THE EXISTING SYSTEM (ISO, CRM, ETC.)

Knowledge within an organization is linked with knowledge about the customer, operational procedures, products, and services. KM cannot be isolated from the other management systems, such as MIS, CRM, and ISO. Rather, it should be integrated with the existing systems to form a consistent management system. TCB is studying to introduce advanced tools into its management activities. TCB also tries to integrate all tools so that the whole system can operate smoothly and the tools can support each other.

LESSONS LEARNED

Techcombank has found the following to be success factors for knowledge management:

- Think of knowledge management as the basis for business process and work style transformation.
- Consider the balance between explicit knowledge and tacit knowledge.

- Promote knowledge management from a management perspective.
- Start small and then expand.
- Look at the business process and think about what knowledge can contribute to it.
- Do not look at IT alone but also at the people; think about change management.

Vu Hong Dan National Expert, Vietnam

COMPANY PROFILE

Founded in 1994, Goldsun has developed its capabilities in the field of marketing and communication design to specialize in multi-advertising services development. Being a member of the International Advertising Association (IAA) has helped Goldsun increase its knowledge of the advertising world and of international standards. The company has contributed to the development of the advertising industry in Vietnam through its membership in the Vietnam Youth Enterprise Association.

Goldsun's achievements:

- First Vietnamese advertising agency to be certified by ISO9001.
- One of only a few Vietnamese ad agencies to run TNmarket research software.
- PR and advertising synergy.
- Strong offices in key markets: Ha Noi and Ho Chi Minh City.
- Good relationship with media owners and favorable discount rates for clients.
- Industrious, young, creative, continuously trained team.

Goldsun's services are shown in Figure 1.



Figure 1. Goldsun's Services

Goldsun's policies:

- Think: Apply new thoughts on old issues!
- "Turn left" to make the difference.
- Speed up to avoid being late.
- Listen to avoid being backward.
- Always ask the question: Why?
- Be trustworthy to gain more counterparts.

• Create unique messages, optimize media use to bring its brand name into the customer's mind at a minimum cost.

Goldsun feels proud in having contributed to the success of well-known international brand names, especially those of Vietnam.

KEY DRIVERS FOR THE ADOPTION OF KM

As a company working in the marketing and advertising area, a new arena for Vietnam, with its high-pressure competition and its many big and more experienced overseas competitors, Goldsun leaders have set up a strategy to make the company a leading advertising company in Vietnam via its service quality and uniqueness. Since its establishment, Goldsun has focused its capacity-building on services: consulting, brand development, and full-service advertising. All areas entail an intensive use of knowledge. With nearly 50 employees, Goldsun found that much of the knowledge created by its people was not being captured properly. This is especially true for its consultancy services related to brand development and advertising activities, a rich source of knowledge and experience among account executives (AEs), designers, and creative staff. Often the knowledge stays with the individuals and is not shared. Failure to sign contracts and conduct consultancy projects did not translate into lessons learned for others to benefit from. Mistakes were often repeated. New knowledge and practices in the fields of marketing, advertising, design, and creation were not regularly updated or shared. Time was wasted in collecting information/knowledge which already existed elsewhere in the organization. As a result, Goldsun could not capitalize on its knowledge assets.

Goldsun's leader, Mr. Hoang Hai Duong, soon recognized the need to develop organizational knowledge assets by knowledge management (KM). He also realized that in order to create a competitive advantage for Goldsun as a service provider, it needed to become a place where everyone was willing to learn and to share knowledge. A KM environment would allow Goldsun to build a learning organization in which both personal and organizational learning was stimulated. On the other hand, expanded competition due to the opening up of the economy had been putting pressure on Goldsun, leaving it with less development time to capture customers' knowledge in the fastest and most efficient manner. These all became the primary driving rationales for Goldsun to implement KM.

STRATEGIES APPLIED

With a vision to become "a leading company of the same kind in a locality," Goldsun has committed to providing customers with error-free advertising. Factors related to personnel and technology are given top priority.

The company has developed and successfully implemented the following strategies:

- An organizational strategy: equitizing and establishing a new company.
- An expanded market strategy: transforming competitors into colleagues, developing strategic linkages.
- Service diversity strategy: using flexibility to control diversity.
- Personnel strategy: people are the most valuable resource of the company. Goldsun has implemented a strategy to regard the company's employees as stakeholders, to employ outstanding individuals and treat them well, and to empower its employees.
- Technology strategy: invest in advanced technology.

KM: FROM INCEPTION TO ACTION

Realizing the importance of KM in the development of the company after being awarded the ISO9001:2000 certificate for its quality management system, Goldsun began to implement KM with a primary focus on people and technology. A KM portal—GOLDSUN Click-2-K ("Click to knowledge")—was developed from 2001 to 2005. The first version was completed in October 2005 and updated in June 2006.

Click-2-K is considered an enabler for knowledge-sharing, storing, and use. A KM team was formed that included some division heads to serve as pioneers in the implementation process.

CEO Duong committed to supporting the implementation process by providing appropriate resources. He himself participated as a knowledge contributor and encouraged the KM team to speed up the demonstration period.

Click-2-K's 12 functions were used by all the divisions in the organization. Within the sixmonth demonstration period, while relatively little content was uploaded into the system, many recommendations for improving the system were submitted. The KM team analyzed all submissions from users for next the version. A more simplified feature of Click-2-K (version 2.0) was adjusted to make it more user-friendly. Only eight functions were re-introduced in the system (Figure 2).



Figure 2. Click-2-K's Interface

Goldsun Company

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Figure 3. Knowledge Sharing: Experience Documents

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Figure 4. Customer Information Database: Customer Knowledge-sharing

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Figure 5. Job Management

KM implementation in Goldsun is still in progress, with current activities in the expansion stage, and it will soon include activities for the whole organization. This case study will draw some conclusions from the first implementation period.

THE KM IMPLEMENTATION PROCESS

Methodology

The KM project was developed so that it would be consistent with corporate business goals. The KM team thus identified KM drivers and a KM vision that were in line with Goldsun business goals, and the KM objectives were then developed to achieve those goals. These four elements are illustrated by the KM planning model (Figure 6).



Figure 6. The KM Planning Model

Initial KM objectives:

- 1. To develop a document library that provides company employees with regulatory documents related to advertising activities, books and current information on advertising, creative design, sales, marketing, brand development, etc. Within the Click-2-K library, there is a subdirectory where the success stories and lessons in failure learned by Goldsun on its sales and marketing activities can be shared.
- 2. To develop a customer information database that contains the transaction history, the nature of services provided by Goldsun, etc. for each customer.
- 3. To update all work procedures, manuals, forms on the Click-2-K software so that it can be integrated with the paperless ISO online system.
- 4. To build up and develop a network of suppliers who provide services on printing, outdoor advertising, materials, and equipment. The suppliers are evaluated and ranked for selection using a consistent set of criteria.

After having set the four KM objectives, the KM team identified KM opportunities for each objective accordingly. Table 1 shows the possible opportunities that Goldsun took into account.

ive 4

Table 1. KM Opportunities

KM opportunities were prioritized and assessed based on:

- 1. Impact of the opportunity on the set objectives.
- 2. Ease of execution.

Finally, three pilot projects for the first phase were set into motion:

- 1. Knowledge base of customers (KOC).
- 2. Knowledge base of services (KOS).
- 3. Knowledge base of lessons learned on sales/marketing and consultancy (KOL).

These three projects brought about some other features to support them. For instance, on the lessons learned, competency profiling is necessary. Thus, a number of other KM functions were taken into account when planning and analyzing the requirements for the system.

Stages of Implementation of the KM Project

Planning

One month was required to plan and work out the resource requirements for the pilot projects. The KM team was formed with clear roles and responsibilities to collect organizational practices, to structure content, to identify IT support requirements, to propose incentives and a rewards scheme for knowledge-sharing, to adopt communication systems, and to conduct training in KM and the utilization of the system.

Knowledge Mapping

The KM team drew a knowledge map for sales/marketing and consultancy knowledge. As Goldsun provides full services to its customers, each AE must have a comprehensive knowledge of the services they provide. Goldsun places a great deal of emphasis on training, but in practice, it takes from six months to a year, even with the supervision of a team leader, before a professional AE can work independently. In order to coordinate well and effectively, all members of the team need to understand the jobs of the other members. For large projects, Goldsun sets up task forces that consist of an AE, design and creative staff, and operation staff. The project team found that when implementing a KM project, each business process and each job position requires basic foundational knowledge. Furthermore, each area of knowledge has been classified according to "knowledge owners."

Requirement Analysis

After the knowledge map has been drawn, the use of knowledge remains the core activity for an effective KM system. The KM team conducted a interviews with various users. The primary question asked was how people acquire, store, share, and use knowledge to improve productivity. These analyses served as inputs for the system design.

System Design and Implementation

In this stage, the KM team was divided into two groups. One worked with IT programmers to design the Click-2-K portal based on an analysis of the requirements. The other group was in charge of collecting content based on the knowledge map. This group also proposed a mechanism for updating, storing, and sharing (by access-right authorization), and for maintaining the system.

Content Management

After six months, the Click-2-K portal was launched. Now, content management remains the most sensitive issue. The question of "the chicken or the egg?" was applicable to Goldsun's KM system. Content cannot be uploaded overnight. Some people argue that they do not log onto the system since there is nothing inside. But if they wait passively for content, it will never come! Thus, in the beginning, only some features were used (see above on Immediate Outcomes). The most challenging task for the KM team is how to have meaningful content within the system and at the same time encourage people to create content proactively. The KM team designed a scoring system, where the contribution of knowledge is scored and aligned with an incentive scheme.

Measuring

The KM team is now measuring the effectiveness of the goals set and the activity levels of the KM system. In reviewing each KM goal, the team identifies a set of impact indicators that will show whether the goal has been met. At the activity level, three indicators point to its effectiveness: the contribution of knowledge (e.g., number of lessons learned that were contributed), the use of knowledge (e.g., time spent accessing the system), and the satisfaction with the system (e.g., number of feedbacks received via a satisfaction survey).

Expansion

This is the final stage, since the implementation process was limited to three pilot projects. A great deal of knowledge will be put into systema; QMS, tables, figures, customer information and data in each service area, improvement, information related to the advertising field, regulations, supplier data, and other fields of knowledge considered to be the core competency. This stage begins once people become familiar with the pilot knowledge base and a sharing culture has been established.

IMPACT AT A GLANCE

Immediate Outcomes

After interviewing people with the highest access scores, Ms. Tran Thi Lan Thanh stated that she found the system useful because her job dealt with the scheduling of Goldsun's experts, both internal and external. Such functions of the human resources unit (for competency profiling) and the scheduling function (for availability of the experts) allowed her to improve her own productivity. In addition, Ms. Lan Thanh is involved in a broad range of training and remuneration activities; she uses the clocking feature to review staff work discipline for monthly performance evaluation purposes. For the training aspect, she is also able to update records of Goldsun people trained abroad and to develop a database on the internal/external training materials of the events organized by Goldsun.

Ms. Thanh is also a Quality Management Representative (QMR). One of the KM team members found this particularly useful. Ms. Thanh no longer has to distribute quality documents in hard copy to each division, she just uploads them by clicking on Click-2-K, using the function QMS Documents. Any procedure, form, or quality record is available for use in the system. From the user side, it has become easier to work with the online quality system. People can now search for a document they need online instead of searching through thick hard copy files. Click-2-K allows all units inside Goldsun to exchange and verify the capability of its service delivery system via its job management function. AEs receiving an order from a customer can send a request to the design and operation units for inputs regarding cost, style, time of service, and other options. All information related to these services and the customer's order will be stored in Click-2-K. All authorized staff can access the necessary information for the assigned jobs with a given ID and password.

Goldsun staff members also find the News feature helpful. This function was designed with three sections. One is for official announcements from Goldsun management. This is for internal decisions, and it replaces the traditional hard copy. There is for general news about people in relation to their job, such as the business environment, best practices, economic statistics, etc., that is useful for the employees. Feedback from new staff members has shown that they are interested in the sharing function, since many practical lessons and experiences from Goldsun and its senior staff are shared. Also, the sharing function can allow people to update information, knowledge, and experiences and even seek assistance or answers from others for any difficulty they are confronted with.

Mr. Doan Manh Cuong, Head of the Customer Department, commented: "This system is good for sharing information about customers. It can also help me manage sales accounts. But I would prefer that the C2K software be more friendly and easier to use." Others also make this comment when they first use C2K. The project team can use this input to improve the next version of C2K.

Mr. Nguyen Van Hien, Managing Director, said: "C2K helps me to know the working time and work progress of employees and the work plan of individuals so that I can better monitor and direct them. It also helps in developing a database, sharing knowledge among senior and junior staff, maintaining and developing resources—even with personnel changes. In particular,

C2K helps me control the job online and from a distance and without any interference, which is good for the business!"

Business Impact

The KM team is now looking for a way to calculate ROI of the KM system at Goldsun. In fact, people see the benefits in terms of savings in time, the efficient use of available knowledge, quicker access to customers' records for lessons learned, and easier access to learning from experience, etc. All these effects have not yet been quantified in terms of money but are limited to users' perceptions.

However, once people are comfortable with the system, it can ultimately create a good working environment, which will improve staff morale and productivity. It also has an effect upon the ability to update knowledge, which results in an improved capability of VPC trainers and consultants to provide better quality services to clients as well as to develop new services to offer to clients. If all these intangible contributions are taken into account, the benefits realized from the system are considerable.

Impact Stories

The most tangible benefit is that Goldsun is becoming a paperless office, although there has been no estimate of the amount of paper saved so far. In the past, everything had to be printed out and distributed in hard copy, from internal managerial decisions and quality documents to the internal newsletter. Now, all these things much more easily available through the knowledge portal using a keyword search. More importantly, people can interact with each other on any subject via an online forum.

Organizational events and personal calendars are the two important uses for job planning within the organization. Goldsun Director Mr. Nguyen Van Hien used to find it difficult to control numerous events for individuals in many different departments. Now, he just clicks to the calendar corner. Better supervision and effective resource allocation makes him more productive as a manager.

BUILDING A LEARNING ORGANIZATION: WHAT WORKED AND WHAT DID NOT

Contributors

Goldsun's Click-2-K system has become a learning portal where everyone can find needed knowledge. Lessons learned appear in the sharing corner, where people accessing the system are able to post a question to a discussion board, called TEO (To Every One). In addition, learning from other institutions, such as partners, customers, etc., is also stressed. All the best practices are gathered by the AE, and designs are uploaded onto the system so that Goldsun management can refer to them as necessary. Customers' knowledge is captured and shared as well, for improved provision of services.

Leadership plays a critical role in the learning process at Goldsun. A continuous learning spirit has always been fostered by Goldsun' CEOs, Mr. Duong and Mr. Hien. This makes for a very favorable learning environment. Without this support and commitment, the KM system could not have been implemented.

Barriers and Cultural Change

Goldsun leaders view the KM project as a strategic, long-term undertaking that requires the participation of all employees in order to establish Goldsun as a learning organization. For this reason, the activities of the project team have been supported strongly by the CEOs/leaders. CEO Mr. Duong made a special presentation to all employees to explain the benefits of the KM

project and to encourage the participation of all employees. After six months of implementation, Goldsun saw some first-hand outcomes of the project, as described above. Some difficulties were also encountered.

The dilemma that confronts the KM team is the content issue. As earlier mentioned, there is insufficient content to encourage people to access the system. Moreover, a phenomenon of "too much content, too little content" has occurred. Goldsun's work encompasses a vast range of activities, so that a great deal of knowledge is created, but choosing the "right" knowledge for inclusion in the system is sometimes difficult. The second barrier is creating a learning culture: how to encourage the habits of sharing and learning. People are more familiar with traditional training, that is, acquiring knowledge and keeping it only for their own use without sharing.

After numerous meetings and discussions with the CEOs, the project team developed measures to get all employees involved in the system: establishing a rule that employees must use the C2K for updating customer information and transactions via the controlling system of QMR before service contracts will be signed by the CEO, granting rewards based on calculating points related to one's contribution to and sharing of knowledge within the system. Goldsun developed a movement called "I have a new idea" that rewards individuals and units with outstanding achievements for the year.

Regardless, the KM team has learned that KM is a transformation process. Change cannot be effected overnight. In 2007, the leaders of Goldsun plan to detail the company's business plans in targets and measures according to the BSC method and to use the C2K software to evaluate and monitor the outcomes. The leaders are also committed to implementing the principles "Turn left" and "Don't be an idea killer," to keep asking the question "Why?" and to learn from anybody, including the custodian.

CONCLUSION AND LESSONS LEARNED

There are some lessons to be learned from the Goldsun case. KM is a very good concept, but the key to its success is to put it into action. This requires the commitment of management and the participation of all employees in the organization. A comprehensive methodology contributes to the overall success as well. Once the KM system has been established, an environment conducive to continuous learning will be fostered. The Goldsun case has been in effect for six months, but there is already significant positive feedback from the system about the benefits of KM. Preliminary outputs are encouraging and can serve as a motivator for the expansion period. Even if there are a number of constraints in the pilot project, the most important thing for it to succeed is to see even the small achievements as meaningful. KM is about changing people's habits of learning and sharing, so the more the KM system recognizes the contribution of users, the more the system becomes effective and information-sharing can be transformed into knowledge-sharing and knowledge creation.

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Part III

National Surveys of the Status of Knowledge Management

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INTRODUCTION

The Republic of China is an island in East Asia, northwest of the Pacific Ocean, 394 km (245 miles) long and 144 km (89 miles) wide, with about a 1,200-km-long coastline (about 1,520 km plus Pescadores). It covers an area of approximately 35,915 sq km. Since 1960, the Republic of China's light industry has developed very rapidly, with heavy industry a distant second. In order to increase merchandise exports, the government established export processing zones¹ to expand foreign trade. During the global energy crisis in 1960s, the government sought to provide impetus to the sector through 10 major construction projects to resolve the energy shortage problem as well as the economic depression. Its rapidly-growing economy earned the Republic of China the reputation of being one of Asia's "Four Little Dragons." Afterwards that time, the government reevaluated the position of heavy industry in the economy and began implementing new industry policies. For example, the China Steel Corporation,² the Taiwan Shipbuilding Corporation,³ and the Chinese Petroleum Corporation, Taiwan,⁴ etc., are large corporations established by the government. During the 1980s, overseas Taiwanese came back from the U.S. to establish electronics factories like the Taiwan Semiconductor Manufacturing Company, the largest semiconductor factory in the world. Many companies and factories worked as OEM to manufacture electronic products for world-renowned brand corporations. Since then, the Republic of China has been regarded as the most important production base in the global computer industry.

In addition, small and medium-scale enterprises (SMEs) were also influenced by the boom in the electronics industry in the 1980s. Production of personal computer motherboards in is number one in the world. The Republic of China became an industrialized country. Up to 2006, its foreign currency exchange reserves were ranked as the third highest in the world, and it is the 18th-largest economic entity.⁵ One of the characteristics of the Republic of China's economy is the numerous SMEs, quite different from Japan and the Republic of Korea, whose economies are led by large corporations.

The Republic of China's industry began to move out to mainland China in the late 1990s, since China offered cheaper labor and land costs. One example is the information electronics sector that has been the backbone of the manufacturing industry. Many companies began moving abroad in the late 1990s. For years, this migration has aggravated the challenge in the Republic of China's industries. However, this also provided the stimulus for an industry transformation. In 1995, the migration ratio of personal computer and related industries was only 25%. By 2002 it rose to 75%, with nearly 60% of the companies migrating to mainland China.

Globalization has provided competition as well opportunities. The Republic of China has been home to several well-known world brands. For example, Acer is the third-largest computer company in the world, Trend Micro is among the three largest information security companies,

¹ www.epza.gov.tw/www/lan/index.jsp.

² www.csc.com.tw/indexe.asp.

³ www.csbcnet.com.tw/csbc/EN/index.asp.

⁴ www.cpc.com.tw/english/home/index.asp.

⁵ http://hirecruit.nat.gov.tw/chinese/html/taiwan_01.asp.

and GIANT is the second largest bicycle company in the world. Other examples are ASUS, D-Link, MSI, and Evergreen, also based in the Republic of China.

On the other hand, the Republic of China's industry went through a transition period from a production orientation to a service orientation after the 1980s, but globalization also sped up the pace of industry dynamics, since many businesses migrated to China. The situation gradually eroded the economy and affected the development of the service market industry.

Faced with the challenge from mainland China's rapid economic development, industry, government, and academe all sought solutions for production effectiveness for all industry sectors. Moreover, the government promulgated policies to upgrade industry by supporting a new economy: the knowledge economy. This new concept advocates technology and knowledge, research and development, and value-added products. For companies run under the traditional economic rules, the primary production factors are machines, capital, raw materials, and labor. In the knowledge-based economy, knowledge becomes the most essential factor. Knowledge management (KM) has been heralded as a way to speed up the transformation. Over the past decade, the government, industry and enterprises, and academe have undertaken various promotions and practice of KM. The following sections discuss KM applications in the Republic of China from the aspects of the enterprise applications, government promotion and practice, and the accomplishments of software vendors or service providers specializing in KM.

KM APPLICATIONS BY ENTERPRISE

The China Productivity Center performed a survey entitled "Investigation of KM Applications"⁶ (China Productivity Center, 2006) to arrive at a profile of general KM applications in industry and enterprises in the country. The survey asked questions about KM from the point of view of technology, requirements, and expectations of government assistance. The investigation revealed the status of KM implementation in the Republic of China's enterprises associated with KM utilization and its requirements. The results are summarized as follows:

Profile of KM Implementation

There are 193 companies that have adopted KM, comprising 25.1% of the survey sample. Among those companies that have implemented KM, larger enterprises constitute the biggest group, accounting for 47.2% of the respondents (Figure 1), or almost half of the sample. Small and medium-scale enterprises make up 29% and 26.6% of the group, respectively.



Figure 1. Implementing Ratios of Various Scale of Enterprises

⁶ This is a project sponsored by the Industrial Development Bureau, Ministry of Economic Affairs in 2005. The primary subjects are manufacturers with more than 30 employees. It was reported on in the "Electronic Factories List in Taiwan and Fujian Area," published by the Ministry of Economic Affairs in 2005. The number of questionnaires distributed was 5,300. Valid retrieved samples totalled 770. The retrieval ratio was only 14.64%.

KM Advocate

The KM advocate is the department or division that takes charge of the KM implementation and promotion for the company. Figure 2 illustrates the survey results. The four groups from the highest to the lowest are the MIS department, top executives, specific offices, and the HR department. It can be seen that either the MIS department or the top executive officers play the lead roles when implementing KM in companies. Moreover, the survey results also indicate that 45% of large enterprises are led by MIS departments, 35% of medium-scale enterprises are led by either the MIS department or the top executive officers, and 46% of small enterprises are led by top executive officers in KM implementation.



Figure 2. KM Advocators

KM Management Tools and System Functions

The KM management tools cover mainly five categories: performance indices, sharing and learning culture building, knowledge map, knowledge communities, experts' yellow pages, and others. The adoption percentages are shown in Figure 3. Among these tools, performance indices and sharing and learning culture building are the most used by the enterprises (Figure 3). These two functions are the ones most often mentioned as being used to accelerate KM utilization as well as when establishing sustainable KM practices in companies.

The application of system functions is shown in Figure 4. It can be seen that the three basic KM system functions applied the most often are the document management system (82.4%), the knowledge portal (57.5%), and the search engine (42.5%).

KM Barriers

The barriers to implementing KM arise mostly from internal factors. Figure 5 summarizes the proportions of KM barriers, they are: "colleagues not able to participate because of heavy workload" (59.1%), "difficulty of performance evaluation" (43.5%), "lack of internal promotion and encouragement policies" (34.7%), "low sharing willingness among colleagues" (29.5%), "lack of implementing strategies or models" and "unable to incorporate KM into operations workflow" (26.9%). Others with also lower percentages are: "misunderstanding" (12.4%), "unable to find a suitable KM platform" (10.4%), "weak support from high executives" (7.8%).



Figure 3. Management Technologies Applied by Enterprises



Figure 4. Information Technologies Used by Enterprises



Knowledge Management in Republic of China

Figure 5. KM Barriers

KM PROMOTION BY THE GOVERNMENT

A report published by the Organization for Economic Cooperation and Development in 2003 (OECD, 2003) indicated that KM should be one of the management goals that governments should set for themselves as their first priority, to be implemented within five years. Those countries that do so will reap benefits, as the system can improve management efficiency and effectiveness and transform officers' long-term behavior. A government is structured as a giant organization. The implementation of KM would strengthen national competitiveness. Hence, it has been a campaign in many countries to transform themselves into a knowledge-based government.

The fast development of information technology and the high level of usage of the Internet have established firm foundations in the country to enable the Republic of China to move towards a knowledge-based economy. In order to cut down on government expenditure, the government has trimmed and streamlined its manpower over the past five years. The prevailing conditions have given rise to the need for KM where professional knowledge and expertise can be better preserved so that other people can easily access them.

The Republic of China also has the upper hand in developing government organizational KM. According to the e-government rating in the latest global information technology report published by the World Economic Forum in 2006 (WEF, 2006), the government is ranked sixth in the level of information application, and 17th as a digitalized society. Thus the government can utilize information and communication technology to do government re-engineering. KM is one of the means to transform the government so that it becomes smaller and more effective. The government formulates policies to compel government employees along KM goals in order to promote a knowledge-based economy. President Chen Shui Bian announced that 2001 is "the first year of impelling a knowledge-based economic society" in the Republic of China. The government offices in charge of KM planning and execution are the Industrial Development Bureau, the Small and Medium Enterprise Administration and the Ministry of Economic Affairs.

KM Applications in Government Offices

There are 297,815 employees in government offices (Central Personnel Administration, 2006). With an annual budget of TWD1,599.5 billion, the government is the largest domestic organization in the country. The operations and administration of government have generated numerous archives and documents that are the intellectual property of the country for internal government management.

For this reason, the government has mandated a number of projects to develop KM in various government offices. In most of these projects, the RDEC designs the plan and the Industrial Development Bureau provides the information technology support services. In past years, some government offices have already mounted satisfactory KM implementation programs, such as the policy data support system pushed by the RDEC, the establishment of a national files KM system, official documents KM, and an e-government life-long learning website (RDEC, 2004). Other offices, such as the Central Personnel Administration, the Council of Labor Affairs, and the Industrial Development Bureau, have all established KM websites as well as information systems.

Besides the central government, Taipei city hall, with its 80,000 employees, has built a KM system that consists of a municipal database, an administration knowledge site, and an administration information site (Chen, 2003). The city government of Kaohsiung, the largest city in southern Republic of China, developed an integrative KM portal system in 2002 and further expanded KM applications in 2006 by adding the experts' yellow pages, knowledge communities, and statistical analysis. More than 250 institutions under the Kaohsiung city hall are authorized to access this new KM system (Information Management Center of the Kaohsiung Municipal Government, 2006). The following presents two examples of successful government KM projects.

Central Personnel Administration (CPA)

The CPA is in charge of 7,900 personnel offices around the whole country. It initiated a KM implementation in 1992 that is a part of the project called the "personnel administration digital nerve system," intended to integrate operational documents and references into a common knowledge archive that can be quickly searched to establish collective intelligence for CPA. The implementation follows a three-year plan. For each year, there are tasks and goals to be achieved:

Year 1. KM infrastructure establishment: knowledge database, KM workflow, knowledgesharing culture.

Year 2. Knowledge extraction: knowledge or expertise extraction, forming a learning organization.

Year 3. Decision support: establishing a decision support system.

Industrial Development Bureau (MOEAIDB) Impelled "Knowledge-sharing Management" (KSM)

In May 2001, the director of the Industrial Development Bureau, wanting to develop the Bureau into an advocate in promoting KM for the government, decided to implement a KM system in order to see what the difficulties would be and to gain actual experiences. The Bureau initiated a project called "Knowledge-sharing Management" (KSM), with the goals of enhancing knowledge-sharing among colleagues, promoting a pleasant work environment, and improving efficiency and innovation to upgrade service quality as well as the quality of decisions (Industrial Development Bureau, Ministry of Economic Affairs, 2001).

There are three stages in the implementation program: planning, implementation in MOEAIDB, and promotion to industry. The project consists of four phases, including knowl-

edge archive management, community-building, forming a learning organization, and process re-engineering. Through 2006, the results have been satisfactory, including the KM information system platform, knowledge document collection and usage, knowledge-sharing community, and e-learning.

However, there are always shortcomings that can be improved upon. The MOEAIDB has learned lessons from the pioneering implementation programs:

- 1. High government officials must have a steady support system together with abundant resources.
- 2. A group impetus team should recruit capable team members.
- 3. The office or department should get all employees involved in KM activities.
- 4. The major strategies should be well planned to facilitate arriving at an organizational culture alignment.
- 5. The first KM trial implementation would often result in many inadequacies. Continuous improvement is necessary and should be a common perception among employees.

Industry Promotion by the Government

Three major KM projects have been launched by the government to promote the KM movement in industry and other business sectors.

Industrial KM Impelling Plan (Industrial Development Bureau, Ministry of Economic Affairs, 2006)

There are two phases of the projects hosted by MOEAIDB. The goal is to expand KM application among companies in industry. Phase I was a four-year plan, from 2002 to 2005. The primary strategies were to hold ideology promotion activities and issue publications to enhance employee awareness, to develop KM application tools and tutor willing companies while offering skill-training programs to assist enterprises in improving manpower quality through KM. By providing KM diagnostic services, up to 65 cases per year, the MOEAIDB helps companies break the KM barriers and speed up the application effectiveness of their KM system. In addition, MOEAIDB has set up a KM integrated service portal that provides online consultation, industrial news, experience sharing, technology matching services, etc.

With the satisfactory accomplishments of Phase I, a new four-year project of the "Industrial KM impelling plan," Phase II, was launched, with the goal of strengthening KM application capability and expanding effectiveness in order to fulfill the KM vision of "knowledgizing industry and industrializing knowledge."

Small and Medium-scale Enterprises KM Application Impelling Plan (Small and Medium Enterprises Administration, Ministry of Economic Affairs, 2005)

The Republic of China has 1.226 million small- and medium-scale enterprises (SMEs), constituting 97.8% of all enterprises. SMEs employ 76.93% of the country's total employees (Small and Medium Enterprises Administration, Ministry of Economic Affairs, 2006). However, because of the limitation of business size in terms of finance, technology, and human resources, SMEs are incapable of implementing KM without outside assistance. MOEAMEA has promoted the "small and medium enterprises KM application impelling plan" since 2003, with the goal of providing assistance to SMEs in gaining a better understanding of the application of KM. The plan publicly recruits KM consultants to offer diagnostic services for SMEs to implement and utilize KM. The MOEAMEA also provides a series of consultancy classes with low tuition fees and hosts promotional activities to raise general KM awareness in the business domain. The vision is to enhance the competitiveness of SMEs by transforming them into knowledge-based

enterprises as well as to give rise to innovations as a result of the accumulation and integration of knowledge.

Fifty-seven SMEs have participated in the coaching project since 2003. Their operational performance has been significantly improved, particularly operational workflow, customer satisfaction, organizational learning, and financial achievements.

The 7th Item, a Web Learning Pattern under the "Commerce Development Impelling Plan," promoted by the Department of Commerce (Department of Commerce, Ministry of Economic Affairs, 2005)

This plan is the 7th sub-plan, "KM platform and e-learning pattern," under the "commerce development impelling plan: chain and franchise service industry impelling plan" implemented by the Department of Commerce in 2005. Its purpose is to assist the commercial service industry to implement KM and applications by accumulating industrial knowledge and then implementing KM applications to establish quality service models. By raising customer satisfaction and adding value to associated products, companies can improve their global competitive advantage. To participate, an enterprise submits a KM implementation proposal to the Department of Commerce. The project period is three years, and the grant amounts to no more than TWD30 million. The Department of Commerce assembles a committee of experts from various sectors of industry or academe to assess the proposals, tasked with selecting candidate companies for sponsorship, auditing the government budget quota, and monitoring the sponsored companies' performance.

CONCLUSIONS

After years of promotion by government, industry, and academe, KM has gained significant attention and a higher level of awareness towards a knowledge-based economy. The following summarize KM practices and possible challenges in the Republic of China.

More Awareness of KM's Importance

In the past, only high-tech companies or large corporations with abundant financial resources, such as TSMC, UMC, and motor manufacturers, could implement KM. Nowadays, more SMEs have requested KM implementation, choosing lower-priced KM packages that can be implemented quickly. Moreover, KM implementation has been expanded from the manufacturing industry to also include the service industry, such as the financial and medical sectors.

Difficulties in Measuring KM Effectiveness

KM effectiveness is difficult to measure based on company revenues or profits. This can cause some confusion when companies evaluate the benefits of KM implementation, especially when companies have budgetary and cost constraints. Although many companies emphasize the establishment of a key performance indicator system to clarify KM effectiveness, there are effects or synergies that cannot be quantified or do not become visible in the short term. This vagueness in measuring KM effectiveness can sometimes erode the determination of a company to continuously implement and promote KM or to keep increasing their investment in KM.

The Role of IT vs. People

The greatest difficulties when implementing KM are not the technology or the system, but internal management problems. When implementing KM, companies often put more emphasis on IT and ignore organizational management issues such as workflows, routine operations, organizational culture, etc. If KM is introduced in the form of an isolated information system that is separate from regular work routines, employees perceive it as extra work. This situation can

escalate if KM effectiveness does not become obvious in the short term. Failure to integrate management of people issues into KM implementation can lead to the KM information system or platform gradually becoming nothing but an embellishment.

KM Implementation of SMEs: The Hesitation and the Superiority

Enterprises cannot see the rewards immediately when implementing KM. Moreover, most KM benchmark enterprises are large enterprises. Many SMEs hesitate, even though their awareness of the importance of KM may have increased. Although SMEs have constraints many resources—capital, human, technology, etc.—the disadvantages can be turned into advantages because of the small scale of their operations. Documents are easier to organize and convert into digital form. Moreover, the employees, smaller number compared with large companies, often have closer relationships and more cross-functional operations and are more used to sharing information or knowledge, and thus ensuring alignment of KM to the business' long-term strategy becomes more efficient. With the help of a proper implementation plan, SMEs can also build an effective KM practice.

The Challenge of Business Migration

Many companies have moved their manufacturing functions to foreign countries over the past two decades. Most of those manufacturers settle in mainland China because of the low cost of labor and land, the huge domestic market, and the common language. These factors have worked to their advantage when compared with American, European, or Asian companies. Under this trend, companies that establish branches in other countries also find that management has become gradually more complicated due to the more disparate scope of operations. Those companies see the need to exchange and integrate knowledge between and among headquarters and the foreign branches. For such cross-country structure, KM implementation will have to be based on a well-established information infrastructure that integrates various divisional information across the globe.

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INTRODUCTION

The recent growth of IT-enabled service businesses in India—call centers, medical transcription, technical support, and back office processing—is powerful evidence that the potential of IT technology and knowledge-based industries extends far beyond the development of software and hardware. As the application of information technology spreads and saturates traditional industries, the concept of knowledge-based industries has extended the scope of service businesses still further to encompass all those in which the application of mental processes, judgment, and skills, rather than the application of mechanized production technology, is the core resource. Education, health services, insurance, and financial services are among the leading industries in this category. Management of all types of information is emerging as a major growth industry world-wide, and India is well poised to become a global leader in this field.

In India, world-wide economic uncertainty has fostered the growth of the knowledge management (KM) community, but other factors, like the gradual liberalization of the Indian economy since 1990, have played key roles towards KM adoption. In the previous decades, a regime of strict governmental controls, licensing, and quotas had constrained the Indian industry in its search for excellence, market share, and international presence. The expanding exposure to markets and competition world-wide—also promoted through its growing integration with the global economy—that has encouraged Indian industry to focus on striving for superior operational efficiencies and organizational innovation, two important objectives that KM serves. As this process of liberalization gathered momentum, a number of Indian firms were well placed to take advantage of KM-based working practices. A leader among them is Infosys, where Tata Steel has been the pioneer.

PROMOTION OF KM

KM is an age-old concept and practice. Institutions and researchers maintaine, share, and deliberate on subjects and issues through research, conferences, journals, books, etc. Organizations today are managing knowledge resources using information technology in structured databases whereby the retrieval, sharing, and dissemination of information is rapid and timely, carried out in various forms: email, blogs, chat rooms, websites, groups, news net, etc.

- 1. A survey was carried out by Pranay Desai, BML Consulting, and Griffith University entitled "Knowledge Management Research Report 2002" in which 17 Indian companies participated out of the 100 included in the list of Fortune companies.
- 2. Workshops and seminars on KM have taken place regularly in Indian institutes of management (IIMs), Indian institutes of technology (IITs), and leading management and technical institutions in the country since the year 2000.
- 3. Courses on knowledge management have been available in the IIMs over the last five years, with emphasis on its specialization.

Status of KM vis-à-vis Other Management Tools and Initiatives

KM in India is still in the introductory stage. A prevailing view among experts as can be understood from Figure 1. A high majority of the respondents (86%) say that successful KM initiatives lead to higher performance. Four per cent have no idea about it. The single most im-

portant factor in successful KM initiatives has been identified by the majority as people issues (58%). Out of the rest, 26% opted for process, and 16% chose technology.



Figure 1. Prevailing View Among Experts of KM in India

Sectoral Comparison in India

The response on the concept of KM is encouraging in the software sector, where the dominant view (56%) is that KM is a strategic part of business. The response is poor in the petroleum marketing sector and the pharmaceutical sector, where the dominant view is that KM is something they are doing but not under the same name. A significant number of the respondents in the pharmaceutical sector (24%) and the petroleum marketing sector (20%) have not even heard of the term KM.

Organizations making sufficient investments in learning opportunities for the employees is the majority view in the software (78%) and the pharmaceutical sectors (72%), whereas only about half (55%) of the respondents in the petroleum marketing sector think so.

	Software	Pharma-	Petroleum
		ceutical	marketing
Never heard of it.	5%	24%	20%
It is something you are doing but	10%	25%	35%
not under the same name.			
It is just a management fad.	15%	12%	5%
It is a strategic part of your	56%	24%	20%
business.			
It is something that could be	14%	15%	15%
beneficial for the organization.			

Table 1. Employees' Views on KM in Various Business Sectors

That organizations value employees for what they know is the majority view in the software (70%) and pharmaceutical sectors (64%), whereas only about half (52.5%) of the respondents in the petroleum marketing sector think so.

In India most large organizations—Infosys, Tata Steel, ITC Ltd, AirTel Bharti Teleservices Ltd, HLL, etc.—have adopted KM as an integral part of their business processes. Most of these organizations have also integrated the KM strategy with technical or cultural issues. These

organizations seem to mature with the implementation of business intelligence systems, supply chain management (SCM), financial management (CFM) module, portal development, etc. There is a growing realization that technology by itself cannot withstand the global competition in the days to come.

Small and medium-scale enterprises (SME's) in India have introduced KM in a non-uniform manner with pilot approaches in place or in phases. However, there are large numbers of public service companies and government organizations with virtually no KM strategy for achieving overall organizational goals.

The total KM market in India is still in the nascent stage and is limited to some extent only to select vertical organizations: banking, finance, consumer goods, and IT service companies. Agribusiness, village industries, retail, educational institutes, government institutions, and other organizations are still lagging in their adoption of large-scale KM initiatives.

How KM is Defined or Understood

In India, KM is often understood in the context of extension of computer-based information management. Organizations in India identify KM as contributing significantly to reducing costs, improving marketing, and enhancing customer focus. They see these as the short-term or immediate benefits of successfully implementing a KM program.

KM is increasingly understood as the organizational process for acquiring, organizing, and communicating both tacit and explicit knowledge so that others may use it to become more effective and productive. These information systems are designed to facilitate collect, codify, integrate, and disseminate organizational knowledge.

National Business and Economic Contexts of KM Practice

India is primarily a knowledge-based economy. Economic growth for 2005–06 is likely to be 8.1% per annum (per the 2006–07 budget report published by the government of India), primarily due to the strong growth experienced in the service sector. The manufacturing sector is growing at 9.4%, and the agricultural sector growth rate is 2.3% for the current year. The Tenth Five Year Plan (2002–07), as approved by the National Development Council (NDC), targeted an average growth rate of 8.0% per annum for the economy as a whole.

The service sector has displayed an incremental growth rate over the last five years, with Indian software exports growing by 32% in 2006. This steady growth rate can be attributed to rapid introduction of technology, improvement in the telecommunications infrastructure, and an emphasis on the adoption of integrated information management solutions.

How KM Is Promoted and Disseminated

The government of India has recently established the National Knowledge Commission to promote and disseminate KM, with the following objectives:

- 1. To take steps that will give India the "knowledge edge" in the coming decades, i.e., to ensure that the country becomes a leader in the creation, application, and dissemination of knowledge.
- To create new knowledge by strengthening the education system, promoting domestic research and innovation in laboratories as well as at the grassroots level, and tapping foreign sources of knowledge through more open trading schemes, foreign investments, and technology licensing.
- 3. To target the health, agriculture, government, and industry sectors. This involves using traditional knowledge in agriculture, encouraging innovation in industry and agriculture, and building a strong e-governance framework for public service.

4. To disseminate a knowledge focus that will ensure universal elementary education, especially for girls and other traditionally disadvantaged groups, to create a culture of lifelong learning, especially for skilled workers, to take steps to boost literacy levels, and to use information and communication technology (ICT) to enhance standards in education and widely disseminate easily accessible knowledge that is useful to the public.

Terms of Reference of the National Knowledge Commission

Per Government Notification of 13 June 2005, the following are the terms of reference of the National Knowledge Commission (NKC):

- Build excellence in the educational system to meet the knowledge challenges of the 21st century and increase India's competitive advantage in fields of knowledge.
- Promote creation of knowledge in S&T laboratories.
- Improve the management of institutions engaged in intellectual property rights.
- Promote knowledge applications in agriculture and industry.
- Promote the use of knowledge capabilities in making government an effective, transparent and accountable service provider to citizens and promote widespread sharing of knowledge to maximize public benefit.

Who Are the Leading KM Promoters, Champions or Lead Institutions?

In India, a country now famous for its dynamic computer software industry, many KM tools and services are available. A considerable number of vendors provide standard or customized solutions for both small and large corporations. Many consultancy companies that specialize in KM have emerged recently, providing solutions to different industries in the region.

Some of the organizations and companies in India which are implementing KM in the private sector are: Reliance Industries Ltd, Airtel, Ranbaxy, Oracle Software India Ltd., Infosys Technologies Ltd. Zensar, Aptech Ltd., Satyam Computers Services Ltd., Laboratories Ltd., Enron-Oil and Gas UDV India Ltd., Indo-Rama Synthetics Ltd., Technology Ltd., Eicher Motors Ltd., International Fragrance and Flavours Ltd., IL & Duncan Clipsal Industries India P. Ltd., Patni Computers Ltd., FS, InfoTech, and ITC Ltd. These are primarily IT, fast-moving consumer goods (FMCG), and manufacturing companies.

OVERVIEW OF KM PRACTICES

The private sector in India started adopting KM approaches in the late 1990s. Initially, this was understood as capturing and storing huge volumes of data and information and disseminating it (or making it available for whoever wanted access) to employees at different levels. In later stages, it was felt that structured or "hard" knowledge required supplementing by experience, practice, and the "softer," tacit elements to be complete. At the turn of the century, many of the larger Indian companies became aware of the critical need for an effective KM strategy, i.e., one that impacted on the performance of the organization, in the face of considerably increased competition from the opening up of the Indian economy and from the tremendous changes that information technology was bringing about. While different events triggered work in the KM area in each instance, most firms have embraced the best practices and good-fit strategies. The case of Tata Steel shows how Communities of Practice (CoPs) became an integral part of its KM strategy that in turn is interwoven into the company's core processes and HRD and organizational development systems that are geared to performance improvements.

In the corporate sector, a number of drivers for KM have emerged: increased workforce mobility, growing complexity of the business environment, the need for life-long learning,

companies' willingness to invest in KM, the need to limit loss of intellectual assets through employee turnover, the need to avoid re-inventing the wheel, the faster pace of innovations, the need to operate at the global level, an increasing shift from tactical to strategic adoption of KM practices, and a steady adoption of Internet and wireless technology. A survey of 34 IT companies (Rao, 2003) found that the reasons why 70% of the surveyed companies adopted a KM initiative were the enhancement of internal collaboration and the capture and sharing of best practices. HR-related practices like e-learning, customer-focused systems like customer relationship management (CRM), and market factors like competitive intelligence were also mentioned as underlying reasons for the adoption of KM in at least 40% of the companies.

DISTINGUISHING FEATURES OF COMPANIES IMPLEMENTING KM

Training

KM is a management tool that seeks to improve business performance by enhancing organizational learning, innovation, and the capacity to adapt by focusing on improving the quality of knowledge processing and the business processes that account for knowledge production, integration, and the identification of problems and opportunities in organizations. Training undertaken in this context in general incorporates the following:

Phase 1. Understanding the knowledge life cycle framework and its open enterprise specifications to improve knowledge processing.

Phase 2. Identifying technical and programmatic development of solutions. Key deliverables include constructed systems, pilot programs, and conversion plans for enterprise-wide implementations.

Phase 3. Implementing and deploying solutions developed in the prior phase. Key deliverables include implemented solutions and refinements in the transition plans.

Phase 4. Monitoring and evaluating the implemented KM systems and programs, including continuous reporting of impact and benefits. Key deliverables include performance reports and requirements for solution modifications and other issues of importance in planning successive iterations of the cycle.

KM Audit, Assessment, and Review Processes

Organizations are adaptable systems whose behavior is complex, non-linear, always changing, and unpredictable. Because of this, KM must be a persistent, iterative process and must be adaptive. Every intervention must be followed by an attempt to measure and evaluate its impact and then to plan again, in response, for successive interventions. This cycle can be repeated endlessly.

The KM audit and assessment is carried out to discover:

- 1. Whether an organization has integrated the KM strategy with technical or cultural issues.
- 2. Whether an organization is utilizing KM procedures to achieve known benefits and to assess tangible and intangible ones.
- 3. Whether there are potential benefits on a long-term basis in the context of improving revenue growth and further enhancing the company's competitive advantage. Potential long-term benefit could be employee development or "product innovation, which are critical parameters in measuring the success of KM implementation.
- 4. Whether the value of organizational knowledge is reported to stakeholders: citizens, shareholders, promoters, strategic partners, customers, and employees within the organization.

Other Preparations

- Public and government enterprises must re-engineer processes, standards, and infrastructure before computerization and technology implementation. To make an immediate impact, the organization must identify and simplify 10 to 20 processes that are cumbersome, bureaucratic, and prone to unnecessary delays and corruption. This approach will require all institutions across the board to work in concert and learn from each other.
- Public enterprises must adopt a private-public partnership model for economic sustainability and feasibility of the services provided by these organizations.
- Common standards: The organizations must focus to adopt a common standard in terms
 of technology, for example, database, software, and network infrastructure and standards for scalability of the application. These standards should enable easy participation
 by any state, *panchayats*, institution, NGO, business, or citizen at any time. These standards, templates and data formats must be carefully designed with consideration given
 to technology, software, user requirements, and interoperability.

CHANGES OR ADJUSTMENTS NEEDED DURING KM IMPLEMENTATION

There are some key issues to be addressed during KM implementation:

- 1. Function orientation to process orientation: public enterprises face a stiff challenge to improve on processes and focus on the process rather than on the function.
- 2. Sequential decision to concurrent decision: government institutions are mostly hierarchal structures. The structure in itself is a hindrance to effective decision-making, and often delays can be attributed to this structure. The change from a hierarchal to a flat structure involves many procedural, legal, and structural changes.
- 3. Cost-based competition to a multi-attribute competition: competition today is based not only on costs but on other factors: mode and time of delivery, customization, and value-added services, etc.

Government institutions must go through government process re-engineering (GPR), establish a common standard for delivery and services, and re-orient their objectives and the role of the organization for optimum use of its resources.

LOCAL MODIFICATIONS, INNOVATIONS, AND TAILORING OF KM TO A SPECIFIC COMPANY

KM solutions cannot be unilaterally applied across organizations without tailoring it to suit the needs of a specific company. In the Indian context, where the country is undergoing development amidst cultural, economic, political, and social diversity, it becomes much more important to consider:

- Organizational dynamics.
- Core competencies.
- Culture.
- Resources.
- Infrastructure.
- Climate.
- Leadership.
- Communication.

- Structure.
- Technology.

The above issues become much more relevant to public enterprises as they face a stiff challenge to improve on their process and delivery systems.

Multi-national companies like Convergys, which started operations in India under the name Convergys India Services (CIS) in 2000, adopted HR practices based on the best practices embraced in the U.S. but subsequently realized that the model does not fully suit the Indian environment. Consequently, the company tailor-made HR management practices and adopted new sets of KM tools to manage intellectual capital. Similarly, companies like Airtel improvised on techniques like storytelling and experience-sharing, varying them to suit their customer relationship management function. Infosys, on the other hand, relies more on technology to capture, share, and transfer tacit knowledge, using tools like k-Speak (a tele-calling service to share knowledge) and k-Summarize (a web-based tool to share knowledge.)

KM FOR OPERATIONAL EFFICIENCY VERSUS KM FOR INNOVATING NEW PRODUCTS, PROCESSES, OR MARKETS

Organizations in India are implementing KM in order to improve processes, reduce costs, minimize lead time, improve marketing schemes, and enhance customer focus to bring about these and other benefits:

- Quicker response, improved professional services.
- Timely product supplies.
- Accurate pricing/discounts.
- Reduction in billing errors.
- Simplified and faster payment processes.
- Reduction in administrative costs for customers/vendors.
- Value-added services (internet, B2B, E-Biz, etc.).

The IT implementation started with cost savings and better services and then moved towards innovating new product services and increasing profit margins.

The banking sector in India embraced banking reforms post-1990 to improve companies' operational efficiency, and this led them to create new products and services. Infosys is one of the companies which introduced KM to develop new products and to enhance collaborative decision-making in the company all across units.

ITC Limited established Internet kiosks in the rural villages of Madhya Pradesh (a state of India) for soya bean growers to carry out the sale, purchase, and exchange of best farming practices. The e-Choupal website, developed by ITC Ltd., which acts as an interface among farmers, customers, and vendors, was highly effective in reducing inventory, simplifying the payment process, and reducing waste. It also helped in developing new agribased products and services. ITC has plans to extend the project to other states of India in 2007–08.

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KM PROMOTION

Over the last three years, awareness of the importance of knowledge management (KM) in Indonesia has been on the increase, notably among large-scale business organizations. Most of these organizations have become aware that KM is imperative for organizational flexibility. To survive the business competition and remain innovative in meeting their customers' demands, they must use KM. In addition, knowledge management within a company becomes crucial in order to:

- To accelerate the flow of product information to both customers and the company.
- To speed up delivery of services.
- To absorb knowledge that already exists within a company in a more organized manner in order to satisfy demand.

Today, the campaign to use KM in organizations has further intensified as a result of the information explosion. There are some national level forums (formal events) in Indonesia which advance KM's position as a tool for corporations and non-business organizations to use in undertaking self-development initiatives:

- National Seminar on Knowledge Management: Knowledge Management and Competitive Values, Key Success Factors in Business, conducted in cooperation with the Institut Teknologi Bandung and Universitas Widyatama (Industrial Management Specialty Group of the Faculty of Industrial Technology).
- 2006 Most Admired Knowledge Enterprise (MAKE) Study, by Dunamis Organization Services dan Teleos.
- Knowledge Management Seminar: Implications for Organization and Governance, conducted by Yayasan Sampoerna and the ITB School of Business and Management.

National Seminar on Knowledge Management

The objective of this seminar is to actively involve the three drivers of KM application: the community, the practitioners, and the academicians. These three groups will share KM application in the organization and develop KM concepts in their research.

2006 Most Admired Knowledge Enterprise (MAKE) Study

The MAKE Study is a review with the objective of identifying the methods used by existing organizations in managing their organizational knowledge to provide value-added services for the shareholders and the community.

At the second implementation of the Indonesian MAKE study in 2006, 10 knowledgebased companies in Indonesia were selected to receive the MAKE Award: PT Anugerah Argon Medica; PT Astra International, Tbk., PT Bank Danamon Indonesia, Tbk., Bank Indonesia, PT Bank Niaga, Tbk., PT Excelcomindo Pratama, Tbk., Kelompok Kompas-Gramedia., PT Medco E&P Indonesia., PT Unilever Indonesia, Tbk., and PT Wijaya Karya.

The three companies which obtained the highest scores are (alphabetically): PT Astra International, Tbk., PT Bank Niaga, Tbk, and PT Unilever Indonesia, Tbk. They then represented Indonesia in the finals of the 2006 Asian MAKE study. For the second time, P.T. Unilever Indonesia successfully emerged as the winner in the 2006 Asian MAKE Study competition. Fourteen other Asian companies also received awards.

Thanks to the Indonesian MAKE Study, many Indonesian companies have been motivated to introduce KM applications in their own companies. Unilever Indonesia, Wijaya Karya, Bank Indonesia, and Exelcomindo Pratama are the four companies and institutions frequently visited by business representatives and non-business organizations for this benchmarking.

Knowledge Management Seminar: Implications for Organization and Governance

Concerns about the nation's future have encouraged the educational institution Sampoerna, ITB School of Business and Management, to conduct this seminar. At the beginning of the national crisis in 1997, Indonesia as a nation decided to undertake reforms in all sectors: politics, economy, and society. However, data show that Indonesia has not been able to improve its business infrastructure to attract prospective investors.

According to a survey conducted in 2006 by the World Bank and the International Finance Corporation, Indonesia was ranked 135th in the business incentives index, down from 131st in 2005. Despite improvements in various sectors of the Indonesian business environment, the country's achievements are not on a par with reforms undertaken in other countries, especially in the ASEAN region.

The lack of improvements in Indonesia's business sector has given rise to the movement Knowledge Governance Indonesia, which integrates human behavior, administrative processes, and smart hierarchical decision-making. This initiative is believed to have given rise to the emergence of a national knowledge management movement to smooth out the flow of national resources. Ultimately, a national knowledge management initiative can help improve national competitiveness. However, even a highly efficient government can only influence knowledge management effectiveness at the organizational level.

In addition, this seminar brings to the surface some considerations concerning the establishment of a knowledge management (KM) society that can become a continuous conduit for knowledge and empirical experience sharing. In time, it will expand learning experiences in order to develop the spirit of knowledge governance as well as foster the existence of a learning organization.

KM CHAMPIONS

Business Sector

Dunamis Organization Services

Dunamis' efforts in the knowledge management area began with the establishment of the Jakarta Executive Learning Community (Jelcom) in 2002. This community is a members-only forum for executives of business organizations. Dunamis began to introduce KM through this community at its 10 annual meetings.

Dunamis' introduction of KM to the business community in Indonesia became even more significant when it was entrusted with the conduct of the Indonesian Most Admired Knowledge Enterprise (MAKE) Study by Teleos (an independent English language research institution in the knowledge management area, Teleos is the initiator and organizer of the Global MAKE Program). The Indonesian MAKE Study was carried out for the second time in 2006. It benchmarks how well KM is applied in business and non-business organizations. MAKE is the only KM organizational performance study available in Indonesia. Three organizations that garner the highest scores in this study automatically become Indonesia's representatives to the MAKE Asia Study.

As a result of this increasing awareness of KM, Dunamis subsequently established a special team to be in charge of this area. Dunamis has formally provided KM services in the country

since 2004, and currently this service takes the form of training, consulting, and assessment. Dunamis conducts various programs that serve as a means for introducing KM more widely throughout the country:

- Workshops: Becoming a Knowledge Worker, Knowledge Management for Managers, KM Blueprint Workshop.
- Consulting: Indonesian MAKE Study, KM Strategy Consulting.
- Assessment: KM Readiness Assessment.

KM Indonesia

KM Indonesia is an association of KM practitioners, observers, academicians, and experts who formally support the KM community in Indonesia. It originated from a mailing list that subsequently evolved into a formal group of communities and organizations.

KM Indonesia has emerged as a forum for communication, coordination, and consultation for all learning societies: business organizations, nonprofit institutions, academic institutions, experts, and practitioners of KM, including beginners who want to learn more about the concept. The Round Table Knowledge Management activity is a program of KM Indonesia aimed at developing an information network as well as an accurate and effective communication channel that is able to provide added value among KM practitioners.

Fostering trust in each other is encouraged in this society, based on the value of togetherness that gives rise to the formation of a network and a strategic alliance that is synergistic. Knowledge-sharing is the primary tool being used in popularizing KM in Indonesia.

Other than these, KM Indonesia has also sponsored seminars closely related to KM that include several companies sharing KM concepts and applications as well as promoting KM training conducted by LIPI.

Government Sector

Bank of Indonesia

The Bank of Indonesia (BI) has assisted the KM campaign in the public sector through cooperative undertakings with selected state- and privately-owned universities: Institut Teknologi Bandung, Universitas Brawijaya, Universitas Sam Ratulangi, and Universitas Udayana. The campaign model is presented through seminars designed to raise KM awareness in the wider community with topics such as "What is KM?" and "Why is KM needed by the community and organizations in Indonesia?"

In addition, BI encourages an academic discussion about KM through an essay-writing competition about KM that is open to the public.

Once they were selected as winners in the Indonesia MAKE Awards in 2005 and 2006, the initiators of KM in BI received special attention private business organizations as well as stateowned corporations. They are frequently invited to share their knowledge about KM.

Viewed internally, the campaign performed by BI on KM began in 2003, when the Information Management Special Unit (UKMI) was assigned to initiate the transformation of BI into a knowledge-based organization. UKMI prepared the appropriate sets of tools, including the work program and its organization. The change agents were chosen and appointed collectively and together they joined the OBP team (knowledge-based organization).

Various initiatives were undertaken in its implementation, for example, the Generic Main Performance Indicator (MPI)—Knowledge-sharing (K-Sharing), supported by the Lynx System, a system which was designed in-house to meet the learning needs of organizations and employees. Another example is when employees are encouraged to think of innovations while carrying out their duties through written work contests regarding the Information Management Innovation (IMOVATION), a reinforcement of the knowledge repository through implementation of the
Begawanship program (a codification of the knowledge possessed by employees approaching retirement through written or audiovisual means).

BI's high scores in the MAKE Study placed the Indonesian MAKE Awards as a bridge to establishing Indonesia as a knowledge-based nation. The practice of KM at BI and BI's enthusiasm in campaigning for KM demonstrates the other side of the coin for KM. When it was introduced, KM was considered to be only one of the management tools, together with the Learning Organization, Balanced Scorecard, CRM, SCM and the Malcolm Baldridge Criteria for Performance Excellence. Now, KM is believed to provide an added value for business organizations.

BI has opened the horizon for KM in Indonesia by popularizing KM as tool for the nation to use to gain prosperity and to improve the well-being of its people. KM is able to improve the performance of government institutions which act in the public interest. BI's change management platform extends until the year 2008, signifying an ongoing change process. Indonesia has, therefore, placed a significant expectation on BI and KM.

To address the change management process, BI has appointed 200 change agents who are stationed at headquarters as well as in the regions (BI has 27 task forces and 37 branches throughout Indonesia). A change agent is specially appointed to serve as a bridge or channel to ensure that the knowledge-sharing process is taking place in all BI's branches and task forces. The success or failure of the process will be highly dependent on the capability and competence of each change agent. Therefore, agents undergo through a very stringent process of recruitment and selection.

KM executors in Indonesia are hopeful that this process will be successfully implemented at BI so that it may spread to other government institutions as well as in private institutions. It is also expected to be the starting point toward a knowledge-based nation.

Indonesian Army

The Indonesian Army carries out KM initiatives within its organization. The echo of this internal KM dissemination subsequently inspired the Ministry of Defense and Security to adopt KM. Despite the fact that it is unknown in the outside world, the Indonesian Army has become a model government institution which applies KM. The Indonesian Army has initiated the application of KM by empowering its Educational Institution, which serves as the primary agency to train its human resources. All army personnel are trained in this institution. The present application of KM within the army has been initiated through the internalization and computerization of teaching materials at all of its educational institutions to facilitate access to explicit knowledge for in-depth studies, using support from available technology.

In addition, this effort is also expected to help develop a writing culture within the circle of military coaches, so that the ideas and results of their science development initiatives can be used as the basis for knowledge development.

The steps undertaken by the Indonesian Army are as follows:

- Identification of existing knowledge (both tacit and explicit) so that there is a knowledge map that records processes or practices relating to KM.
- Identification of infrastructure: teaching materials, library, intranet, internal communications, media, email, discussion forums, and digital library.

A change of culture takes place through the formulation of policies and recommendations. This is very important because the culture prevailing in the Indonesian Army is still very paternalistic in nature. The leader is very dominant in the internalization of the KM process in the Indonesian Army.

The National Police of the Republic Indonesia via the Officer Intermediate School

This facility will be developed into a Knowledge Center where knowledge at the Selapa (Officer Intermediate School) level will be managed appropriately so that it can be shared by all relevant parties who need it and have an interest in it, such as Student Officers, Gadik, Alumni, and various circles within and outside Selapa.

The Knowledge Center is one of the quality improvements being undertaken at Selapa. Other efforts being conducted are:

- 1. To foster care over quality and continuous quality improvement with the 3Q motto as the primary commitment of Selapa Polri: Educational Quality, Operational Quality, and Output Quality. Selapa has also promoted the use of Selapa Polri Pin "Sambada Dharma Manggala" to improve the quality of institutions and the educational system.
- 2. To adopt a sophisticated educational management model/guide in making a syllabus, teaching program system, teaching materials, personal paper work, intensification discussions, problem-solving discussions, management training level ii, seminars and unit simulation.
- 3. To implement the teaching and learning program using the case study method, with 70% devoted to the active student learning method and 30% to tutorials.

Lembaga Ilmu dan Pengetahuan Indonesia (LIPI or Indonesian Science and Knowledge)

LIPI activities are undertaken through knowledge management training programs, introducing KM practices through the knowledge-sharing forums of KM Indonesia and through various researches carried out within the KM context.

LIPI began performing KM research in 2002. Its intention is to transform LIPI into a knowledge-based organization. This initiative was proposed by the KM researchers at Pusat Dokumentasi dan Informasi Ilmiah (PDII or Center of Scientific Documents and Information). They are Bambang S, Hendro, Triyono, and Nasir. Their mission is to encourage all branches and units of LIPI to apply KM by 2007.

If LIPI is successful in implementing KM internally in its complete form, it can inspire other organizations to implement it also. LIPI, as a state-owned research institution, envisions itself to be a role model in the application of KM.

The training programs conducted by LIPI serve as a contribution to the state. Most of its training materials are about the sharing of programs which have been implemented by LIPI. This is LIPI's effort to promote KM to the Indonesian public.

The training conducted since 2005 is called Knowledge Management training. In addition, the PDII LIPI has conducted public training and in-house training activities. In January 2007, the PDII will release a book relating to KM. The authors are the four initiators of KM in LIPI.

Officer Intermediate School of POLRI (Police of Republic of Indonesia)

The policy established by the Chief of Police of the Republic of Indonesia, General Police Sutanto, to make the Officer Intermediate School of Polri (Selapa Polri) into a Center of Excellence has motivated this state agency to strive for its own quality improvement process. The qualities to be improved—the 3Q—are educational quality, operational quality, and output quality.

Brigadier General Police Drs. Budi Gunawan, SH. Msi. is the one who recommended the application of knowledge management as a method to establish a Center of Excellence.

One of initiatives recommended to apply the KM concept is the establishment of a knowledge center at Selapa, launched in December 2006 under the name Selapa Knowledge Center. It is expected to be the center of a Community of Practice, a place for gathering and sharing knowledge, experience, and research. It is equipped with a modern library, an internal portal, an Internet shop, a bookstore, a café, a meeting room, video conferencing, a discussion room, and an executive room. These facilities are intended to provide support for people wishing to know about the details of police and government, regardless of whether they are in Selapa or belong to other groups wishing to obtain knowledge through SKC. The main concept behind this SKC is that it must be the knowledge resource that should approach the users and not vice versa. This contradicts the concept of a knowledge center where it is the users who actively seek out the information or knowledge centers in order to obtain science/information/knowledge.

Educational Institutions

Institut Teknologi Bandung

A reputable institute located in Bandung has made available the concepts and application of KM to organizations and academic communities. ITB has established cooperation with other universities and non-business institutions to promote the KM concept through seminars and a sharing of best practices of organizations whose KM applications are well established. Through these seminars, ITB has endeavored to:

- 1. Share information about the research and application of KM (best practices), especially from companies or institutions that been successful in applying KM.
- Assist the industrial world in improving the performance and application of KM in their respective companies.
- 3. Develop a communication network among communities, academicians, and practitioners of KM in Indonesia.

In the forums conducted by ITB attended by hundreds of academics, business professionals, and bureaucrats, KM initiatives were seen as are not only important for the business world to address stiff market competition, but also relevant to public institutions because of the increasing demands from stakeholders for performance that is in line with democratic principles.

At ITB itself, the initiators of KM are not centralized. At present, several groups of ITB academics are campaigning for KM: the Industrial Management Specialty Group of the Faculty of Industrial Technology of ITB, the School of Business and Management of ITB, and the Knowledge Management and Research Group of ITB. The first and second groups promote KM through the forums mentioned above. The Knowledge Management Research Group (KMRG) of ITB has initiated a movement for developing a knowledge infrastructure based on KM. Through the web-based knowledge infrastructure, the expectation is to be able to link with educational, commercial and non-educational institutions in order to arrive at the national intellectualization process.

Universitas Indonesia

Universitas Indonesia (University of Indonesia, UI) is the first university to develop KM as one of its academic subjects. KM has been offered as a major at the postgraduate level in the Faculty of Psychology since 2004: human resources psychology and knowledge management. The main approach applied to this major is one of person as the operator and KM as the object. This is not to say, however, that the UI does not make note of the benefits provided by information technology for KM.

Selection of the Faculty of Psychology as the department which manages KM as a major presents a dilemma because it adheres to the principle of "knowledge is power," that is, if knowledge is shared (distributed), its owner's existence will lose its meaning, since if one is "forced" by the system to share knowledge, then one will feel coerced and will not fully share it. How can a person be willingly induced to implement a participative sharing of knowledge within an organization for mutual benefit, so that it becomes corporate knowledge in the form of

innovations? This is one of the principal problems confronting implementors of KM, one that can only be addressed by changing the behavior and attitude that work against knowledge-sharing. The Faculty of Psychology is believed by the management of UI to be the most appropriate faculty to manage this sector, considering that the weakness in the application of KM in Indonesia is due to the poor KM culture, especially in knowledge-sharing, caused by this attitudinal factor.

This program is also intended to prepare the knowledge workers of Indonesia—who are applying knowledge in their work—to confront the obstacles in implementing and aligning KM with the company's corporate strategy so that it will be able to compete in the knowledge economy arena of the 21st century.

Competencies of Human Resources Psychology and KM Graduates of UI

Graduates of UI are expected to:

- Be able to identify the opportunities obtained from the knowledge-based economy era.
- Be able to formulate corporate strategy into knowledge-based strategy.
- Be able to develop innovation within the organization by building mutual trust among individuals and developing a remuneration system that supports sharing and leads to the development of a knowledge-sharing culture.
- Be able to foster collaboration among members of a community.
- Be able to undertake good quality scientific research.

KM PRACTICES IN INDONESIA

Knowledge management in business non-business in Indonesia has entered a favorable stage. At present, especially for the business community, knowledge is viewed as a vital strategic resource and learning is a strategic capability for business organizations. As the initiator, the business sector apparently still serves as the main driver in developing KM in Indonesia.

The main stimulus is that Indonesian companies' existence and survival are greatly affected by the external environment, which must be monitored and any developments anticipated and followed up on. The external environment both provides opportunities and poses threats. The primary external development that significantly affects large companies in Indonesia is the ASEAN free trade agreement, which has presented new opportunities and challenges. There is the opportunity to become a regional performer in an industry, but on the other hand there is also the threat to becoming uncompetitive in one's own market within the country. Many companies have realized that knowledge is an influential but intangible asset for a company's existence, and some have proceeded to implement knowledge management within their own company circles.

In general, there are three KM approaches adopted by existing organizations in Indonesia.

Management of Explicit Knowledge: Knowledge as Object

Specific activities:

- Further development of information systems such as CRM, Content Management.
- Development of a KM portal.
- Knowledge repository.
- Question and answer (Dr. Know).
- Online library.
- Online discussions.

This approach is used by Anugrah Argon Medica (AAM) and by Telecommunication of Indonesia. AAM has provided employee access to facilitate reading of required materials,

Knowledge Management in Indonesia

considering it to be basic to the implementation of KM. This conversion from tacit knowledge into explicit knowledge is based on the systematic and proper file management of each properly documented project. Each leader is required to formulate strategies and ideas in the form of a work program and to perform best practices which will subsequently be documented to share with the rest of the company.

As another approach, P.T. Telkom implemented knowledge management by applying a model called Kampiun, intended as means of collaboration and sharing as well as an informal and transparent communication channel for obtaining knowledge required in fulfilling the business process of the company.

Optimization of Tacit Knowledge: Development of a Learning Organization, Knowledge as a Process

Specific activities:

- Formulation and implementation of a comprehensive employee development system.
- Development of leadership programs, in some cases by establishing a "corporate university."
- Provide the learning infrastructures and facilities.
- Encourage and facilitate the establishment of knowledge-sharing forums and discussion groups.

Many organizations in Indonesia refer to the Indonesian MAKE Study 2006 and use this approach in the application of KM within their organization. The group of banking companies is among these. For example, in the Bank Niaga, which was a winner of MAKE 2006, the status of the Learning Management Group (LMG), which previously was a department within the Human Resources Group that handled the application of KM in the organization, has been upgraded to a stand-alone division, at the same level with Human Resources. The development of knowledge management is geared specifically toward value addition for shareholders while at the same time achieving the objectives of Bank Niaga. In this context, KM is focused on achieving organizational growth, and priority is given to improving growth capacity, competitiveness, and improvement of organizational adaptability. Access to knowledge management is controlled by the Expert Panels and disseminated throughout the company through a highly information-technology-based model.

In addition to Bank Niaga, other companies that use this approach are Wijaya Karya (construction and building), Bank BCA, Bank Muamalat, Bank Danamon, Exelcomindo Pratama (Cellular Operator), Kompas Gramedia Group (printed media), and Bintang Toedjoe (consumer goods).

Development and Implementation of Knowledge Strategy

Specific activities:

- Formulation and implementation of knowledge management strategies which can support business strategies.
- Development of a learning and sharing culture through a comprehensive campaign.

KM as a strategy can be clearly seen in the case of Unilever Indonesia, the defending champion of the Indonesian MAKE and the Asian MAKE since 2005. Unilever realized the importance of KM in maintaining its business performance. Unilever began performing retrospective activities in 2003. Data on experiences in handling Unilever products, especially the ones that failed, was gathered from the Executive Team (from the leader down to the team members).

Personnel from the Learning Center Division provided a list of questions (maximum of 10) in relation to the entire process as it was experienced. This information was recorded and documented and subsequently made into a document which was then sent to parties that required it. It is also entered into their knowledge repository so that it may be accessed by anyone wishing to learn from the failure (in order not to repeat it).

Unilever has also just conducted some experience-sharing groups, such as the K-Club (business experience sharing program in the form of a talk show), Group of Learning and Development (sharing forum among junior employees), Book Club (knowledge-sharing regarding the contents of a book followed by a discussion, the result of which is subsequently documented in the intranet page of the K-Club), and Video Café (discussion on a topic which is led by a guide using video to facilitate the discussion).

Since 2001, Unilever has conducted the Learning Award program in order to encourage the establishment of a learning culture. The Learning Award is a point-award program for each employee who makes time to share knowledge and experience with coworkers (including K-Club and Book Club). Points collected have a certain value which may be exchanged for a non-monetary prize from the company, either as a voucher or in some other form. Those who amass the most number of points within a year will receive an award in the form of paid travel abroad. This type of prize is also provided to second and third place winners.

Prizes for the Learning Award are only some of the means used by Unilever as motivation toward the ultimate objective: building a knowledge-sharing culture in the company and using knowledge in their work. Lately, the learning and sharing spirit has been seen at work at Unilever, both at the head office and at its factories: in 2001, only 30 employees were involved in sharing. This year that number had increased to 260.

Learning and sharing activities were initiated by Unilever with their Sharing of Learning and Results (SOLAR), begun in 1998 and conducted every Friday afternoon. This program invites personnel from within the company or external parties to share either a general topic about life or life values or something directly related to work or best practices.

Unilever benefits from these learning and sharing activities in a significant savings in its training budget. The culture and the process of sharing and using knowledge at work has been successfully revived in a pleasant atmosphere (not only through classroom training), which results in even more satisfactory results for the company.

Other companies also use KM within their organizations in a similar manner: Astra International, Bank Indonesia, Medco Energy, and Petroleum Indonesia.

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INTRODUCTION

The Republic of Korea's economic development over the past decades has been phenomenal, by any measure. In about two generations, from 1962 to 2005, the Republic of Korea's Gross National Income (GNI) increased from USD2.3 billion to USD786.8 billion, with its per capita GNI soaring from USD87 to about USD16,291. The country has established itself as a leader in a large number of industries, including shipbuilding, electronics, semi-conductors, and automobiles.

The country's economic success, however, has not been without difficulties. The economic crisis that began in late 1997 was the most notable one. This crisis, which roiled markets all across Asia, raised doubts as to the country's ability to continue its economic progress. The Republic of Korea, however, turned this crisis into an opportunity to implement comprehensive reform measures that were primarily intended to integrate the Republic of Korea into the world economy and to create an economic structure suitable for an advanced economy.

Information Technology (IT) is a strategic area that the government has identified for these purposes. Since the Asian financial crisis, the country has increased investments in IT industries and IT infrastructure. The country was one of the first in the world to connect the entire country with an information superhighway, which was accomplished by the year 2000. High-speed Internet subscribers numbered only 10,000 back in 1998. As of January 2007, the number of users totalled over 14 million households, or roughly 88% of the entire population. The development of the IT industry in the Republic of Korea has not only been the role model for developing countries, it has also been spotlighted by developed countries. The IT industry is widely believed to be a key success factor in overcoming the crisis of 1997 and in bringing the country into further economic prosperity.

The rapid transformation on a massive scale of the country's economy following the financial crisis presented formidable challenges to the government, business organizations, and individuals. Many, if not most, of the traditional beliefs, operational procedures, and behavioral principles have changed, practically overnight; old habits had to be rapidly replaced with new knowledge. Organizations were forced to enter the race to acquire and to train the human resources that the changing times required. The competition for knowledge had begun.

The IT infrastructure offered innovative new opportunities for organizations to manage knowledge. These organizations found it only natural to exploit the unique advantages of IT technologies to facilitate knowledge management (KM). The early adoption phase of KM in the Republic of Korea, therefore, coincided closely with IT implementation. In many cases, IT technologies were heavily utilized, especially during the early days of KM.

Nonetheless, it should be understood that IT technologies by themselves are not a sufficient means for effective KM. Neither should it be interpreted that IT technologies are even a requirement for KM. IT certainly has the potential to facilitate the effective management of knowledge, but it is surely possible to have effective KM without complicated IT systems. In many cases, excessive or blind dependence on IT technologies to management KM resulted in disappointing failures.

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In this study, we will discuss KM in the Republic of Korea. Specifically, we will attempt to:

- 1. Accurately assess the status of KM in the country.
- 2. Identify the success factors.
- 3. Identify success and horror stories to be shared with member countries.

The experience of the Republic of Korea over the past decade should provide interesting and valuable lessons as to how knowledge and knowledge management can facilitate the economic achievements of a country as well as an organization.

PROMOTION OF KM

Status of KM vis-à-vis Other Management Tools and Initiatives

KM in the Republic of Korea is now well accepted as a key enabler in enhancing a company's competitiveness. Recognizing the importance of knowledge and knowledge utilization became a major goal of the Korean government as it sought to transform the country into a "knowledge-based state," as it declared in 1998. At the national level, a number of knowledge and knowledge management initiatives are currently being implemented.

During the early days of KM, it had evolved separately from other management tools and initiatives (first and second generations). While the importance of knowledge and knowledge management had been widely recognized, most organizations were not aware that KM can and should be integrated into their core activities. Korean organizations are beginning to realize, however, that the potential of KM can be fully exploited with its total integration into business/management processes (third generation KM). Taking advantage of an effective IT infrastructure, many organizations are currently employing KM in conjunction with various management and innovation tools/initiatives.

The shift to third generation KM is quite apparent among the larger organizations, especially those affiliated with *chaebol*, large business groups. As will be further explained below, these companies are actively integrating KM into their core business operations, and as a result they utilize KM in coordination with other management tools and initiatives, such as the Six Sigma.

The efforts of organizations in the Republic of Korea are increasingly being recognized by the international KM community. As an example, Korean organizations first appeared on the global Most Admired Knowledge Enterprises (MAKE) list in 2004. As of 2006, Samsung and LG, the two largest Korean *chaebol* groups, were also included in the Global MAKE list.

At the government level, considerable emphasis is placed on "e-government initiatives," establishing infrastructure for the next step: to transform itself into a "knowledge government." The "e-government" program in the Republic of Korea is built upon the Master Plan for Information Promotion and Cyber Korea 21 projects in the 1990s. In 2001, a national vision for building a knowledge-based information society was announced. The e-government initiatives were established with three primary objectives:

- 1. To raise the standard of government-wide services to the highest satisfaction levels in terms of quality.
- 2. To create a market-based government with IT based services that fully support private businesses, e.g., e-commerce between the public and private sectors.
- 3. To deliver real-time, interactive government services to maximize efficiency, transparency, and equity.

The e-government initiatives were implemented with three policy guidelines:

- 1. Single window e-government.
- 2. Information sharing system.
- 3. Single operating infrastructure.

These policy guidelines were enforced with rigor and provided invaluable bases for the next step of knowledge government (Figure 1).



Figure 1. Stages of KM Progress

The concept of knowledge government is to build upon the IT-based infrastructure for improved knowledge generation, storage, and sharing at all levels (Figure 2). Most government agencies in the Republic of Korea have already established second-generation KMS and are contemplating the move to third-generation KM.



Figure 2. Concept of e-Government in the Republic of Korea

How KM is Defined or Understood

Knowledge is a broad concept. Narrowly defined, knowledge includes 1) any tangible and/or intangible outcome of work, successful or not, and 2) any lessons and/or insights with or without readily available additional applications. During the initial stage (first generation KM), knowledge primarily refers to the former. Naturally, first-generation KM mainly focuses on effective and efficient sharing of individual works. Typical examples include file sharing systems and electronic document management systems (EDMS).

Second generation KM focuses more on the latter component. IT-based KMS has proven to be one of the most effective tools for capturing lessons and insights, which are not the actual work results. During the past decade, IT-based KMS has been the most popular initiative for KM in the Republic of Korea. Any new knowledge, separate from work results, is expected to be written up in a report and stored in the KMS for further utilization.

KM initiatives at this time were often blind adoptions of IT-based and packaged commercial KM solutions. Many Korean organizations, aware of the importance of knowledge and KM, rushed to implement IT-based KM systems. Most of the KM systems at this time, however, were based on the second-generation concept.

Recent years have seen leading KM organizations to move into third-generation KM initiatives. The most distinctive characteristic of this is that knowledge is no longer separate from work results or work processes. Knowledge created throughout the work processes is automatically (and often without conscious awareness of the workers) stored, analyzed, and provided to the worker at a time when that knowledge can be most appropriately utilized.

As such, KM is now an integral part of IT-based Real Time Enterprise (RTE) realization and serves as a key enabler of continuous workplace innovations. Knowledge, therefore, is beginning to be understood not as a separate asset, but as a fully integrated component for organizational performance enhancement.

National Business and Economic Contexts of KM Practice

Recognizing the importance of KM, the government took a leading role to facilitate knowledge in the Republic of Korea for the country to become a knowledge-based economy. As briefly introduced above, the government has played a central role in transforming the country into an IT power. Four areas of government initiatives are:

- 1. IT infrastructure.
- 2. R&D capability.
- 3. Knowledge-based new industries.
- 4. Knowledge-compatible human resources.

The Korean government has made sizeable investments in the IT infrastructure since the late 1990s. The country was the first to have made high-speed Internet access available to almost 100% of the households in the country. It also was one of the first to provide broadband wireless connection services throughout the country. At the same time, it has also invested heavily to develop IT-savvy human resources.

The government has been implementing various projects to achieve these policy goals. Its goal can be summarized as: 1) facilitating world-class knowledge creation, and 2) increasing the average knowledge level of the country throughout all sectors.

How KM is Promoted and Disseminated

As laid out in the government policy goals, the basic means of KM promotion and dissemination is through IT, either directly or indirectly. This is intended to exploit the country's unique strength; the IT infrastructure in the Republic of Korea is one of the very best in the world. The typical KM process of knowledge creation \rightarrow accumulation \rightarrow sharing \rightarrow utilization \rightarrow recreation can be most effectively exploited through IT. Naturally, almost all KM initiatives have some IT components. The government has therefore invested heavily in establishing advanced IT infrastructure throughout the country. High-speed internet access is already available to every citizen in the country, and the wireless broadband internet standard (WiBro) is expanding IT access to a new level.

Leading companies are already taking advantage of wireless Internet access to further their work processes and KM initiatives. Insurance companies are the most widely recognized. Through mobile devices, including notebooks and PDA phones, insurance adjusters are in continuous contact with organizational knowledge centers in all phases and places of their work, whether accident locations, hospitals, service shops, or police stations. This clearly is the most recent, innovative step in the realization of RTE in the true sense, and it depends heavily on KM.

The public sector is much slower than business organizations in adopting KM. Crudely put, the business sector often has the single most important goal of profit and is willing to adopt new tools and ideas to further this purpose.

The successes of business organizations, however, are actively shared with the public sector as well as other organizations. Many organizations, most notably academic and research organizations, are active in recognizing the achievements of the leading KM organizations. The Korea Productivity Center is one example.

Leading Promoters, Champions, or Lead Institutions

The government is active in creating, supporting, and monitoring KM developments in the Republic of Korea. To facilitate KM development, the government has introduced quite a few incentives, such as tax benefits for IT investments and solution development, training/educational support, and funding knowledge-creating research. Indirectly, the government stresses the importance of KM through annual KM awards in cooperation with research organizations like the Korea Productivity Center.

More direct attempts are carried out through academic and other research organizations. The KM Research Consortium (KMRC), for example, includes both KM researchers and practitioners sharing all aspects of KM application. Trade associations and executive training programs also emphasize the importance of KM in organizational effectiveness. These attempts raise awareness among executives of the importance of KM as well as the most recent developments in KM methodologies.

Leading business newspapers and research institutes are cooperating extensively to promote KM by various means, the most notable of which is to emphasize KM's impact on business performance enhancement.

OVERVIEW OF KM PRACTICES

As explained above, KM practices in the Republic of Korea have gone through distinctive phases that coincide closely with progress in IT.

During the early days of KM, knowledge was defined rather narrowly; major emphasis was placed on sharing data and work results within organizations (first-generation KM) through local area networks (LAN), the early phase of networking and email.

This was soon replaced by second-generation KM, whose most distinctive tools include ITbased knowledge management systems (KMS). The definition of knowledge was widened to include any new lessons learned from successes and failures. The importance of systematic knowledge accumulation for easy future reference was recognized. KMS has appeared to effectively manage knowledge accumulation and the search for reutilization. Jargon like the knowledge map (K-Map) appeared to address the needs of knowledge classification and taxonomy.

Other challenges include the need to encourage organizational members to prepare their newly acquired knowledge into distinctive reports with keywords and to submit them to the KMS; the so called "mileage system" was developed for this purpose.

The greatest challenge of second-generation KM is, however, that the knowledge must be written up into a report before it can be stored in the KMS. This is clearly a separate activity from the organizational members' primary responsibilities and, as a result, many found preparing separate documents for KMS burdensome. Furthermore, KMS is found to be a rather ineffective means of knowledge utilization, simply because when you need the knowledge most, you usually do not have time to search through KMS.

Many organizations are still struggling with these challenges, while a few leaders have moved into third-generation KM. A notable example can be found at Samsung, where knowledge is captured and stored without additional preparation. This is made possible by integrating KM into work processes.

Distinguishing Features of Companies Implementing KM

The distinctive features of third-generation KM are perhaps best illustrated at the Samsung Advanced Institute of Technology (SAIT), the research arm of the Samsung Group of Companies. SAIT has been implementing KM initiatives since 1999 and has quite successfully transformed itself into a leading KM organization in the Republic of Korea. SAIT has embedded its research process into IT and through further alignment of its process with KM and Six Sigma methodologies. The research process is broken into distinctive stages, and critical knowledge components have been identified at every stage. The knowledge created throughout the research process is now automatically stored in KMS without any additional preparations. As such, knowledge creation, accumulation, and reutilization are extremely well organized to enhance research productivity. The Samsung SAIT case study, included in this volume, provided further details.

Other organizations are currently beginning to move into third-generation KM. It must be noted, however, that this generation of KM initiatives is not independent of the preceding generations. Second-generation systems, such as KMS and other culture/change management-oriented initiatives, continue to serve as indispensable backbones. Most notably, communities of practice CoPs are frequently recognized as a critical component of a successful KM system. In recent years, CoPs have received broad attention as an important KM enabler. CoPs typically consist of members from all over the organization, regardless of their formal positions and immediate responsibilities. Exchanging ideas freely from diverse perspectives, CoPs are now commonly accepted to be uniquely valuable in generating, sharing, and validating key knowledge. SAIT, POSCO, and SK are often considered to be model examples of successful CoPs.

Korean organizations are also implementing various KM initiatives, and further details will be provided through the APO project.

Reasons for Adoption and the Decision-Making Processes

KM is widely accepted as an effective means of performance enhancement. Success stories are distributed via media, the popular press, and testimonials. Among the larger organizations and many, if not most, small- and medium-sized organizations in the Republic of Korea, it is rare not to see at least some KM efforts made. Thus current decisions on KM center less on whether or why investments should be made on KM than on what, how, and when they should be made. The Republic of Korea had already witnessed major investments in second-generation KM initiatives, most typically IT-based KMS. Unfortunately, however, the limitations and

increased burdens of KMS have resulted, in many organizations, in less-than-expected performance improvements.

The leading organizations are by now fully aware that KM is an endless journey to continuously improve organizational effectiveness via knowledge. These organizations now strive to integrate KM into their management practices and processes.

Company-wide Preparedness and Preparations

As most organizations in the Republic of Korea recognize the importance of KM and have already implemented at least some KM initiatives, the necessity of KM is no longer an issue. Experience tells us, however, that the relative effectiveness or success of KM depends on change management. Knowledge, at least in some cases, has long existed in a less codified format. Many people still feel uncomfortable about fully revealing what they know, for fear of reducing the possibility of using their knowledge as leverage against their employers. In many cases, the strong tradition of relying more on oral and informal communications to transfer knowledge makes people uncomfortable when preparing written documentation of their knowledge. The leading KM organizations have successfully overcome these challenges, but most organizations are still incurring serious costs in time and money to facilitate behavioral changes.

Training

Various attempts have been made to facilitate the implementation of KM initiatives. As most organizations have been implementing KM for quite some time, general awareness training programs are no longer in great demand. Rather, specific user training programs are provided as each KM initiative is introduced.

As KM initiatives are being integrated into management processes and KM itself becomes an important innovation tool, specific training programs exclusively for KM purposes are beginning to disappear.

KM Audit, Assessment, or Review Processes

In recent years there has been an increasing attention to measuring knowledge management (KM) contributions to organizational performance. Robust measures of KM effectiveness pave the way for a better understanding of the relationship between KM activities and business performances within the organization. The implementation of appropriate KM measures, therefore, ensures that an organization will be able to better manage its KM activities and steer its KM activities to realize maximum business performance.

Nonetheless, previous efforts on KM measurements have concentrated mainly on revenuegenerating for-profit organizations. Given that the majority of early KM adopters were interested in the role of knowledge in enhancing their business capabilities to compete in a knowledge-intensive economy, this is certainly understandable. As a result, KM measures in relation to the organization's sales or revenues have received wide attention. As the value of KM becomes increasingly apparent, however, organizations whose primary responsibilities do not include revenue or profit maximization have also begun to pursue KM activities. The traditional KM measures of relating KM effectiveness with revenues or profits would obviously not be readily applicable to such organizations; new and additional measures have become necessary.

Here again, SAIT offers a good example. SAIT developed a conceptual framework to measure KM effectiveness in the absence of direct business performance responsibilities. The process begins with the identification of SAIT's business objectives. Logical relationships between the business objectives and various KM performances are then developed. KM performance metrics capture proven measures of KM effectiveness, supporting business performance achievements. Points 1, 2, and 3 in Figure 3, in turn, present operational KM factors, a

combination of which would enhance KM performances. As such, the framework as presented here borrows heavily from the Balanced Scorecard (BSC) methodology, but has been adapted for an organization without direct sales-generating responsibilities.

SAIT identified three key KM performance metrics: patent, business applicability, and R&D effectiveness. Patents are generally recognized as an acceptable measure of technological innovation. It is also generally accepted, however, that not all patents are equally innovative. As such, SAIT adopted both quantity and quality of patents as key KM performance metrics. Business applicability is a measure of commercialization or business performance results of a technological breakthrough. R&D effectiveness measures the extent of value added and time saved in the entire R&D process. In other words, it measures both R&D effectiveness, in terms of value, and efficiency, in terms of time.



Figure 3. KM Metrics at SAIT

KM performance metrics are in close causal relationship with three sets of operational KM factors which affect one another and, in combination, influence key KM performance measures. Collaboration is a good example. Close interactions with customers and the external expert community are becoming increasingly important to enhance the chances of successful commer-

cialization, patent, as well as R&D effectiveness. The process, as presented in Figure 3, is adopted to integrate and simplify, while maintaining the integrity and usefulness of the measures. The 26 preliminary measures that SAIT initially identified were eventually integrated into seven key KM indices: patent, commercialization, research efficiency, core knowledge, customer satisfaction, fusion and synergy, and idea generation.

Most of the seven indices contain portions of the three KM factors: core knowledge, knowledge cycle, and KM infrastructure. Again using collaboration as an example, CoP activities with customers and/or an external expert community first enhance core knowledge identification. Once identified, core knowledge, through CoP, is shared across and within SAIT boundaries, resulting in an improved knowledge cycle. As the knowledge travels through knowledge cycles, it gets further refined, increasing the probability of successful commercialization. Increases in CoP and other collaboration activities create corresponding increases in the KM infrastructure. Thus, various aspects of collaboration, including CoP activities, are systematically integrated for a composite collaboration measure. Other measures are similarly developed to address other aspects of KM activities at SAIT. These measures form the bases of the seven final KM performance indices.

The adoption of numeric indices has proven to be quite valuable in enhancing KM effectiveness at SAIT. SAIT's experiences demonstrate that accurate measurement of KM activities is not only possible but also important in improving KM activities in organizations without direct revenues or profit responsibilities. In this regard, the case of SAIT addresses an important aspect of KM measurement which has not received much attention thus far. As KM is now beginning to be adopted in more organizations whose primary concern does not include revenues or profit maximization, the implication presented in this article should provide meaningful information.

The case of SAIT has been closely studied by other organizations, and certain aspects are actively being adapted to fit their respective requirements.

Other Preparations

KM in the Republic of Korea has often been implemented as part of IT. In many cases, therefore, KM initiatives required that substantial IT infrastructure be in place. The capabilities of IT, especially in terms of networking organizational members to an unprecedented extent, was (and to a certain extent, still is) a serious cultural shock. Cross-functional communication is not only possible but also required to fully exploit the potentials of KM. This created a subtle but significant need to adapt individual behavior and communication patterns.

As knowledge is systematically collected and stored, the need to evaluate the relative value and accuracy of each submitted or registered knowledge increases accordingly. This, in turn, makes it necessary to evaluate individual competence and expertise in fields of specialization. In many organizations, this need resulted in the creation of objective capability indices, further enhancing the impact of KM.

Changes or Adjustments during KM Implementation

KM, however much supported by IT or other means, is inherently a human and behavioral process. As such, successful KM must reflect each country's cultural and behavioral specificities.

Korean organizations have generally made two adjustments during KM implementation: individual recognition and strict mandatory policy. Both of these adjustments reflect Korean cultural characteristics. Koreans are traditionally known to be shy and to find comfort in anonymity within groups; they are mostly hesitant to stand out voluntarily. This does not mean, however, that they prefer to remain silent or hidden all the time. They would rather be recognized than actively draw attention to themselves. Reflecting these cultural characteristics, Korean organizations tend to build their systems in such a way that excellence may be systematically recognized

and attributed to specific individuals. In this manner, individual contributions and expertise may be "systematically" recognized, without attention being actively drawn to an individual.

The second adjustment reflects Koreans' traditional style of communication. As a strongly homogeneous country, Koreans tend to prefer face-to-face and implicit communication styles. "Reading each other's eyes" is a common expression in the Republic of Korea, which does not necessarily help in the systematic accumulation and sharing of knowledge on a large scale. Without being addressed, this might hinder the effective management and utilization of knowledge. To avoid this risk, Korean organizations tend to establish strict mandatory policies for KM: everyone, without exception, has to submit knowledge in a standard format. While this is more of a change management issue, it is central for the successful KM establishment in the Republic of Korea.

KM for Operational Efficiency versus KM for Innovating New Products, Processes, or Markets

KM initiatives in the Republic of Korea have proven to be effective both in operational efficiency enhancement and in innovation facilitation. Success stories are abundant for both cases, as illustrated in the two case studies included in this study. It seems clear by now that operational efficiency enhancement and innovation facilitation have become truly inseparable; even if one wanted to, it would be difficult to obtain one without the other.

The basic concept of KM as implemented in Samsung and SK stresses that KM is a continuous learning process through which knowledge created by top performers is continuously transferred to the rest of the employees within the organization. That knowledge may include improved ways of doing business, in which case the benefits would primarily be efficiency enhancement. Conversely, the knowledge may also be improved ways of reducing lead time in new product development, in which case the benefits would be innovation facilitation. As the new environment of the 21st century requires speed in business, KM is clearly making meaningful contributions for Korean organizations to sustain critical competitive advantages in the global marketplace.

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INTRODUCTION

Malaysia's journey towards becoming a knowledge-based (K-based) economy began when Vision 2020 was launched in February 1991. The vision committed Malaysia to becoming "an economy driven by brain power, skills, and diligence, in possession of a wealth of information." The National Information Technology Agenda (NITA) and the inception of the Multimedia Super Corridor (MSC) were the next significant steps taken. NITA aimed to foster the development of information technology (IT) as a strategic enabler of dynamic economic growth. The MSC was designed to be an engine of economic growth for the 21st century and for the country to become a "K-based economy within an economy." Both projects sought to bring Malaysia into the knowledge-intensive, high-technology era through a number of important demonstrator and flagship applications, culminating in the emergence of a knowledge society by 2020.

PROMOTION OF KM

Promotion of KM in Malaysia began with the establishment in 1996 of the Multimedia Super Corridor (MSC), an initiative taken by the Malaysian government to leapfrog the country's development through the creation of an ideal multimedia environment for world-class companies to use as a regional hub. The MSC was developed specifically to explore the frontiers of information and multimedia technology, revealing its full potential through the creation and implementation of cyberlaws, cutting-edge technologies, and excellent infrastructure (MDC, 2005). MSC is managed by the Multi-media Development Corporation (MDC). It is probably the first Malaysian organization to endorse KM as an integral part of its organization and to integrate KM programs in a structured and organized way. It was also the first organization in Malaysia to appoint a chief knowledge officer (CKO) in 1999, when a KM department was established at the MDC. Moreover, MSC status companies are intended to propel the country into becoming a knowledge-based nation, and therefore, by default, they are knowledge-intensive organizations.

MALAYSIA'S KNOWLEDGE-BASED ECONOMY DEVELOPMENT INDEX

The knowledge-based economy development index (KDI) (Figure 1) was developed by the government to monitor the progress of the economy towards becoming more knowledge-based. The KDI was evolved to assess Malaysia's readiness to become a knowledge-based economy. It also compares Malaysia's position relative to 21 other countries, primarily developed ones. The KDI is derived from selected key factors required to drive a knowledge-based economy: computer infrastructure, information infrastructure, education, and training as well as research and development (R&D) and technology. The overall KDI increased by 591 points from 2,413 in 2000 to 3,004 in 2005 with improvements recorded in all areas, as shown in Figure 1. The most significant improvement was in computer infrastructure, which registered an increase of 196.4% in terms of scores between 2000 and 2005, followed by R&D and technology at 25.9% and education and training at 22.9%. In terms of KDI by countries, Malaysia was 17th in 2005.



Figure 1. The Knowledge-based Economy Development Index, Malaysia, 2000 & 2005

An assessment of the country's knowledge readiness based on the level of knowledge content¹ was also undertaken across 10 manufacturing and eight service industries. It was found that all the industries that were assessed were those that had established a certain level of knowledge competency and capability as well as those that had embarked on some form of knowledge acquisition, generation and sharing activities. Overall, the information technology services, chemical, telecommunications, tertiary education and financial service industries exhibited better knowledge readiness. In terms of knowledge enablers, all these industries were generally better with respect to their technology and information infrastructure, and in providing a supportive knowledge leadership. In terms of knowledge actions, all industries performed well with respect to knowledge utilization, moderately well for knowledge-sharing and acquisition but were generally weak in knowledge generation.

UTILIZATION OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

Recognizing the strategic role of information and communications technology (ICT), in enhancing productivity and competitiveness, investments in ICT expanded at an average annual growth rate of 4.7%. The ICT expenditure in the various economic sectors contributed to the extensive build-up of improved ICT systems and processes as well as in the development of more web-based applications, increasing productivity and efficiency levels. In terms of ICT adoption, the number of personal computers installed almost doubled from 9.4 per 100 population to 21.8 in 2005 while Internet dial-up subscriptions increased from 7.1 per 100 population in 2000 to 13.9 in 2005, as shown in Table 1.

¹ The assessment was based on a survey of 1,819 firms undertaken in 2003. A total of 21 high-powered variables reflecting knowledge enablers and actions were used to assess the level of knowledge content of selected industries. The results were extracted from the Knowledge Content in the Key Economic Sectors Report, 2004.

		RM million			% of Tota	1	Average Annual Growth Rate (%)
Sector	2	000 2004 2003	5 ^e	2000	2004	2005	2001-05
Agriculture	200	128	138	0.8	0.4	0.4	-7.2
Mining	222	224	234	0.9	0.7	0.7	1.1
Manufacturing	12,188	13,652	14,367	47.5	45.6	44.6	3.3
Utilities	378	430	470	1.5	1.4	1.5	4.5
Construction	112	126	135	0.4	0.4	0.4	3.8
Wholesale and retail trade	1,585	1,735	1,870	6.2	5.8	5.8	3.4
Transport and communications ¹	1,221	1,581	1,770	4.8	5.3	5.5	7.7
Finance and business services	1,894	2,563	2,845	7.4	8.6	8.8	8.5
Other services ²	140	62	70	0.5	0.2	0.2	-12.9
Government	1,389	1,981	2,245	5.4	6.6	7.0	10.1
Consumer	6,314	7,440	8,104	24.6	24.9	25.1	5.1
Total	25,643	29,922	32,248	100.0	100.0	100.0	4.7

Table 1. ICT Expenditure by Sector, 2000-05

Source: World Information Technology and Services Alliance (WITSA)

¹ Includes telecommunications services.

² Includes businesses providing personal, repair, cultural, recreation and entertainment, healthcare, legal, education, social, and professional services.

^e Estimates.

Estimates.

PROMOTING E-COMMERCE

As e-commerce presented opportunities for businesses to increase productivity and improve competitiveness, its development was further intensified through the establishment of the requisite infrastructure, which included the setting up and promotion of various electronic transaction mechanisms. The involvement of the private sector, primarily financial institutions and industry associations, was significant in the establishment of financial exchanges for business-to-business (B2B) and business-to-consumer (B2C) online transactions.

A number of action plans under the Internet banking services and the Multimedia Super Corridor (MSC) e-Business Program were piloted to further promote the e-mode of communications and transactions through secure B2B and B2C online business transactions, especially for small- and medium-scale enterprises (SMEs). In addition, to promote the uptake of e-commerce as well as to address concerns relating to consumer protection and security of information, measures were taken to enact new legislation. These included the Electronic Transaction Bill, the Electronic Government Activities Bill, and the Personal Data Protection Bill, which are currently in preparation (Ninth Malaysia Plan 2006–10).

ICT SKILLS

As part of efforts to move the nation towards a knowledge-based work culture, human resource development continued to be a critical aspect of Malaysia's strategy and initiative for ICT. In order to meet the rising demand for highly skilled computer workers—computer system designers and analysts, computer programmers, and computer support technicians—the 48 MSC-status institutions of higher education produced more than 31,000 ICT graduates as of

2005. Various programs were initiated to encourage these institutions as well as other training institutions to work with industries to ensure relevancy and marketability of skills acquired.

Despite the rigorous efforts of the education and training sector, the MSC Impact Survey 2005 indicated a shortage of ICT-related personnel in specialized areas indicating a mismatch in the supply of and demand for practical skill sets required by the industry. Two pilot schemes, the Undergraduate Skills Program and the MSC Internship Program for new ICT graduates, provided advanced skills training as well as re-training and re-skilling to more than 2,000 participants.

Apart from specific institutional training, continuous industry wide in-service skills upgrading and advanced training also contributed to the enhancement of ICT knowledge and skill levels of the workforce. Under the Human Resource Development Fund (HRDF), MYR176 million was disbursed for ICT-related training at 227 training centers nationwide.

E-GOVERNMENT

To accelerate the objectives of Vision 2020 to transform Malaysia into a knowledge-based society, a strategy has already been defined through seven innovative flagship applications. These applications are engineered to jump-start the MSC Malaysia initiative and to create a multimedia utopia for innovative producers and users of multimedia technology. Consortia of both local and foreign companies work with various government agencies to enhance the socio-economic development of Malaysia. The Multimedia Super Corridor offers a Malaysian initiative for the Information Age. The flagship applications are:

- Electronic government.
- Multi-purpose card.
- Smart school.
- Telehealth.
- R&D Clusters.
- E-Business.
- Technopreneur development.

The electronic government initiative was launched to lead the country into the information age. It is expected to improve both how the government operates internally as well as how it delivers services to the people of Malaysia. It seeks to improve the convenience, accessibility, and quality of interactions with citizens and businesses. Simultaneously, it will improve information flow and processes within the government to improve the speed and quality of policy development, coordination, and enforcement.

The vision of an electronic government is a vision for government, businesses, and citizenry working together for the benefit of Malaysia and all of its citizens. The vision focuses on the government effectively and efficiently delivering services to the people of Malaysia, enabling the government to become more responsive to the needs of its citizens.

The seven pilot projects of the electronic government flagship application are:

- Project Monitoring System (SPP II).
- Human Resource Management Information System (HRMIS).
- Generic Office Environment (GOE).
- Electronic Procurement (EP) (www.eperolehan.com.my).
- Electronic Services (E-Services) (www.eservices.com.my).
- Electronic Labor Exchange (ELX) (www.elx.gov.my).
- E-Syariah (www.esyariah.gov.my).

The myGovernment Portal (www.gov.my) acts as the one-stop source of Malaysian government information and services for its citizens.

OVERVIEW OF KM PRACTICES

KM practices are widely implemented in the public and private sectors in Malaysia. The issue is whether organizations have implemented KM explicitly. In other words, do they have a systematic KM approach in place? Or implicitly, where no proper guidelines or systems have been established yet, are some KM activities already being practiced? KM systems are usually implemented by large enterprises or multinationals, whereas small- and medium-size enterprises (SME) seldom have KM systems. However, some of them try to link human resource management (HRM) to achieving knowledge management and also to understand the critical success factors in KM.

Contribution of HRM Activities Towards KM Practices

Knowledge must first be created before it can be managed in an organization. The knowledge creation process demands the interaction and involvement of people, technology, and information. Salleh and Goh (2002) conducted a survey of managerial-level employees of Malaysian companies in four areas of HRM: training, decision-making, performance appraisal, and reward and compensation. From the results, it appears that if a company wants to become a knowledge-based organization, it must begin with quality training. Keeping in mind that companies are now increasingly concerned with customer retention, this can only be realized by ensuring customer satisfaction regarding the company's products and services. Thus, establishing a quality culture among employees is a basic requirement. When management and employees acquire a general understanding of quality concepts, they themselves will initiate the organizational learning process that will lead to continuous improvement. Furthermore, having a company-specific quality concept and definition will generate a concerted and properly focused improvement program. If a company has already achieved a certain quality standard, then knowledge creation can be achieved by promoting employee creativity and excellence.

Survey results have shown that training (empowerment and team-building) that is related to creativity is significant in the facilitation of knowledge documentation, knowledge transfer, and knowledge creation. Empowerment is a driver of knowledge creation because empowering people gives them a sense of power and authority, thus giving them more room to innovate and explore new possibilities. Empirical studies reveal that managers who distrust their subordinates and do not delegate often leave the employees demoralized (McClelland 1995). Team-building training is also needed; apart from imparting skills and techniques for more effective cooperation and collaboration, it can enhance group emotional intelligence which produces trust, identification, and efficacy among group members.

The results of performance appraisals show that the process can be used as a data collection system that gives the information that people need to translate into knowledge and a competitive edge. Hence, the appraisal system solicits and documents internal feedback (i.e., from employees) and external feedback (i.e., from customers), which can later be used as inputs to KM activities. The performance appraisal system is also aimed at directing employees' KM activities by rewarding positive behavior such as creativity in daily operations and IT usage. This is reflected in the results, whereby the feedback generated is used to reward or punish an employee. However, one must not forget the element of forgiveness in the performance appraisal system. Learning, according to Bennis and Nanus (1997), actually means trying to learn and improve from past failures. Also, a company should not react to any reasonable failure with anger. Pfeffer and Sutton (1999) extend this concept to KM by arguing that "knowing comes from doing" and that to encourage a culture of action, a company should support and forgive reasonable failures.

In order to transform a company into a knowledge organization, it must establish a different form of compensation system. The pay and incentive system should:

- Reward a risk-taking attitude in order to promote creativity in solving daily problems.
- Stress group-based compensation and reward to stimulate knowledge exchange and sharing among group members.

If the pay system is based on internal competition, such as raises given out in a zero-sum fashion and for individual rewards, it creates a counter-collaborative organizational culture, one where people always need to watch their backs to see who is conspiring against them (Pfeffer and Sutton, 1999). This certainly makes knowledge-sharing impossible. The results have indicated that some companies are giving out rewards to their employees based on:

- Individual contributions towards a group's performance.
- Knowledge-sharing.
- Innovative work approach.

The good thing about KM is that a company can compete better and that the knowledge itself can be retained in the system through the five KM activities, even if the knowledgeable worker has left the company. This research indicates that the knowledge-based organization requires a different management approach when compared to a non-knowledge-based organization. In terms of human resource training, the focus is placed on developing people who are capable of tapping internal and external information and turning it into useful organizational knowledge. The training focuses on:

- Leadership skills and change management.
- Creativity.
- Problem-solving skills.
- Quality initiatives.

Two primary instruments that are used to support transformation in an employee's behavior and mindset are:

- Performance appraisal system.
- Compensation and reward system.

The performance appraisal system, in addition to providing inputs to KM activities, also aims to stimulate organizational improvement by effectively directing the employee's behavior. The compensation and reward system focuses on promoting knowledge exchange and group collaboration. The study also shows that the HRM practices of companies that are moving towards knowledge organization are different from those companies that are only starting on the learning curve. Less directing and controlling are needed for knowledge-oriented companies, and the processes and procedures should already be well established.

Critical Success Factors in KM

Technology, including information revolution and globalization, continues to exert major effects on KM development. Many developed countries have recognized ICT as a driver for a knowledge-based society. The new economists look at ICT as a driver of change and a tool for releasing individual potential and the knowledge embodied in people. ICT has transformed the ability of both individuals and organizations to augment their intelligence via accelerated learning (Pemberton and Stonehouse, 2000). However, the mindset of employees towards knowledge is very important in ensuring the success of a KM system.

A study was conducted by Chong (2006) to compare KM components between its perceived importance versus its implementation in Malaysian companies. The respondents were middle-level managers of ICT companies in Malaysia located at the MSC. The key KM components to a successful KM implementation, based on a review of the literature, are:

- Employee training.
- Employee involvement.
- Team working.
- Employee empowerment.
- Top management leadership and commitment.
- Information systems infrastructure.
- Performance measurement.
- Knowledge-friendly culture.
- Benchmarking.
- Knowledge structure.
- Elimination of organizational constraints.

The study examined whether the factors mentioned above are important to KM's success and the level of its implementation and whether there are significant differences between the perceived importance and the level of implementation of KM factors (Table 2). The survey uses the five-point Likert scale from 1 = not important to 5 = very important for perceived importance; and 1 = not implemented to 5 = extensively implemented for degree of implementation. The average mean factor for the degree of implementation given by respondents for all KM factors is 3.30, as shown in Table 3. Table 4 shows that there were higher significant differences on the performance measurement, and in benchmarking and training factors. This finding is consistent with the mean score where both performance measurement, and benchmarking and training scored below average means in terms of the degree of implementation. Pearson (1999) points out that the delivery of KM to an organization can be started by establishing appropriate performance measurement systems. However, Chong (2005) found that the companies are still using the traditional performance measurement system where financial returns are still the priority. This may be due to the fact that more than half of the respondents have just started their KM activities, 28.6% currently evaluating the importance of KM and 28.3% only planning for KM. Thus, they are unable to see how their current performance measurement system would fit the requirements of a knowledge-based company.

U		
Factors	Mean	Standard Deviation
Team working	4.10	0.77
Leadership and policy	4.04	0.82
Knowledge sharing and acquisition	4.00	0.80
Performance measurement	3.99	0.87
Information systems infrastructure	3.99	0.73
Benchmarking and training	3.82	0.82
Average mean factor scores	3.99	0.80

Table 2. Mean Factor Scores for Degree of Importance of KM Factors

Factors	Mean	Standard Deviation
Leadership	3.55	0.93
Team working and empowerment	3.42	1.00
Information systems infrastructure	3.36	0.96
Knowledge sharing and acquisition	3.32	0.98
Organizational policy	3.23	1.03
Performance measurement	3.18	0.96
Benchmarking and training	3.04	1.08
Average mean factor scores	3.30	0.99

Table 3. Mean Factor Scores for the Degree of Implementation of KM Factors

Table 4. Comparison of the Degree of Importance and Degree of Implementation of KM Factors

Factors	Difference Mean	Standard Error Mean	t-value
1. Performance measurement	0.82	0.045	18.466
2. Benchmarking and training	0.77	0.042	18.265
3. Knowledge sharing and acquisition	0.69	0.045	15.448
4. Leadership and policy	0.67	0.038	17.680
5. Teamwork and empowerment	0.66	0.042	15.759
6. Information systems infrastructure	0.63	0.039	16.208
Average mean differences	0.71		

Similarly, benchmarking is also inevitable because, like performance measurement, it is not applicable unless most organizations have begun to establish KM programs where benchmarking is then enabled. When organizations have just started to implement KM programs, it is impossible to benchmark with other organizations with long-established KM practices. According to Choi (2000) and Chong (2005), only organizations that have initiated KM programs can understand the importance of benchmarking and knowledge accessibility. Even in firms that embrace innovations and recognize the importance of managing knowledge, some best practices still take many months or even years to be shared and adopted throughout the organization.

In terms or employee training, managers perceived that there is a big gap between importance and implementation in their organizations. Chong (2005) observed that the Malaysian ICT companies surveyed are still in the initial stages of their KM program and thus unable to see the types of training programs that are important to KM's success. He observes that many of the current training programs focus on how to improve employees' skills in performing their jobs rather than on how the knowledge can be managed.

Table 4 also shows the four factors that scored below the average mean difference: knowledge-sharing and acquisition, leadership and policy, teamwork and empowerment, and information systems infrastructure. A gap still exists between factors that are perceived as important and the implementation of these factors.

Knowledge-sharing and acquisition factor are related to an egalitarian culture and knowledge structure. As the Malaysian organizations researched are still unfamiliar with KM, they are not sure of how a knowledge-friendly culture can be created. Many of the knowledge-sharing activities are only within a project or team rather than on an organization-wide basis. Since many companies are new (66% of them were established within the last 10 years and within the time frame KM has been introduced) and have been involved in the ICT business, it is quite natural that they do practice some degree of knowledge-sharing, one of the fundamental aspects of KM in their organizations. In addition, respondents not only perceived that a knowledgebased structure is important to a knowledge-based company, but they have also implemented it.

The respondents have also perceived that their organizations' leaders are supporting their KM activities. Since the nature of ICT businesses is knowledge-intensive, the leaders must demonstrate their support in order for their products and services to be successful. At the same time, ICT businesses also involve employees working in teams to design solutions for their clients. These employees have to be empowered so that they can make on-the-spot decisions to respond to their clients' requirements. Nevertheless, respondents state that their employers have given them only limited authority. The employees feel that time and resources are wasted when they are not allowed to make meaningful decisions on behalf of their organization and, most importantly, for their customers.

Findings on organizational constraints indicate that the respondents' organizations do not attempt to create a environment conducive to successfully carrying out KM programs. Many companies cited a lack of budget and incentives as the main barriers to KM implementation. Since 66% of the organizations surveyed are small in nature (proxy by the number of employees), they might not necessarily have the resources to fully implement KM. McAdam and Reid (2001) found that smaller companies are less advanced with a mechanical approach and lack investments in KM. These findings corroborated with Chong's (2005) study which showed that there is a positive relationship between company size and investment in KM. Since a large number of the ICT companies have been in existence for only five years or less (more than 50%), their priorities centered around taking advantage of business opportunities rather than focusing on improving the internal administrative issues of the organization. For the ICT organizations which have been in existence for more than 25 years (22%), rigidity and bureaucratic structures may have created a barrier, preventing them from becoming learning organizations and practicing KM. This might also explain why there is a significant gap between the level of importance and implementation of the KM success factors among the ICT companies in Malaysia.

The Malaysian organization must quickly strategize their KM activities to fill the gaps if they want to be successful in their endeavors. It is important that plans and policies be developed to support their KM activities. Organizations can improve their KM implementation activities through:

- Top management support and leadership. Top management has the greatest responsibility in enabling KM in their organizations. They have the ability to influence other success factors, such as enabling a knowledge-friendly culture, designing KM-based training programs and encouraging employees to attend them, removing organizational constraints to show support to KM activities, involving and empowering employees on the job, creating a knowledge-friendly culture, and developing a knowledge-based performance measurement system.
- Training. There are many training programs related to KM that should be made available to its employees by the ICT organization, for example, training on the importance of knowledge-sharing, training on how to use the knowledge repository, and encouraging the change in mindset required to implement KM.
- Knowledge-friendly culture. KM is people-based, not technology-based. The importance of creating a knowledge-friendly culture to ensure KM implementation success must also be given equal attention by Malaysian companies. Top management is responsible for creating a perception among employees that "knowledge-sharing is power." At the same time, a proper reward system that encourages sharing must be established. However, these organizations must ensure that the reward system is in effect

on a long-term basis, not just short-term, so as to avoid a situation where employees are simply "gaming" the system for rewards.

- Removal of organizational constraints. It is important that senior managers of companies attempt to remove all organizational constraints that create barriers to successful KM implementation, especially those in terms of culture, such as a negative attitude towards knowledge-sharing, lack of passion towards acquiring knowledge, and budgetary constraints.
- Teamwork. Service-based organizations rely heavily on teamwork. Management must encourage the organizational members to work together and build on each others' ideas and strengths. This is because the focus of business and KM application is on providing an environment in which knowledge workers of various disciplines can come together and create new knowledge. Technology is not the primary issue in KM. In fact, organizations with team-oriented employees who trust each other are more successful at sharing knowledge than those who are merely technologically superior. When employees in companies work in teams and share their knowledge, this will undoubtedly allow them to solve work-related problems and come up with creative and innovative solutions for their customers.
- Employee involvement. In the businesses where client satisfaction is of paramount importance, it is imperative to emphasize the meaningful involvement of employees in their jobs. This is because recognition of the importance of an employee's tacit knowledge is based on the assumption that successful performance improvement will not only depend on how work is organized and on the skill of the worker, but also on the willingness of employees to convert tacit knowledge of the work process into continuous process improvement and innovation.
- Employee empowerment. This is another important aspect. In the case where employees are meeting customers' requirements, it is important that employees to be given a substantial level of autonomy to decide on solutions. This will prevent wasting time and effort when employees discuss and make decisions on clients' needs. By involving and empowering the employees in their jobs, they can coordinate diverse sets of activities and solve complex organization-wide problems.
- Performance measurement. KM-based performance measures must be embedded in the overall business performance model and not just be a marginal add-on to the core measures. A comprehensive performance measurement system must be developed to capture the impact of knowledge on individual and organizational performance.
- Knowledge structure. Most useful knowledge can be captured and created by sharing knowledge with customers and suppliers, since the dynamic environment of today requires continuous interaction with suppliers. This is especially important to a service-based industry.
- Information systems infrastructure. Many companies think that investing in KM systems is a waste of money. This is especially true where the majority of companies studied are small businesses in which funding is an issue. However, companies can combine their current IT capabilities to support KM systems. More importantly, the firms must start by identifying what type of business they are in and pinpointing what kind of knowledge needs to be captured, leveraged, and applied.
- Benchmarking. Many firms have adopted benchmarking as a significant, systematic technique to measure the company's performance towards its strategic goals. Once an organization has benchmarked best practices, it is easier to apply the useful knowledge around the organization. It is important that a company start from the inside before going outside.

As Malaysia strives to go global with its knowledge-based products and services, all firms play a very important role in realizing the country's vision. KM is not about a one-time investment. It requires constant attention and investment over a considerable period of time even after it begins to deliver results. In addition, companies must be aware that the people factor is the most important KM driver. All KM efforts must center around the people in the organization who are actually performing the jobs where the sharing takes place.

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INTRODUCTION

This report reviews the status of knowledge management (KM) promotion, development, and practice in the Philippines as of late 2007. It is based largely on the author's professional and consulting experiences, personal observations, and readings of papers and cases about KM practice in the Philippines.

PROMOTION OF KM

KM is new in the Philippines. Institutional interest in KM started in the 1990s, but widescale efforts on KM began only after 2000:

- In 1993, the administration of former President Fidel V. Ramos organized a two-day symposium on knowledge industries and included the results in its national pole-vaulting strategy.
- In 2000, the first KM unit in the Philippine government was set up: the KM Division of the Information and Management Service of the Department of Health.
- A regular KM column in *Business World*, the major business daily newspaper in the Philippines, appeared in early 2001.
- The first KM course at the University of the Philippines started in mid-2001.
- The KM Systems Bureau was organized at the House of Representatives (Philippine legislative body) in late 2001.
- The Knowledge Management Association of the Philippines was organized and registered as a nonprofit organization with the Philippine government's Securities and Exchange Commission in mid-2002.
- In 2002, the Development Academy of the Philippines (the NPO for the Philippines) identified KM as one of its seven thrusts for the 2002–12 decade and organized the Center for KM as an operating unit.

The practice of KM in the Philippines is still in its very early stages, while the promotion of KM is an important ongoing process in a number of companies. The promotion of KM is undertaken by many interested parties, sometimes in coordination or cooperation with other entities but, more often than not it is carried out independently.

Status of KM vis-à-vis Other Management Tools and Initiatives

A survey of 76 Philippine companies by the People Management Association of the Philippines (PMAP) in 2001 showed that many corporate executives are aware of KM and its potential benefits but only a few initiate KM programs in their organizations. According to Dr. Vivien Supangco of PMAP's Research Committee:

A little over three-fourths of the companies in the sample acknowledged the importance of consciously managing knowledge in their organizations. However, only 61.8% reported

that their companies had varying degrees of efforts aimed at managing knowledge in their organization.¹

This result is similar to those obtained in European and American surveys. Knowledge on how to implement KM seems to lag behind the awareness of its importance. Another possible explanation is that respondents are undertaking KM initiatives but they do not call them KM.

A 2001 doctoral study of 20 provinces and five cities in the Philippines revealed that many local government units practice various forms of knowledge management, but not all local government executives call those practices by this name.²

A small survey of 33 technology-based enterprises conducted in 2006 showed that 43% have a formal KM policy or strategy and that 79% have a policy for building a culture of knowledge-sharing. The most common KM tools were the use of email/Internet, use of CD-ROMs, mentoring, intranet, electronic newsletter, and video conferencing. Note that except for mentoring, most of the KM tools are ICT- and communication-oriented. Seventy-nine per cent report that they regularly update their databases of good practices, lessons learned, and expertise. Sixty-four per cent prepare documentation of lessons learned, training manuals, etc. Forty-three per cent use KM tools to facilitate work collaboration among team members.³

Compared with other management tools, the attention given to KM by management and business schools is not significant. There is no master's level degree program in KM, only graduate courses. These are offered at the Technology Management Center of the University of the Philippines in Diliman, the Department of Development Communications at the University of the Philippines in Los Baños, the Asian Institute of Journalism and Communications, the Ateneo de Manila University Graduate School, the Asian Institute of Management, the De La Salle University, and the Asia-Pacific College.

In the Philippines, interest in KM is usually initiated by IT or PQA/TQM practitioners. The latter tendency is similar to the manner in which KM interest developed at the Asian Productivity Organization and the American Productivity and Quality Center. Interest in KM from human resources management/human resources development (HRM/HRD), organizational development (OD), and corporate planning practitioners can be seen, but the even from these directions, interest is not very strong in the Philippines.

Another indicator is the observation that KM units and KM positions evolve or were constituted from related managerial or functional units or positions. Some examples are shown in Table 1.

KM unit, KM position/function	Came From or Managed By
House of Representatives' KM Systems Bureau	IT unit combined with planning unit
DAP Center for KM	Combination of OD, HRM/HRD and IT
Department of Health	IT unit, document archives and library
UNICEF Manila	Communications unit
(continued on next page)	

Table 1. Where KM Unit/Position Came From

¹ Supangco, V.T., Management of Knowledge in 76 Philippine Firms. In: *99 Paradigm Shifts for Survival in the Knowledge Economy: a Knowledge Management Reader*, by Talisayon, S.D. (Center for Conscious Living Foundation; 2005, pp. 274-275).

² Rodriguez, A.S. An operational model to institutionalize knowledge management in the Philippines: lessons on knowledge management practices from the Fifth Country Programme for Children. Unpublished Ph.D. Public Administration dissertation. University of the Philippines Diliman; 2001.

³ A.O. Alcantara. Unpublished class research paper. Technology Management Center, University of the Philippines; 2006.

Knowledge	Management	in Asia:	Experiences	and Lessons
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A local IT company	IT/ERP systems development	
Another local IT company	IT/software development	
A holding company with over 140+ subsidiaries	Comptrollership unit	
CKO of national economic planning agency	MIS/IT unit	
University of the Philippines at Diliman	Technology management	
University of the Philippines at Los Baños	Development communications	
Philippine Sustainable Development Network	IT/Internet access services	

How KM is Defined or Understood

The idea is prevalent that KM is identical to information management. Many managers associate KM with computers and intranets. This perception is perhaps fueled by the tendency of vendors of IT products and services to repackage or sell themselves as KM companies. An IT instructor in one of the better-known universities gave a public lecture on KM in 2001 where he equated KM with e-learning. An international aid agency issued a call for proposals for a "KM system" project; an examination of the project's terms of reference showed that they were referring to an intranet. This misconception arises because many managers do not know the meaning of "knowledge" as it is understood by most KM practitioners and cannot tell the difference between the terms "information" and "knowledge."

Because the scope of KM overlaps with other management fields, companies may be doing KM without calling it knowledge management. The exchange of best practices is a KM tool, for example, but those who practice it are not aware that they are doing KM; when asked whether they are implementing KM, it is possible that some of them may even say no.

A large Filipino-owned drug company practices the "buddy system" to train new factory workers in a job by assigning them to work for a period of time with an experienced worker in the same job. In KM, this type of mentoring or coaching is described as a tacit-to-tacit transfer of knowledge. However, the drug company did not consider their buddy system a KM practice until after one of their factory managers took a course in KM.

The scope of KM overlaps with those of the better-known management areas of information management, human resource management, customer relations management, and productivity/quality improvement. Appreciating KM requires an understanding of its broader framework, which so far has been acquired by only a few Filipino managers because there are very few KM training programs available locally.

National Business and Economic Contexts of KM Practice

At the national level, the concepts of natural capital and environmental capital were successfully introduced into the Philippine government. The National Statistical Coordination Board, which is responsible for generating official national income and growth statistics, had developed a satellite account, a national accounting subsystem for tracking the money value of natural and environmental resources in the country. However, it has not yet developed a similar subsystem for tracking and similarly measuring national intellectual capital or, more specifically, human capital.

The concepts of intellectual capital and knowledge assets are poorly understood, for example, by executives of the National Economic Development Authority (NEDA). NEDA has not formulated any national framework or strategy that will move the country towards becoming a knowledge-based economy, unlike other Asian governments such as Malaysia, India, the Republic of Korea, and Singapore. With the support of a foreign aid agency, NEDA has currently embarked on a KM program. However, the KM framework employed by the aid agency is based on the knowledge cycle, disconnected from NEDA's organizational and value creation goals. In other words, an understanding of KM as a tool for organizational value creation is absent.

Knowledge Management in the Philippines

At the level of companies, there seems to be a better awareness of the importance of KM, specifically the link between KM and productivity. For example, a holding company of a large Filipino conglomerate of more than 140 companies created the position of Vice President for Business Excellence, responsible for integrating KM, TQM or PQA, BSC, MBCFPE, ISO, and other similar initiatives.

There is a considerable overlap between KM and human resource development or human resource management (HRD/HRM). Some HR managers seem to sense this. Perhaps this was the reason why the largest HR association in the Philippines, the People Management Association of the Philippines (PMAP, formerly called the Personnel Management Association of the Philippines), initiated an annual course in 2002 in KM for HR managers. However, the level of interest in this course has been very low.

The lack of KM awareness has been noted by the Center for Knowledge Management of the Development Academy of the Philippines, the National Productivity Organization (NPO) of the Philippines. It has observed that the market for KM products and services in the Philippines is still limited.

How KM is Promoted and Disseminated

The promotion of KM in the country is undertaken through:

- 1. KM programs in Philippine subsidiaries of multinational corporations or in Philippine branches of international development organizations.
- 2. KM initiatives by isolated individual "KM champions" in the Philippine government, private corporations, academic institutions, and non-government organizations.
- 3. KM programs by institutional champions, such as the Development Academy of the Philippines and two professional KM organizations, the KM Association of the Philippines (KMAP) and the Society of KM Practitioners of the Philippines (SKMP).

The Philippine government does not have a national knowledge strategy, a national plan towards a knowledge-based economy, or any instrument of national policy which mandates the promotion of knowledge management (KM), although it does have a National Information Technology Plan (IT21). IT21 reveals that the government's attention is focused on IT infrastructure, technology and content—on tangible assets. The creation of economic or social value by the proper deployment of knowledge and other intangible assets is not yet appreciated. The NSCB measures gross domestic capital formation (tangible assets) but not human capital (intangible assets), despite the fact that the nearly USD15 billion annual earnings from Filipino overseas workers is equivalent to human capital that exceeds cumulative domestic capital stock.⁴

⁴ Very rough estimates can drive home the point that the tangible assets that the national government measures may not be as important as the intangible assets that it does not measure. The Philippine Gross Domestic Capital Formation in 2005 was PHP228 billion in 1985 prices, according to the National Statistical Coordination Board (NSCB), made up of new construction, new durable equipment, and any addition to agricultural stocks and improvements. Cumulative capital stock was roughly PHP8.56 trillion at 2005 prices at 10% per annum depreciation and a 20-year lifetime. In 2005, remittances from overseas Filipino workers amounted to USD10.7 billion, according to the Central Bank of the Philippines, the Bangko Sentral ng Pilipinas (BSP). This is an underestimation because it is suspected that a large amount of foreign exchange comes in through various informal channels. This annual foreign exchange earning is roughly equivalent to human capital of about PHP9.27 trillion, computed as the net present value of the same level of annual forex earnings. Assumptions made: average 91day Treasury bill rate of 6.358% in 2005 (BSP data) and average forex rate of 55.0855 in 2005 (NSCB data). This is an underestimation of intangible assets because human capital is only one of the three forms of intangible assets.

Articles on KM appear occasionally in local newspapers. In 2001-2003 a regular weekly KM column appeared in *Business World*, the largest business newspaper in the Philippines.

KMAP and SKMP sponsor regular KM events. These two professional associations are the major institutional promoters of KM. Starting in 2007, the two associations decided to cooperate by making their Board chairmen automatically serve as the vice chairman of the other organization and by exchanging membership privileges.

Who are the Leading Promoters, Champions or Lead Institutions?

The promotion of KM is undertaken both by institutions and individuals:

- KM programs in subsidiaries of multinational corporations or in branches of international development organizations that are encouraged by their parent companies or organizations.
 - a. Subsidiaries of multinational corporations: Development Dimensions International, Accenture, etc.
 - b. Branches of international development organizations and the projects that they fund: CIDA, WHO, World Bank, UNICEF, Christian Children's Fund, International Institute for Rural Reconstruction, AusAid, etc. AusAid, through the Philippine-Australia Human Resource Development Facility, has pushed for KM at the National Water Resource Board, a government agency, and at the Davao City Chamber of Commerce and Industry, a non-profit service network. CIDA, through its Local Government Support Programme, sponsored KM at the Department of Interior and Local Government. The Philippine office of CIDA in 2006 launched its own KM program and is promoting KM among its Philippine programs and projects.
- 2. KM initiatives by isolated individual "KM champions" in the Philippine government, private corporations, academic institutions, and non-government organizations.
 - a. In the government: the House of Representatives (the Director-General of the Congressional Planning and Budget Office is the champion), the National Economic and Development Authority (NEDA) (the former Secretary for Planning was the champion), the Department of Health (the Division Chief of the KM Division is the champion), etc.
 - b. Graduate courses in KM at academic institutions were initiated by professors who eventually taught the courses at the University of the Philippines in Diliman, the University of the Philippines in Los Baños, De La Salle University, the Ateneo de Manila Graduate School, the Asian Institute of Management, and Asia-Pacific College.
- 3. Local institutional champions.
 - a. The National Productivity Organization, namely, the Development Academy of the Philippines.
 - b. The Knowledge Management Association of the Philippines.
 - c. The Society of Knowledge Management Practitioners.

OVERVIEW OF KM PRACTICES

No studies have been done of KM practices in Philippine companies. In the following sections, the focus will include both private companies and other kinds of organizations. Some KM practices, such documentation and exchange of best practices, are often not considered or labeled by companies practicing them as KM. If only those companies that "consciously" practice KM were considered, their number would be very small indeed.

Distinguishing Features of Companies Implementing KM

Philippines-based companies implementing KM practices, whether consciously or not, are usually:

- Large companies, especially those that spend considerable amounts to set up their intranet and those that are members of the Best Practice Exchange Network (BPEX) maintained by the Development Academy of the Philippines.
- Companies that sell IT products or services are usually aware of KM, and some of them position their products as "KM products"; a few consciously "practice what they preach," such as Digital Solutions and Infostructure.
- Subsidiaries of multinational corporations or local branches of international development institutions.
- Government agencies whose KM or learning-oriented projects are driven by foreign funding agencies.

AusAid funds a large training program implemented by the Philippines-Australia Human Resource Development Facility (PAHRDF), which benefits scores of Philippine government agencies. These training programs explicitly aim to develop these agencies' capabilities in human resource development, IT support systems, knowledge management, and organizational learning. For example, PAHRDF supported setting up a KM system for a nongovernment organization, the Davao City Chamber of Commerce and Industry, and for a government agency, the National Water Resources Board. The United Nations Development Programme (UNDP) provided funds to formulate a KM framework and strategy for the Philippine House of Representatives. The World Health Organization (WHO) funded a KM audit and formulation of a KM framework and action plan for the Department of Health and subsequently a project to support the development of web-based KM toolkits by the in-house KM Team. WHO and the Deutsche Gesellschaft für Technische Zusammenarbeit GmbH (GTZ) co-funded the training of the KM Team through a U.S.-based KM certification course. GTZ also supported a KM project for the National Economic and Development Authority. The Canadian International Development Agency (CIDA) has developed a KM program which encourages cross-project knowledgesharing.

Reasons for Adoption and Decision-making Processes

KM adoption in the Philippines remains largely externally driven or externally funded. When a company or organization by itself decides to adopt KM, the initiative is often introduced by an internal KM champion who understands and appreciates KM. It often happens that a after a middle-level executive attends a KM course, he or she convinces colleagues and the top company executive of the usefulness of a KM course. At the University of the Philippines in Diliman, the KM course professor requires all students to plan and execute a KM practicum in the organization they are working in, with the approval of their supervisor; the supervisor is then encouraged to provide the professor with feedback on the students' performance. KM initiatives have been introduced in several companies in this manner:

- An R&D Decision-making Quality Benchmarking study was introduced in an IT company developing new products for interactive television using mobile telephony, gaming, wireless marketing, and other interactive broadcast solutions.
- A process for identifying, measuring, and assessing the tacit knowledge content of a job was applied to the position of Quality Assurance Manager in a regional beer company.
- A Department of National Defense officer conducted an inventory of knowledge assets in a Technical Working Group in the department.

- At the International School in Manila, the Communications and Development Manager developed a method for recognizing, identifying/locating members of, and initiating support systems for three internal Communities of Practice (CoPs) that cut across departments: customer service, website management, and records management.
- Tools and guidelines were developed for nurturing an e-Community of Practice (e-CoP) in the civil society sector whose members are geographically dispersed and affiliated with various organizations. The common area of practice of the CoP is trade advocacy.
- A Lessons-Learned Meeting (LLM) and its resulting After-Action Report (AAR) were developed and customized for use by an IT company.
- A quantitative instrument was developed for measuring the knowledge-sharing culture of an organization, distinguishing among four contexts: social, organizational, managerial and technical.
- A software engineer in a government R&D institute developed procedures and tools for effective team learning (dialogue supported by mind-mapping tools) for the purpose of generating new project concepts in three software development groups.
- A portal evaluation system was developed for application to the supply-chain subportal of a large drug manufacturing company.
- Social Network Analysis (SNA) software wasselected and applied for quantitative analysis, graphical portrayal, and understanding of informal networks within an organization.
- The mentoring and peer assist processes in an IT company were evaluted.
- A KM Literacy Scale was developed.
- A measuring instrument for organizational innovativeness was developed and tested.

There are no follow-up studies on whether these KM initiatives have been sustained.

Company-wide Preparedness and Preparations

A short presentation for top executives or the company's board of directors is often among the first KM activities undertaken, providing top decision-makers a common understanding of what KM is and what its expected benefits are or convincing them that KM should be adopted by the organization.

- A bilateral development funding institution began with a two-hour experiential introduction to KM for its top managers, followed by two half-day sessions with leaders and officers of various projects in Manila and Mindanao.
- An international coalition of resource centers for water and sanitation started off with a short one-hour exercise in KM for its board of directors.
- The regional office of a UN agency held a two-hour lecture with short workshops for its country officers and managers in the regional headquarters. A frequently-asked questions (FAQ) sheet on KM was provided to top managers.
- A manufacturing subsidiary of a multinational micro-electronics company conducted a short KM session among its top executives.

After these initial activities, the top executive usually issues an administrative directive to all units of the organization informing everyone of the forthcoming KM initiative. This was the way it was done at the Department of Health to introduce the organization to KM. At the Development Academy of the Philippines (DAP), the Executive Committee adopted KM as one of its seven major strategies over the next ten years through a strategic planning workshop. To implement this strategy, DAP created the Center for Knowledge Management. A center-wide strategic planning workshop was conducted to formulate the basic outline of the center's directions and programs.

Training

Because KM concepts and tools are new to many, training is often a major part of KM initiatives.

- A project was initiated by three international development agencies for a knowledgesharing and exchange initiative among Philippine cities. In 2005, the project conducted the first online KM course in the Philippines. The online format was chosen because the course participants were geographically dispersed and could devote only part of thieir work time to the course.
- Training of staff who would be responsible for administering the KM system accompanied KM initiatives at four government agencies.
- Before the Chamber of Commerce and Industry of a major Philippine city formulated its KM framework and designed its KM system, most of its professional staff, together with the General Manager and the Executive Vice-President, went through a training program in which the KM audit procedures were integrated through a "learning KM by doing KM" approach. The KM audit results provided the input data for them to be able to develop the design specifications for their improved portal.
- In the Philippines, the reason that the bilateral aid implementing agency insists on "workplace training" methodologies is that lecture-type training is an inferior method of enhancing KM skills. Experiential adult learning methods work best for providing an understanding of KM concepts and skills in practicing KM tools and procedures. For example, a regional development bank has experimented with "KM games."

KM Audit, Assessment, or Review Processes

There are several KM assessment processes in use in Philippine organizations, from the simple to the complex—from one-time, informal discussions between the consultant and the top executives to well-planned KM audit processes that involve interviews, writeshops, and questionnaires or diagnostics. In the simple approach, the assumption is that top executives are knowledgeable about KM and know best what they need.

In one case involving a government agency, KM assessment was seriously hampered because the agency had no concept equivalent to "business process" and almost all of its work processes were undocumented. It was a case of putting the cart before the horse. As a result of this finding, the government agency decided to back-track and initiated a process audit that included process improvement or innovation and process documentation.

A complete KM audit can be a time-consuming affair requiring the participation of all midlevel executives and the administration of several types of survey questionnaires and interviews. This kind of KM audit is needed if an organization-wide KM strategy is desired to identify the most cost-effective KM initiative(s) that can create the greatest value for the organization or be aligned with existing organizational strategies.

Perhaps the worst case is initiating a KM initiative without first performing some kind of KM assessment or audit. Instances have been observed in the Philippines where an organization implemented an arbitrarily-selected KM tool without being clear about the link between the tool and customer needs, organizational value creation, or productivity of employees. The two most common mistakes made, by successful Philippine companies as well, when setting up are:

- 1. A visually impressive company website that is no more than a static company brochure.
- 2. A top-down intranet that is a web version of the traditional newsletter and directives/ policies from the top executive.

Aside from various better-known productivity measures and indicators, KM assessment tools in use in the Philippines include the following:

- Quantitative knowledge taxonomy and a quantitative knowledge (supply vs. demand) gaps analysis; simplified performance support system (PSS) gaps analysis.
- Sociogram; social network analysis, quantitative and/or graphical.
- KM readiness scale; KM literacy scale.
- Intellectual capital accounting or estimating the monetary value of a company's intangible assets.
- Learning Organization Diagnostics[©].
- Knowledge-sharing scale, authoritarian-versus-egalitarian scale, Q-Morale[©] and KMoriented organizational climate survey.
- Quantitative indicators of potential KM champion.
- Portal evaluation checklists and scales.

Other Preparations

Based on the professional experiences and personal observations of this author, factors often present in KM initiatives that demonstrate participation and sustainability are:

- 1. Executive sponsorship.
 - a. Policy and financial support.
 - b. Visible personal support.
 - c. Participation in KM initiatives.
- 2. Presence of a KM champion, preferably from the upper management level, and/or the presence of a manager-level KM core group that understands and appreciates KM.
- 3. Formulation of a KM strategy and program/action plan, which often includes training and communication components as well as a way to monitor or measure the results. The KM strategy formulation is basically an internal initiative rather than consultant-driven.
- 4. Executive approval and budget support for the KM program/action plan.

If the KM initiative is limited in scope and time, then the above factors are important but not critical. However, if the KM initiative is organization-wide, then the above factors are essential, and change management perspectives and tools must accompany it.

Changes or Adjustments during KM Implementation

Changes or adjustments during KM implementation that this author encountered, observed, or implemented were not drastic or major. Some examples:

- A quickly-organized breakfast meeting with the board of directors to get their key inputs on company priorities.
- Adding training of in-house staff in data flow diagramming to facilitate the transition from business process documentation to IT system design and development.
- Issuing a memo directly from the top executive to remind every manager to fill out a needed survey.
- Adding half-day KM sessions for lower-level project staff members to facilitate their understanding and buy-in of the KM initiatives and to assess their preferences in the choice and manner of implementing KM initiatives.
- Removing online chat sessions because of insufficient participation; many participants have no time for them or are unfamiliar with the technology.
- Adding the option of submitting hard copies of an audit survey anonymously due to apprehension on the part of some respondents that their identities can be traced via email submissions.
- Shortening and simplifying a KM audit questionnaire.
- Formulating a very short "elevator KM briefing" (a briefing that can be memorized and presented in less than one minute to someone you are in an elevator with) and printing it on a pocket-sized card for the chairman of the board of directors to ensure a quick understanding of what KM is and what the value of KM is for the company.
- Organizing a KM Club, inventing a KM mascot, and printing an iterative design on an attractive lapel pin for participants and consultants to give the newly-organized club a sense of pride and identity.

Local Modifications, Innovations, and Tailoring of KM to a Specific Company

KM is frequently tailored to a specific company during the project development stage, in response to company-issued terms of reference (TOR), or, if there is no TOR, during negotiations and pre-work before the project proposal or plan is finalized.

KM for Operational Efficiency versus KM for Innovating New Products, Processes, or Markets

Organizations implementing KM in the Philippines often want KM to improve efficiencies of existing business processes; this is where KM and productivity/quality improvement overlap. Some companies are willing to re-examine their business processes and improve or innovate them, if needed:

- Surveys of various consumer segments are undertaken by a commercial outfit to generate data for possible business process innovation.
- A more systematic monitoring and evaluation of policy implementation and impacts at the local level is developed and international trends are monitored in a government agency as inputs for the improvement of policy-making processes.
- Technology, market, and political foresight exercises are undertaken as inputs to improving the R&D agenda-setting processes of a government R&D agency.
- SWOT analysis and examination of long-term strategies is undertaken by a grants retailing agency to align selection and preparation of best practices documentation to show to foreign donors and to use in applying for renewal of program grants to support those long-term strategies.

Only after the business process innovation and improvement is satisfactorily done can the KM support system be examined and improved.

In the majority of cases known to this author, the company's concern is what KM tools to use and how to use them. In a few cases, the organization is also concerned with embedding organizational learning processes in its operations:

- A monitoring team consisting of members drawn from many sectors and organizations performs part-time environmental monitoring functions as required by Philippine law. Because its membership is very fluid, its Executive Committee decided to document a learning-oriented manual that provides for continuous process improvement and a knowledge loop for this continuous process.
- A national policy and regulatory agency designed its KM system in the context of a learning organization. Operationally, this includes regularized procedures for stake-

holder-driven re-examination of its work processes and to reflect any changes in the improvement of the intranet to support such work processes.

• An international coalition of resource centers in water and sanitation conducts several multi-country cooperative projects. They piloted a structured post-project lessons learned meeting (LLM) to extract knowledge and lessons gained from a project to improve the manner in which they design, network/coordinate, and implement subsequent projects.

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INTRODUCTION

The Republic of Singapore is an island city-state located on the southern tip of the Malay Peninsula, south of the Malaysian state of Johor and north of the Indonesian Riau Islands. With a population of about 4.5 million people, it is the smallest country in Southeast Asia. Colonized by the British during the 19th century, Singapore, with its natural deep water port, quickly became an important export outlet for Malayan primary products such as tin and rubber. After the Japanese occupation and the end of World War II, Singapore became a crown colony in 1946, and it was granted internal self-government in 1955. In 1963 it joined the Federation of Malaysia as an independent state, from which it was expelled in 1965. When Singapore became fully independent in 1965, with no natural resources, it was faced with significant problems: unemployment, labor unrest, poverty, poor housing conditions, etc. As a consequence, the government, under the People's Action Party (PAP), embarked on a strategy of export-led growth driven largely by foreign multinational companies (MNCs) and government-linked companies (GLCs). During the last 40 years, the fast-paced government-led industrialization has created a robust and increasingly knowledge-based economy with a well-diversified manufacturing industry based on electronics, chemicals, mechanical engineering, and biomedical sciences as well as a sophisticated service sector (Toh, Tang, and Choo, 2002; Evers, 2005a). Together with Hong Kong, the Republic of Korea, and the Republic of China, Singapore is one of the four original "East Asian Tigers."

In a knowledge economy, it is not only the hardware but especially the software which makes the difference in terms of value creation. In a fully developed knowledge society, systems are not technology driven but determined by contents, meaning, and knowledge. As Evers et al. (2004a) have pointed out, a knowledge society is believed to have the following characteristics:

- Its members have attained a higher average standard of education in comparison to other societies, and a growing proportion of its labor force is employed as knowledge workers.
- Its industry produces products with integrated artificial intelligence.
- Its organizations—private, government and civil society—have been transformed into intelligent organizations.
- There is increased organized knowledge in the form of digitalized expertise stored in data banks, expert systems, organizational plans, and other media.
- There are multiple centers of expertise and a polycentric production of knowledge.

The key elements of Singapore's KBE strategy include heavy investment in information and communication technology (ICT) infrastructure, training programs to increase computer literacy, government support of R&D and R&D personnel, creation of research institutes in selected fields such as ICT, informatics, biotechnology, etc., and gearing education systems towards holistic education and the creation of "centers of excellence."

A significant contextual explanatory variable which needs to be examined in order to understand Singapore's success in capacity-building for k-economy needs is "good knowledge governance" (Wade, 1990; Menkhoff, Evers, and Chay, 2005: 1-19). This is evidenced by the impact of the various development blueprints (e.g., IT 2000), organizational arrangements and

regulatory bodies (e.g., Infocomm Development Authority of Singapore/IDA) which have transformed Singapore over the years from an entrepot to a modern knowledge-based economy (KBE).

Knowledge governance (Kaufmann, 1999; Stehr, ed., 2004; Menkhoff, Evers, and Chay, eds., 2005) is both an administrative process and a structure of authority relations. It involves the channelling of resources in building up knowledge management capabilities and in improving the competitive advantage of a country in the world market by using knowledge as a factor of production (Drucker, 1994). At the organizational level, the effective management of both tangible and intangible knowledge resources (in short, knowledge management), such as experience-based knowledge about customers' spending habits and consumer preferences or employees' competencies and successful problem-solving approaches in specific projects, requires leader-ship support, a culture of knowledge-sharing, suitable technology solutions, such as shareware systems, and people with a particular mindset and orientation toward work and peers (Grant, 1996; Hansen, 1999; Nahapiet and Ghoshal, 1998; Liebowitz, 2000; Szulanski, 2000; Alavi and Leidner, 2001; Ensign and Hebert, 2003; Chay, Menkhoff, Loh, and Evers, 2005).

Academically speaking, KM refers to the totality of organizational strategies aimed at creating a "smart" organization able to use as leverage its various IC assets, to learn from past experiences, whether successful or unsuccessful, and to create new value through knowledge. At the people level, KM puts emphasis on the competencies, education, and learning abilities of organizational members. At the organizational level, KM is concerned about the creation, utilization and development of the collective intelligence of an organization. Technologically, effective KM requires the efficient organization of a suitable communication and information infrastructure (e.g., intranet) based on relevant taxonomies and knowledge repositories (Menkhoff, Chay, and Evers, 2005a).

PROMOTION OF KM

The term "knowledge management" has various connotations in the context of Singapore, such as "people as the only resource" or "learning nation," indicating the importance of educational and human capital development policies in achieving k-society status. The official promotion of knowledge management is part of the efforts to increase the performance efficiency and service delivery of government bodies, statutory boards, etc. in line with the "Many Agencies, One Government" (e-Government) vision (Misra, Hariharan, and Khaneja, 2003). In this context, information provided via official e-services channels becomes important actionable knowledge for stakeholders. Prominent examples of government-related bodies that have successfully implemented intra-organizational knowledge management systems include the Singapore Police Force, the Land Transport Authority, the Immigration Department, and the National Library Board. Potential benefits from managing knowledge more effectively in the public sector include:

- · Improved productivity and service delivery efficiencies.
- Increased innovation capability.
- Core competency development.
- Improved decision-making.
- Greater responsiveness to changes.
- More unified strategy.
- Improved service to customers through greater customer knowledge.
- Improved employee morale.
- Strengthened relationships.
- Cost efficiency. (Riley, 2005: 122)

E-GOVERNMENT/NETWORKED GOVERNMENT

Besides its own citizens and public servants, strategically important stakeholders of government agencies include local firms and foreign multinational companies who appreciate the various (smart) global best practices implemented by Singapore's government over the last few years as part of its e-Government plans. One example is the so-called Online Licensing Business System (OBLS) which makes it easy to apply for required operating licenses (see below).

KM in Singapore's government has come a long way in comparison to the emphasis on ICT and automation which prevailed during the early 1980s, when the civil service computerization took center stage. The Civil Service Computerization Program (1980-99) was an important milestone of Singapore's journey towards an "intelligent island," as indicated in Table 1. In 1980, the Civil Service Computerization Group (CSCG) was established to improve the productivity of the civil service and propel Singapore into the information age. In 1981, the National Computer Board (NCB) was set up to implement computerization plans in the Civil Service, to spearhead the development of information systems, to coordinate computer education, and to promote the computer services industry. Reducing paperwork and automation were key goals during this phase. From 1985–90, with the National Information Technology Plan (NITP), led by NCB, the focus shifted to the private sector. NITP aimed to develop the IT industry and promote the use of IT for productivity and competitiveness improvements in all economic sectors. In the 1990s, the launch of the so-called "IT 2000: The Intelligent Island" plan marked the beginning of the 3rd CSCP phase with its emphasis on IT, telecommunications infrastructure, and sophisticated online and networking systems for Singapore's citizens (citizen-centric services). In 1999, the IDA was formed. In 2000, it launched the so-called "Infocomm 21" blueprint, a strategic plan to turn Singapore into a global infocomm capital for infocomm industries, research and development, venture capital, intellectual capital, education, and thought leadership, as well as an international showcase and test bed for infocomm applications and services.

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Year	National Infocomm Plans	Infocomm Plans of Government		
2010–15 2006–10	iN 2015	iGov2010		
2003-06	Connected Singapore	e-Government Action Plan II		
2000-03	Infocomm 21	e-Government Action Plan		
1992–99	IT2000	Civil Service Computerization		
		Program (1980–99)		
1986–91	National IT Plan	Civil Service Computerization		
		Program (1980–99)		
1980-85	National computerization plan	Civil Service Computerization		
		Program (1980–99)		

Table 1. Singapore's IT Master Plans (1980–2015)

Source: The Straits Times, 30 May 2006; S8

Infocomm 21 has since evolved into "Connected Singapore" to develop new sources of growth, including areas involving creative inputs, such as design and the arts: "Connected Singapore sees infocomm technology as a true connector, bringing together the power of computing, communications and content, to create new business opportunities, consumer value and cultural experiences" (*The Straits Times*, 30 May 2006; S8).

Infocomm 21 and Connected Singapore were instrumental in realizing the ambitious goals of the e-Government Action Plans I+II, with their emphasis on providing effective public e-services.

The key strategies of Singapore's e-Government action plan are:

- Electronic service delivery.
- Service-wide infrastructure.
- Knowledge-based workplace.
- Infocom education.
- Technology experimentation.
- ICT governance and management.

Singaporeans have access to 1,600 e-services with the ease of a mouse-click.

Examples of e-Government Services

The Online Business Licensing System (OBLS) is a one-stop portal that enables businesses to apply for 69 required operating licenses from 19 government agencies online (www. business.gov.sg/licenses). The so-called CitizenConnect Centers available at various community centers help people with little or no access to the Internet to get in touch with various government services (e.g., applying for an account at the National Library). The Work Permit Online service allows companies and private households to apply for, renew or cancel work permits (e.g., for maids). Results are obtained within one day which has significant effects in terms of cost and time savings. VOG (www.vog.gov.sg) is an online tool for public sector employees to search for suitable talent in government bodies and public agencies. Under the auspices of the Public Service Division of the Prime Minister's Office, it also offers information such as job descriptions, rewards and benefits. Singapore Personal Access or SingPass (www.ecitizen.gov.sg/ signpass) allows citizens to initiate various transactions (via one password) such as filing income tax declarations or viewing their Central Provident Fund (CPF) statements. The one-stop Senior Portal (www.seniors.gov.sg) provides senior citizens and their families with information about health, safety, housing, finance, employment legalities, grandparenting and volunteering. EnterpriseOne is a one-stop portal initiated by Singapore's Standards, Productivity and Innovation Board (SPRING) aimed at providing government information and services to businesses. A Chinese version is available at www.sccci.org.sg/ enterpriseone. mPAL enables citizens with General Packet Radion Service (GPRS) Java-enabled mobile phones and 'WAP over GPRS' settings to view their CPF accounts.

Recently, the government launched a new five-year infocom technologies masterplan called iGov 2010. iGov stands for Integrated Government. The new blueprint is aimed at further simplifying and integrating existing e-services as well as to develop new and innovative services in collaboration with both the private sector and citizens so as to "strengthen Singapore's competitive advantage and (to) make Singapore a place to live, work and play in" (Straits Times 30/5/2006, S2).

KM Experimentation Program (KMEP)

Singapore's government has actively promoted knowledge management in many different ways. A key mechanism has been the so-called KM Experimentation Program (KMEP) which started in 2001. It aims to build awareness among public sector agencies with regard to the organizational benefits of KM systems. The S\$ 5 million program helped to nurture knowledge management (KM) ideas, develop prototypes and trial systems by co-funding the cost of approved projects subject to a fixed cap per project. Participating agencies were asked to fund the remaining amount. Apart from providing seed funds to participating agencies, the program was aimed at facilitating "public sector-wide learning through co-ordinated planning and research on KM concepts; promotion of KM ideas; as well as sharing project experiences amongst participating agencies." Several agencies (among them the National Junior College, IE

Singapore, and the Singapore Police Force) have benefited from the program that emphasizes "knowledge bases and intellectual assets" in legal service, scholarship administration, education and best practices in productivity. As a result of the initiative, many government agencies have at least one full-time equivalent person doing KM (often located under the organization's CIO or Planning Department).

In 2001, Singapore's Standards, Productivity and Innovation Board (SPRING) published a high quality "Primer on Knowledge Management" to create awareness among employers and public agencies with regard to the benefits of KM. Another important player in Singapore's KM landscape is the Civil Service College, which has been tasked with the promotion of KM in the public sector. The college conducts KM-related training courses, as can be seen below.

STATUS OF KM VIS-À-VIS OTHER MANAGEMENT TOOLS AND INITIATIVES

Knowledge management is just one of many tools and initiatives used and implemented by Singapore's public sector agencies under the PS21 initiative. A recent visit by the author (to-gether with a group of civil servants from various Commonwealth countries) to the reputable (and KM-enabled) Jurong Town Corporation (JTC)—which manages Singapore's industrial estate development—in May 2007, as well as the author's former involvement in a Community of Practice (CoP) set-up by the Workforce Development Agency (WDA) in collaboration with KM *guru* Etienne Wenger, suggest that KM is well and alive in Singapore's public sector. However, it is important to note that related activities are not always called KM. Terms such as "organizational development" or "learning organization" are often used simultaneously. A particular challenge faced by both public and private sector organizations when it comes to KM is to measure its value added. There is a strong emphasis on accountability and sustainability of OD initiatives in Singapore, driven in part by the ongoing implementation of balanced scorecard/ROI approaches.

A reputable Singaporean service organization that has strategically implemented knowledge management processes aimed at increasing service quality, service innovation, and revenues is Singapore Airlines (Heracleous, Wirtz, and Pangarkar, 2006). In 2005, Singapore Airlines (SIA) was recognized as one of 14 Asian MAKE (Most Admired Knowledge Enterprises) winners in a study conducted by Teleos in association with The KNOW Network. For SIA, KM is a key business process, as it uses customer-related knowledge (via a sophisticated customer feedback system) to develop new product and service innovations. KM consultancy services are provided by large firms such as Siemens, Accenture, Microsoft, etc. Small local companies with KM expertise include Straits Knowledge and KDI. KM Consultants sometimes team up with Systems Integrators for Consulting + IT solutions. KM technology solutions are offered by companies such as Verity, Documentum, Hummingbird, Livelink, Sharepoint, Plumtree, or Authentica. Respective products are sold as traditional IT solutions with a KM slant.

Compared to the implementation of KM systems in Singapore's public sector and larger firms, the local business community has been somewhat less responsive in embracing formal KM systems. Small and medium-sized enterprises (SMEs) are not always aware of the potential benefits of implementing strategic KM systems (Menkhoff et al., 2004), as opposed to government-linked companies, foreign MNCs (e.g., Siemens), and consulting companies.

HOW KM IS DEFINED OR UNDERSTOOD

There are various definitions of KM. How local organizations in Singapore define and deploy KM is contingent upon their strategic orientation and interests, as indicated by the following samples of KM-related job advertisements.

Sample of KM Job Advertisement in Singapore

KM Job: Assistant Director in Singapore Tourism Board (STB) (2/2005)

Assistant Director, Information & Knowledge Management

You will lead a team to identify and drive implementation of knowledge management processes, procedures, and systems to facilitate tacit knowledge creation, capturing, and sharing within STB. You will develop and review knowledge management content governance and policies to ensure that sensitive and non-sensitive content are managed appropriately in STB. In supervising change management activities, you will be required to educate about and promote the use of knowledge management methodologies, tools, and processes in the organization. You will be required to review knowledge management measurements to track and/or recognize staff for efforts in knowledge-sharing and collaboration. You will also build the team's capability to help them perform their role and responsibilities.

You should have at least eight years of relevant working experience, with in-depth understanding of knowledge management principles and processes, and you should possess experience in implementing these within an organization. You should have strong analytical, conceptualization, and systems thinking skills. Excellent change management and communication skills are also essential.

NATIONAL BUSINESS AND ECONOMIC CONTEXTS OF KM PRACTICE

Singapore launched its state-led start into a knowledge society (based on high-value-added, high-tech industries and a knowledge-based service sector) in the early 1990s after an initial phase of export-oriented industrialization (Rodan, 1989). A recent report on the state of the economy describes the road map to Singapore's future as follows:

As the Singapore economy develops, it can no longer rely on the accumulation of capital and labor to sustain economic growth. Singapore needs to further develop its KBE (knowledge-based economy), deriving its growth from the production, dissemination, and application of knowledge. (Toh, Tang, and Choo, 2002)

Earlier, the foundation of a National Science and Technology Board in 1991 had marked the beginning of a massive government-led drive to improve the technology base of the Singaporean economy. The Strategic Economic Plan of 1991 identified strategic clusters of manufacturing and services earmarked for government support. The Singapore Science Park was set up to facilitate research and development and to host the R&D activities of high-tech corporations and agencies. Various scholarship schemes were launched to train young scientists abroad. The National Information Infrastructure (NII), which was started in 1992 with the objective of deploying a national broad-band network, has been implemented (Low and Kuo, 1999).

During the Asian financial crisis, it became clear that standard technology, for example, the production of mass storage devices, could no longer be sustained in the face of competition from China. Singapore needed to concentrate on new, innovative technologies to maintain a competitive edge. This would only be possible if the knowledge base of the economy could be further strengthened. The idea that knowledge had become the major factor of production was quickly adopted by economists and the planners of the powerful Economic Development Board (EDB). The drive for a broader defined knowledge-based economy *per se* was outlined in government documents in 1999 (Singapore, 1999). A 10-year plan, Industry 21, outlined the path to take to "develop Singapore into a vibrant and robust global hub of knowledge industries in manufacturing and traded services, giving new emphasis to knowledge-based activities as the frontier of

competitiveness" (Chia and Lim, 2003). The situation became more urgent when knowledge-intensive semiconductor producers experienced a downturn in 2001–02.

The Singapore government reorganized and renamed the statutory boards that had been responsible for the development of a high-tech industrial base. The National Science and Technology Board (NSTB) was reorganized and became the Agency for Science, Technology, and Research (A*STAR). This organization established two research councils, the Biomedical Research Council and the Science and Engineering Research Council, to support private-sector research and development. It also formed Exploit Technologies Pte. Ltd. to safeguard and market intellectual property and the patents created by its research institutes.

During the 1990s and into the new century, a massive recruitment drive brought in foreign professionals, scientists, and technologists with R&D skills (A*STAR 2002). The relatively high percentage of foreigners in local research institutes may be interpreted as an indicator of Singapore's high degree of globalization—but it has also raised concern over Singapore's increased dependence on foreign talent. There was also massive investment in institutions of higher learning. The two older universities, NUS (National University of Singapore) and NTU (Nanyang Technological Universities), were complemented by a new government-financed but privately-run institution, the Singapore Management University, with an undergraduate training program modeled after the famous Wharton School (U.S.).

In 2004, the construction of the "Biopolis" complex was completed. This biomedical city is situated at the Buona Vista Science Hub. Tenants include the Genome Institute of Singapore (GIS), a research institute affiliated with A*STAR, the Singapore Institute of Molecular Biology, the BioTechnology Center, the Bioinformatics Institute, the Institute of Biomedical Engineering, and other R&D organizations. Biotechnology represents one of the four pillars of a knowledge-based economy prioritized by the Singapore government. Besides industries in the areas of biotechnology/biological sciences, future growth is expected to be driven by microelectronics, robotics and artificial intelligence, information technology, laser technology and electro-optics, and communications technology.

By now Singapore has a very well-developed knowledge infrastructure in terms of ICT, research institutes, and knowledge workforce (Toh et al. 2002). Considerable research is being conducted by scientists and researchers in Singaporean institutions of higher learning and research centers, especially in the areas of biotechnology and the life sciences. This is in line with the blueprints of the Singapore government aimed at staying economically competitive in the knowledge-based economy (Singapore Economic Development Board 1999). Universities like NUS, NTU, and SMU strive for recognition as world-class research centers, and institutions like A*STAR and affiliated organizations carry out cutting-edge applied research.

K-Society Measurements and Indicators

According to a study by Evers et al. (2004a), Singapore performed better than Germany or the Netherlands in terms of R&D. With regard to the number of mobile phones per 1,000 inhabitants, Singapore also outperformed Germany, the Republic of Korea, and Malaysia. It also has the highest number of PC owners per 1,000 inhabitants. The output of Singapore's emerging knowledge-based economy so far has been impressive, as indicated by the increasing number of patents filed (in part in cooperation with other countries such as the U.S.). Key success factors of Singapore's KBE achievements include:

- 1. The creation of knowledge hubs, competence centers, and centers of excellence.
- 2. The creation of knowledge clusters as learning regions.
- 3. The transferral of knowledge to local stakeholders in civil society and the government.
- 4. The transferral of knowledge through global networks (including GPNs).

5. The use of local knowledge to build comparative advantages. (Evers, Gerke, and Menkhoff, 2006)

HOW KM IS PROMOTED AND DISSEMINATED

KM is promoted in many different ways and contexts. An Infocom Education Program (IEP) was launched in 2001 to equip public officers with new ICT-related skills and competencies to support the e-government vision. The program also features a Distinguished CIO Speaker Series and strategic computing courses for public sector leaders. In terms of knowledge management and knowledge-based workplace skills, the KM Experimentation Program (Prime Minister's Department) provided important inputs as outlined above.

An important educational role in terms of KM education is played by the MSc (Knowledge Management) Course offered by the Nanyang Technological University (NTU), an offshoot of the MSc (Info Studies) program. The MSc KM program is a two-year course (part-time) consisting of three core subjects, six to eight electives, and a dissertation. The fifth intake (about 40 students per intake) was in July 2006. The course initiative supports the respective government blueprints in areas such as learning nation, knowledge management, learning organization, etc. In the context of this program, more than 100 dissertations have been submitted with a focus on KM in (local) public organizations.

A close collaboration exists between the NTU MSc KM program and the Civil Service College to promote KM among Singapore's civil servants and to provide relevant skills upgrading. CSC offers various KM courses in collaboration with other agencies and/or external consultants.



Figure 1. Number of PCT Patent Applications Filed by Singapore, Malaysia, Thailand, and Indonesia, 1997–2005

Example of a KM Course Organized by the Civil Service College

Title: "Coming to Grips with Taxonomies" (Facilitator: KM consultant)

Short description: A practice-oriented one-day seminar on how to use taxonomies, thesauri, and metadata effectively in KM projects, with Singapore-based case studies and hands-on practice activities.

Venue: Civil Service College

Program: "Introducing Taxonomies for KM" (Facilitator: Faculty from MSc in Knowledge Management Programme, NTU). "The Business Case for a Taxonomy" (Speaker: Vice President of software company). Case Study 1: "Building Multiple Taxonomies Around User Needs—The NLB's Digital Library Project" (Speaker: NLB Leader). Taxonomy Practice Activity 1: "Issues and Challenges in Using Taxonomies" (facilitated by KM consultant). Case Study 2: "Generating a Taxonomy from a Knowledge Audit." Taxonomy Practice Activity 2: "Walking the Talk" (facilitated by KM consultant).

KM CHALLENGES

One of the challenges is that KM is too closely associated with IT tools. While technology is certainly one of the key enablers of KM, there is a need to balance tools with the organizational culture to tackle silo thinking or "knowledge is power" mindsets and to align the KM strategy with existing management frameworks (e.g., ROI). There is also a need to link KM to ROI and to the strategic goals of the organization. Another problem is the lack of awareness among SMEs with regard to the practical benefits of KM. Other issues include a shortage of published KM success stories, misunderstandings among employers with regard to the difference between IT and KM (most advertised KM-linked jobs are still IT adverts), lack of time, unwillingness to share knowledge, failure to address cultural issues, and over-reliance on senior managers who are believed to be responsible for KM.

LEADING PROMOTERS, CHAMPIONS, AND LEAD INSTITUTIONS

- Prime Minister's Department/Head of Civil Service/SPRING Singapore.
- Infocomm Development Authority (IDA).
- Nanyang Technological University (NTU), National University of Singapore (NUS), Singapore Management University (SMU).
- Civil Service College (CSC).
- iKMS.

Singapore's Information and Knowledge Management Society (iKMS)

As a non-profit IKM organization, the Information and Knowledge Management Society (iKMS) plays a crucial role in promoting KM in Singapore. iKMS aims to serve information and KM professionals (members) by making information on KM easily available through a wide array of resources: evening talks, seminars, conferences, networking opportunities, journal, newsletters, special interest groups, collaboration forums, and group discussions (www.ikms. org). The initiative started in Singapore in late 1999 as a KM interest group. It was registered as a society in 2001, chaired by Dr. Suliman Hawamdeh. iKMS publishes a quarterly peerreviewed KM journal and has a membership of close to 300 members, about half of whom are corporate members. It brings together practitioners, researchers, and commercial providers, maintaining links with other KM organizations in Pacific Asia, Europe, and the Americas. Its mission and objectives are:

- 1. To create awareness of KM and information processing through seminars, conferences and publications.
- 2. To promote the development of effective KM practices in both the private and public sectors in Singapore.
- 3. To promote research and development in the field of KM and information processing.

iKMS members derive various benefits, such as bimonthly talks and sharing sessions with KM experts in KM workshops and seminars for professional development. There are also special interest groups with a focus on digital content, KM metrics and standards, KM ethics, and KM processes. In the past, members have participated in several KM conferences, including KM Asia, KM in Government, World Knowledge Forum, ICADL, Asia Pacific Conference on KM, etc. iKMS also publishes a newsletter of events and resources and maintains an online memvership website with links, resources, and members' feedback. It provides access to local KM research and case studies.

The first issue of iKMS' journal, *Journal of Information and Knowledge Management*, was published in 2002. Members receive the quarterly journal issues free of charge. It features research as well as practice-oriented papers by academic, business, and government contributors on topics such as the role of context for KM, culture, information processing, information management, KM, tools, techniques and technologies, knowledge creation and sharing, best practices, policies and guidelines, frameworks for KM, tools for KM, and KM education. The publisher is World Scientific.

Examples of iKMS Evening Talks (23 Mar 2006):

Talk 1: "Building Capability through Cognitive Apprenticeship: The Singapore Armed Forces Competency-Based Learning Project" (Speaker: Learning Development Officer from SAFTI Military Institute, Singapore).

Talk 2: "Knowledge Mobilization: Leveraging and Extending Knowledge Management" (Speaker: NTU Visiting Professor).

Example of an iKMS Seminar (4 May 2005):

"KM 101" (Instructor: iKMS Representative)

Objective: to equip knowledge managers with the basic KM tools and techniques; practical exercises and group activities.

Intended outcomes: at the end of session, the participant will have an overview of the Siemens KM framework and gain a basic understanding of the different components of a typical KM framework.

iKMS KM Conferences

iKMS organizes international KM conferences on an annual basis. Proceedings are published by World Scientific. The second ICKM, 2005, was conducted in North Carolina, U.S. The third ICKM, 2006, took place at the University of Greenwich, London, while the fourth ICKM, 2007, was held in Vienna, Austria.

Since 2001, the author has been proactively involved as Course Director of the MFA-CommSec Knowledge Management Program (duration: 6 days), conducted annually at the Singapore Management University (SMU). The sixth run of the program (funded by the Singapore Ministry of Foreign Affairs and the Commonwealth Secretariat/CS) was conducted at SMU in May 2007 and attended by about 20 senior government officials from various African countries, South Asia, the Caribbean Islands, etc. Led by the author and KM experts from the Center for Development Research at Bonn University (Professor Hans-Dieter Evers) as well as the Governance and Institutional Development Division of CS (M. Jasimuddin), the participants explored the strategic issues and the methodology of sustainable organizational KM and national knowledge governance infrastructures. Key learning methods included lectures, case analyses, group discussions, guest lectures by KM software experts and KM consultants, self-directed learning, and a field visit. On day three of the program, the participants visited Jurong Town Corporation (JTC) to learn what a smart Singaporean learning organization looks like. Strategy, culture, and people are by far the most important enablers of KM. Based on various case studies such as JTC, Siemens, the Inland Revenue Authority of Singapore (IRAS) etc., the participants discussed intensively how the shift from a "knowledge is power" mindset to a culture of sharing in a KM-enabled organization can be managed successfully and what knowledge governance structures are required to master in the transition towards a k-economy/society. They also had the opportunity to develop and present action plans to implement KM systems in their own organizations and countries. It is envisioned that the KM program will help representatives of both developing countries and emerging markets to appreciate and manage the difficult transition toward a knowledge society more effectively and to become KM champions in their own organizations.

KM PRACTICES

Good KM practices have been illustrated in two case studies in this book: Jurong Town Corporation and Qian Hu.

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INTRODUCTION

Professor Ikujiro Nonaka, knowledge management (KM) guru, has said, "In an economy where the only certainty is uncertainty, the one source of lasting competitive advantage is knowledge." This has been proven to be true in a knowledge-based economy (KBE), where knowledge assets—the knowledge possessed by an organization and its employees in the form of information, ideas, know-how, understanding, memory, insights, technical skills, and capability—are more vital than tangible assets such as machines and facilities. Knowledge assets are not only held by the organization but also reside with customers, suppliers, and partners.

An organization's competitiveness depends on how well it can use and create new knowledge to increase quality, reduce costs and time, and develop new products to meet and exceed customers' requirements and expectations. Organizations that effectively manage the creation and utilization of knowledge will be able to exploit market opportunities and deliver better quality and faster products and services, thus increasing operational efficiency and creating value for their customers. It is now recognized that the practice of knowledge management is essential for the sustainability of organizational competitiveness in the knowledge-based economy.

KM DEVELOPMENT: AN INTEGRAL PART OF THAILAND'S JOURNEY TOWARDS A KNOWLEDGE-BASED ECONOMY/SOCIETY

Thailand's journey towards a knowledge-based economy/society (KBE/KBS) is still at an early stage when compared to those of other leading Asian countries, including Japan, Singapore, and the Republic of Korea, but a significant step was taken with the development of the 9th National Economic and Social Development Plan (2002–06) after Thailand's recovery from the economic crisis in the late 1990s. In this regard, one of the key goals—"Value Creation through Knowledge Base"—was realized through the promulgation of various national policies and initiatives relevant to the key components of KBE as defined by the World Bank, including innovation system development, human resource development, information and communication technology (ICT) systems, and enabling environment and institutions.

Since these integrated national policies and plans for a KBE/KBS economy/society were only initiated recently, each ministry or concerned agency has developed a master plan and strategy for KBE within their own contexts. Thus key initiatives in each component of KBE have been undertaken, sometimes in coordination but more often independently of one another. Only those related to ICT and public sector reform which have significant impacts on national KM promotion and development will be included in this paper.

Information and Communication Technology

Thailand's two national information technology policies—IT 2000 and ICT 2010—were drawn up by the National Information Technology Committee, with the National Electronics and

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Computer Technology Center (NECTEC) as the secretariat. IT 2000 was aimed at developing the basic foundation for ICT infrastructure, and ICT 2010, approved by the Cabinet in 2002, primarily focuses on harnessing the benefits of ICT to move Thailand towards a knowledge-based economy/society (KBE/KBS). The ICT Ministry, established in 2002 as part of public sector reform and in response to the ICT Master Plan, was the key driver in reinforcing the government's commitment to the development of ICT for national advancement in line with ICT 2010.

The IT 2010 policy framework consists of three main objectives: upgrading the status of Thailand's technological capability from a "dynamic adopter" into a "potential leader" based on the United Nations Development Program's Technology Achievement Index, increasing the number of knowledge-based workers in Thailand from 12% to 30% of the total labor force, and increasing the proportion of knowledge-based industries to 50% of the country's GDP. In order to achieve these objectives, the IT 2010 policy framework lays out strategies to cover five main areas of development: e-Government, e-Commerce, e-Industry, e-Education, and e-Society.

As for the short-term strategies set out in line with ICT 2010's goals, three priority areas have been focused on: development of the software industry, development of e-government, and promotion of ICT utilization among SMEs. Some key initiatives were undertaken by various public and private institutions/organizations involved:

- The establishment of a Software Industry Promotion Agency (SIPA) to provide direction and measures for the development of the software industry and to provide a onestop service to drive investments in the software industry.
- ICT professional training.
- The establishment of a Software Excellence Center in the Software Park.
- High-speed internet services.
- Setting up government information technology services as well as electronic systems for public sector operations and services, including e-payment, e-citizen services, e-auction, e-budgeting, smart ID cards, back-office operations, and nationwide networks among public agencies.
- Enabling SMEs to utilize ICT in major business and back-office operations.
- Establishment of the Thailand Knowledge Center (TKC) within the Ministry of ICT to serve as a knowledge center for all Thai people.

The ICT initiatives undertaken serve as an important technology foundation and an enabler for KM implementation in both the public and private sectors.

Public Sector Reform

The key initiatives which significantly accelerated the movement towards a knowledgebased society in the public sector country-wide occurred when the State Administration Act and the Government Restructuring Act went into effect in 2002. This resulted in the establishment of the Office of the Public Sector Development Commission (OPDC) under the Office of the Prime Minister to drive and promote public sector reform aimed at more citizen-focused, efficient, and cost-effective public services and the promotion of the changes of paradigm, culture, and values of government officers for better personal and organizational performance as well as a better quality of life for government workers.

Specifically, the Royal Decree on Good Governance enacted in 2003 specifies that the public sector is required to become learning organizations through improvements in the creation, sharing, and utilization of knowledge for the improvement of operational efficiency and effectiveness. The aim is to use KM as a means to build a change management team in each and every government office. As a result, implementation of KM has been included as one of the key

performance indicators for all government offices since 2004. Although this is a top-down approach which makes KM an obligation and is not based on demand, it has resulted in a massive implementation of KM by the public sector country-wide for the improvement of organizational performance and initiatives towards building a learning organization.

The results from a survey recently conducted by the Thailand Productivity Institute as part of this study confirm that the inclusion of KM as a performance indicators for the public sector by OPDC has had a significant positive impact on KM awareness in this sector, as more than 95.7% of the government offices participating in the survey are now implementing KM, compared to only 22.6% in the private sector.

The low rate of KM implementation in the private sector is not unexpected, since existing national policies and plans so far do not specifically or explicitly focus on KM development and promotion in the private sector. However, key strategies of the Ministry of Industry (2005–08) have included the restructuring of industrial infrastructure to knowledge-based industries and the improvement of work force competency and organizational competitiveness for KBE. Until recently, most national policies and plans to support private-sector KM initiatives are related to ICT, science and technology (S&T), and innovations. Some examples are the promotion of software industry investments, the promotion of ICT utilization for SMEs, human resource development in ICT, S&T, and innovations, high-speed internet services, financial incentives for R&D technology development and innovations for Thai private companies, etc.

Although no designated national plan for KM development and promotion exists, the knowledge dimension has now been focused and integrated into all key national policies and master plans, for example, the 10th National Economic and Social Development Board Plan, the Master Plan on Intellectual Infrastructure Development, the ICT Master Plan, the S&T Master Plan, the Industry/Agriculture/Service Reform Plan, etc. The challenge now is how to drive and accelerate knowledge management processes (the creation, diffusion, and utilization of knowledge) at both the macro and micro levels.

It is now recognized that development of the intellectual infrastructure, including human capital, organizational landscape, conducive environment, and a learning society that enables knowledge management processes, is critical for innovation, productivity improvement, and sustainable competitiveness as well as the well-being of the Thai people. The results of the recent National Economic and Social Development Board's studies on nine key national policies and master plans indicate that key components supporting the intellectual infrastructure do exist in those policies and master plans, but the emphasis on various components of the intellectual infrastructure varies. For example, the National Industry Master Plan emphasizes the development of an environment conducive to manufacturing and work force competency development, while the Education Master Plan focuses on human capital development. In addition, there is no mechanism in place to integrate the existing policies and master plans; policies, plans, and institutions overlap. Therefore, attempts are being made to:

- Set up a central institute responsible for integrating and aligning relevant policies, master plans, institutions, and mechanisms.
- Promote the linkages of sectoral innovation networks.
- Promote the development of master plans at the local/community level for future globalization.

The challenge for Thailand now is how to integrate the master plans, policies, and responsible institutes to minimize redundancy, maximize outcomes, and create synergies for all parties involved so that national development towards KBE/KBS will be more efficient and effective.

LEADING KM PROMOTERS, CHAMPIONS, OR LEADING INSTITUTES AND THEIR INITIATIVES

Recognizing the importance of KM as an integral part of national development efforts towards KBE/KBS, various institutes or agencies have been established to drive, support, facilitate, or promote the implementation of KM at the national or organizational levels in all sectors since the beginning of the 9th National Economic and Social Development Plan (2002–06). At the national level, KM has been driven and promoted by key institutes, mostly by public organizations and institutes using various approaches such as policy setting, collaboration, community-building and networking, workshops, conferences (local and international), educational programs, publications and media, and ICT tools such as knowledge portals, web sites, and blogs. At the organizational level, a number of public and private organizations use various promotional approaches such as seminars, training and workshops, pilot projects, consultancy services, and publications. Some of the leading organizations promoting KM and their initiatives:

The Knowledge Management Institute (KMI)

The main KM promoter in Thailand is the Knowledge Management Institute (KMI), a nongovernment organization established by the Thailand Research Fund (TRF) in 2002. KMI's mission is to drive Thailand towards KBS and for the country to become a learning society through the promotion of KM in all sectors of society and the development of context-specific KM methodology, as well as KM capacity-building in all sectors for a better quality of life and the happiness of the Thai people. KMI's key strategy is to be a facilitator but not an implementer of all KM initiatives undertaken by participating organizations and networks. Therefore, KMI has only 12 employees, including the executive director. More importantly, KMI has also practiced KM in its operations, integrating knowledge-sharing in its work processes, office layout, and working climate. In five years since its inception, KMI has become the most recognized institution in the national KM arena, with the following achievements:

- Development and dissemination of practical KM models/methods for Thai organizations such as the Tuna Model, Communities of Practice (CoPs) methodology, Knowledge Market, After Action Review (AAR), etc.
- Establishment of a large number of cross-sectoral and cross-organizational knowledgesharing networks nationwide to promote the creation and diffusion of knowledge from knowledge providers to knowledge users, including:
 - Ministries and provincial offices (five departments, three provincial offices, one state enterprise, OPDC).
 - Health care networks (three health care/regional networks, five institutes, two hospitals).
 - Education networks (vocational schools network, Rachapat University network, University KM Network, consisting of seven universities, Ed-KM network, consisting of more than 95 KM core teams from schools, two projects, two institutes/networks for teacher development, Buddhism Learning Centers).
 - Community/social networks (at least seven networks in agriculture, community development, and drug control and prevention).
 - Private sector (at least six companies).
- Capacity-building of KM facilitators, chief knowledge officers (CKOs), and KM master trainers for a large number of networks and organizations through participatory KM workshops (more than 40 workshops were conducted in 2006) and advisory visits to a large number of networks/organizations.

- Organizing various KM conferences, seminars, and meetings, such as the Annual National KM Forum, the largest KM forum in Thailand with more than 2,000 participants from all over the country, KM Forum for Public Sector Movement towards a Learning Organization in collaboration with the OPDC, and the Thailand Productivity Institute, the Forum for Local Community Networks Alliances.
- Capturing and sharing of KM best practices in organizations in the public and private sectors (at least 30 organizations in 2006).
- Organizing site visits to organizations that have good KM practices.
- Providing awards and recognitions, for example, the Distinguished Blog Writer Award, awards for high-performance CKOs, KM network managers, and KM facilitators.
- Providing financial support for several projects on KM promotion in community development and agriculture.
- Conducting special promotional projects, including the KM internship project, the KM externship project, the KM road shows, and the Intelligent Organization Coaching Service (IOCS).
- Promoting knowledge through various media: books, KMI newsletters, CDs, KMI web site, and web blog (www.gotoknow.org).

Office of Public Sector Development Commission (OPDC)

The Office of Public Sector Development Commission (OPDC), one of the key KM drivers in the public sector, was established in 2002 under the Prime Minister's Office to promote public sector development in accordance with the Public Administration Act enacted in 2002. One of the OPDC's responsibilities is to monitor public sector reform through key performance indicators, one of which is KM. This initiative has created significant impact on KM awareness and implementation in the public sector as part of public sector reform.

To help the public sector introduce their KM initiatives, the OPDC, in collaboration with the KMI, the Institute of National Quality Improvement, and the Thailand Productivity Institute (FTPI) in various stages of their development, provides KM seminars, conferences, and KM training courses/workshops for CEOs, CKOs, senior management personnel, and KM core teams of central and regional government agencies countrywide. A pilot project on KM implementation was undertaken in Nonthaburi Provincial Office and the Department of Customs with the aim of using the pilot organizations as role models for KM implementation in the public sector.

In addition, the OPDC has just launched the Public Management Quality Award Scheme (PMQA), a public-sector version of TQA, to promote public sector awareness of performance improvement. In connection with KM, the PMQA has included KM as one of the requirements. Thus, PMQA will indirectly enhance the awareness and implementation of KM in the public sector.

At present, the OPDC is monitoring and sustaining KM implementation in all government offices and at the same time has started initiatives on using KM a means for learning organization development in the public sector.

The Thailand Productivity Institute (FTPI)

The Thailand Productivity Institute (FTPI), a national productivity organization under the Ministry of Industry, has been promoting knowledge-sharing networks since 2000, primarily in the private sector, through benchmarking (BM) programs that include consulting, training, and site visits. This was done at a time when the KM concept was still unrecognized in Thailand. The institute's objectives are to facilitate the identification of best practices in companies and to share them across organizations. So far, more than 400 organizations in the various industrial

sectors (agro-products, rubber products, pharmaceutical products, sugar, automotive parts, etc.) have participated in this network.

FTPI is a one of the key supporters of KM implementation in the public sector through its KM consulting services to OPDC. In addition, FTPI has also assisted OPDC in developing the Public Management Quality Award Scheme (PMQA), a means to indirectly promote KM awareness and implementation through its requirements. Besides providing KM consulting and training services to OPDC and individual organization, FTPI also regularly organizes public seminars and conferences on KM (local and international conferences) and site visits to KM best-practice organizations, and it cooperates with KMI and other institutes in various KM events. KM books and articles are also published to promote awareness and understanding of KM in all sectors.

The Office of Knowledge Management and Development (OKMD)

To promote KM for the public at large, the Office of Knowledge Management and Development (OKMD), a state agency under the Prime Minister's Office, was set up in 2004 to provide and share opportunities and intellectual pursuits within Thai society. All Thais are to have an equal opportunity in accessing learning facilities that can be used to advance their own careers. The OKMD consists of seven specialized organizations, each one a separate entity under its administration:

- The National Institute for Brain-based Learning (NLB) promotes parents' understanding of child care practices through the provision of a gift bag containing a handbook on child care for parents of newborns.
- The National Center for the Gifted and Talented (NGT) arranges a special education curriculum and appropriate learning processes for gifted and talented children through adulthood.
- The Thailand Knowledge Park (TNP), an innovative new library, provides space and multimedia resources for children, a nurturing environment for fostering creativity.
- The National Discovery Museum Institute (NDMI) provides all Thai children with Thai history using new paradigms to relate the story of how the nation came into being. The story serves as a basis for enhancing creativity and imagination.
- The Thailand Creative and Design Center (TCDC) presents design works from all over the world for Thais to learn design methodologies and product development.
- The Thailand Center of Excellence for Life Science (TECLS) helps keep pace with the advances in biotechnology.
- The National ICT Learning Center (NILC) provides a knowledge base for Thais to learn about and become savvy in computer literacy and the IT system.
- The Center for the Promotion of National Strength on Moral Ethics and Values (Moral Center) promotes morals and ethics through the interaction of the public and private sectors countrywide.

It is hoped that these specialized organizations that serve as public knowledge resource centers will facilitate the self-learning process by the Thai people and thus create the "new Thai blood" that can adapt to changing world circumstances and play a major role in Thai society's movement towards KBS and a learning society.

The Thailand Knowledge Center (TKC)

The Thailand Knowledge Center (TKC) was established under the Ministry of ICT with the aim of promoting the development and management of knowledge in digital media, i.e., textbased, image, and multimedia for the public. TKC, a knowledge center accessible to the public, promotes two kinds of knowledge: local community knowledge, such as local foods, herbs, etc., and non-local knowledge in 13 areas, such as sciences, technology, management, etc. TKC also provides free web hosting services, an email service system, a search engine, multimedia services, e-learning, web conferencing, online discussion forums with experts, a forum for the development of information literacy skills, a TKC portal, and a virtual space for CoPs.

The Knowledge Network Institute of Thailand (KNIT)

The Knowledge Network Institute of Thailand (KNIT), a non-profit organization, was established in 2003 under the Foundation for Higher Education Promotion within the Bureau of Higher Education, Ministry of Education. Its mission is to utilize experts' knowledge in higher educational institutions for efficient and sustainable national development through focused policy research, coordination, and collaboration with all parties involved in Thailand and overseas, facilitation and management of the knowledge-sharing networks, and establishment of a knowledge repository as well as an experts' database by sector.

Universities

The higher education institutes are also key players in KM capacity-building. So far, at least four universities in Thailand offer master's or doctorate degrees in KM: Chiengmai, Mahidol, Silapakorn, and Rachapat Suan Dusit. In fact, almost all of the master's degrees in management being offered in most Thai universities have incorporated KM as one of the topics in their management curricula. KM has also become a very popular topic for master's and Ph.D. theses in various disciplines—human resource management, hospital management, educational management, business management, etc.—as indicated by the more than 40 theses on KM (master's and doctoral degrees) published by local universities. KM experts at these universities sometimes provide training, advice, or consultancy services on KM to organizations upon request.

KM Consulting Companies

Some internationally recognized consulting companies, a few local companies, and some local freelance KM consultants help promote KM implementation through their consulting and training activities. However, the services are still very limited compared to the demand.

KM STATUS SURVEY

A mini-survey on KM's status in Thailand was undertaken as part of this study to better understand the perception, awareness, and actions taken on KM in the public and private sectors. Questionnaires were sent to more than 2,000 organizations in the private sector (mostly large enterprises) and the public sector (all government offices and state enterprises). Out of the 202 questionnaires returned (~10% response rate), 133 were from private companies. Out of the 202 respondents, 73% and 42% were middle-level managers, directors, or higher in the private and public sectors, respectively. Eighty eight per cent of the respondents have heard about or were aware of KM; 45% of these understood the KM concept, and 37% had heard about it but did not know its concepts. Only 60% of those who said they understood the KM concept gave clear answers when asked about KM.

Training or seminars, mass media (television, radio, publications), and internal communications were the top three sources of information from which respondents learned about KM. This indicates that training, seminars, and conferences might be good approaches in creating KM awareness.

Forty-eight percent of respondents are now "consciously" implementing KM, 67% and 33% from the public and private sectors, respectively. Government offices implementing KM accounted for 96% of the respondents from the public sector. The high level of KM imple-

mentation in the public sector is likely due to the inclusion of KM as a key performance indicator by OPDC. This top-down approach seems to work very well in terms of creating KM awareness. However, the effectiveness and sustainability of KM initiatives undertaken in the public sector must be closely monitored.

Interestingly, international companies accounted for only 8% of the respondents from the private sector that is now implementing KM. This is below expectations, since Western and Japanese companies are believed to have embraced KM earlier than Thai companies. It is very likely that some of these companies might unconsciously be implementing KM or that KM has been fully integrated into their work processes and thus is not explicitly mentioned.

The results also indicate that more than half of those responsible for KM initiatives in organizations were senior management, followed by the designated unit for KM (40% were in the human resource development unit), middle management, and the KM committee, respectively. There was no significant difference observed between the public and the private sectors in this regard.

Reasons for not implementing KM included a lack of understanding on how to do it, the high investment involved, the unavailability of KM consultants, and the lack of awareness on KM benefits.

Respondents who were implementing KM were also asked to rank their KM practices in five aspects: KM processes, leadership, culture, technology, and measurements, based on a scale of 1-5. Some key points:

- Most respondents were aware of the importance of KM and thus included KM in their organizational strategies. Although organizations encouraged employees to embrace KM, it was not integrated into the performance management system.
- Although most respondents were aware that organizational culture was one of the key success factors for KM implementation, very few were successful in fostering such a culture. This might be due to the fact that most respondents were still at the early stage of KM implementation and thus cultural changes were not yet evident.
- IT had been used for internal communication and collaboration among employees as well as for organizing, storing, and transferring information and explicit knowledge. However, information and knowledge from various sources were not very well linked or integrated.
- A KM measurement system seemed to be the least developed area in most respondents' companies.

Based on the respondents' perceptions of benefits gained from KM, the scores from the private sector were higher than those from the public sector. Table 1 shows the benefits gained in both sectors ranked in order.

	1
Public Sector	Private Sector
1. Employee satisfaction	1. Product and service delivery
2. Employee efficiency	2. Employee efficiency
3. Customer satisfaction	3. Customer satisfaction
	Quality of products/services
4. Quality of products/services	4. Employee satisfaction
5. Product and service delivery	5. Profits

 Table 1. Benefits Gained from KM Implementation (Ranked in Order)

Critical success factors for KM implementation included senior management commitment and support (91%), the capability of the KM core team (understanding of KM concepts and methodology) (72%), responsible person(s) or unit for KM (51%), inclusion of KM into the performance measurement system (46%), and supporting IT systems (31%), respectively. The results are in line with the critical success factors observed in two case studies included in this book.

As for the problems encountered, most respondents thought that the main problem was a lack of participation of employees (75%), a lack of understanding of the implementation steps (74%), a lack of resources (mostly manpower) (65%), and a lack of senior management support (45%). These results are in accord with observations in the two case studies presented here, where employees were well informed about the objectives and benefits of KM implementation and thus had buy-in.

Overall, the survey results indicate that the public sector is ahead of the private sector in terms of KM awareness and initiatives, which might be due to the inclusion of KM as one of the performance indicators for the public sector and the lack of a national policy or measures to promote KM in the private sector. However, the private sector seems to be more effective in terms of mapping out strategic directions and outcomes. As for the promotional approach, seminars and conferences seem to be the most effective approaches to enhancing KM awareness.

In addition, the results obtained from the survey reflect and support some key findings in the two best practice case studies (the Faculty of Medicine Siriraj Hospital and the Siam Paper and Packaging Business, SCG Group), as presented here, particularly the importance of senior management support and participation, organizational culture, and employee buy-in, all of which are related to people. The results indicate that KM success is primarily based on the management of people and not on technology.

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VIETNAM MACRO ECONOMY

Vietnam is a transitional and developing economy. The country was accepted as a member of the World Trade Organization (WTO) as a less-developed country in 2006. The Vietnamese government is firmly committed to building up a market-based economy. Vietnam is considered one of the most dynamic economies in the region. Its economic growth rate is among the top, at 7.51% on the average during the years 2001–05 (Figure 1). It was estimated that it would be as high as 8.2% in 2006. The economic structure has been shifting from agriculture-based to industrial-based, with the reduction of the share of the agricultural sector in the gross domestic production (GDP) decreasing from 27.2% in 1995 to 20.7% in 2005. The share of the industrial and construction sector increased from 28.8% in 1995 to 40.8% in 2005; services decreased from 44% to 38.5% (2005) (Figure 2). Vietnam has been attracting many international investors due to its high economic growth rate, stable political situation, and the government's economic reform commitments.



Figure 1. Some Indicators of Economic Performance of Vietnam, 2001-05

Small- and medium-sized enterprises (SMEs) are starting to play a more and more important role in the economy. This sector accounts for about 90% of the total number of firms at present and creates the majority of the jobs for the country as a whole.

Regardless of its rapid economic progress, Vietnam is still a developing country. Per capita GDP was about USD640 in 2005 and USD720 in 2006. The agricultural sector still accounts for a significant share of the GDP; in particular, its share in the country's total employment is still very high, about 56.8% in 2005. Meanwhile, the manufacturing sector relies heavily on imported materials and creates low value-added products with primarily assembling and processing industries. The competitiveness of the economy as well as that of its enterprises is very low when compared with other world economies and even with regional economies. The World

Economic Forum has published an assessment of the competitiveness of world economies. Vietnam was ranked 74 in a field of 117 in 2005 and 77 out of 125 in 2006. Also, according to this assessment, Vietnam ranks at the bottom among the eight regional countries (Table 1). This assessment shows that some indicators of Vietnam are better than the others. For example, for the macroeconomic, primary schools and health indicators, Vietnam scored 53 and 56 out of 125 economies, respectively, in 2006, while its score 96 and 90 for the indicators on technological innovation and higher education. It should be noted that these poor indicators are related to knowledge absorption and creation.



Figure 2. Vietnam GDP and Employment by Sectors, 2005

Table 1.	Competitiveness	Index Rank of	Vietnam a	and Eight Reg	ional
Countrie	s over 125 Econo	mies in 2006			

Country	Overall	Sub-indexes			
	Index	Basic	Efficiency	Innovation	
		Requirements	Enhancers	Factors	
Vietnam	77	71	83	81	
Singapore	5	2	3	15	
Republic of Korea	24	22	25	20	
Malaysia	26	24	26	22	
Thailand	35	38	43	36	
India	43	60	41	26	
Indonesia	50	68	50	41	
Philippines	71	84	63	66	

Source: World Economic Forum

The contribution of knowledge to Vietnam's economic development has been very limited. Economic growth is mainly driven by labor and capital factors. From 1990–2001, the total factor productivity (TFP), including knowledge/technology, comprised only 6% of the change in the national productivity. This rate is even lower for the period 2001 to 2004 (Nguyen Thi Tue Anh et al., 2005). Most technologies and equipment currently in use are outdated. The technological

capacities of firms are very poor, and their investments in research and development are still modest. According to the World Bank's assessment, the development level of Vietnam towards having a knowledge economy is very low: Vietnam ranked 91 in a group of 128 countries in terms of the Knowledge Economy Index (KEI) (Table 2).

Knowledge management (KM) is a very new concept in Vietnam in general and in the country's firms and organizations in particular. So far, this concept has not been mentioned in any official government policy or document. It has been introduced by the Vietnam Productivity Center (VPC) in several workshops, awareness-training courses, and pilot projects conducted since the beginning of 2000. But these are only a few small beginning steps, and very limited audiences have been introduced to the concept. Some large foreign companies may be applying it, since it is already used in their parent companies abroad. Otherwise KM is still new to other kinds of organizations, including the research institutes.

					-	
	KEI	Rank Among 128 Countries	Sub-indexes of KEI			
Country			Econ. Incentive Regime	Innovation	Education	ICT
Singapore	8.24	16	9.61	9.06	5.33	8.95
Republic of Korea	7.48	28	5.38	8.18	7.62	8.75
Malaysia	5.57	44	5.95	5.13	4.27	6.94
Thailand	4.76	63	4.19	4.18	5.61	5.06
Philippines	4.25	69	4.31	3.37	5.34	3.98
Indonesia	2.96	90	3.05	2.58	3.34	2.85
Vietnam	2.92	91	2.3	2.51	3.99	2.88
India	2.58	98	2.47	3.72	2.16	1.96

Table 2. Knowledge Indicators of Vietnam in Comparison with Eight Regional Economies

Source: World Bank

Although almost no significant attempt has been made in Vietnam to apply KM, some practices in the country have laid down a good foundation/promotion for KM applications in the future, including the application of KM in the SME sector.

First, awareness about the knowledge-based economy is increasing. Conferences have been organized to discuss how to promote the knowledge economy in Vietnam. In the socio-economic development plan 2006–10, developing a knowledge-based economy is indicated as a direction for Vietnam's future development. The government has formulated some concrete tasks to increase the contribution of knowledge to economic development:

- Increase the productivity, quality, and competitiveness of the agricultural sector.
- Increase the value added and competitiveness of industrial goods and increase the contribution of science and technology in industrial products.
- Promote and support the SME sector, especially in technology transfer; promote and support large-scale corporations in investing in R&D so the country can gradually climb up the technological capacity ladder from technological absorption to technological creation.

Second, the Vietnamese government has taken several steps in developing the information and communication technology (ICT) sector and in promoting the application of ICT in the economy. The government has issued Vietnam's strategy on the development of information and communication technologies through 2010 and a vision statement through 2020. In its strategy, the government set several targets for 2010:

- To promote the usage of IT, for example, in developing e-citizen, e-government, e-companies, and e-commerce systems.
- To develop the ICT industry to become a leading industry with an annual growth rate of 20%–25% on average.
- To develop the ICT infrastructure nationwide.

Some indicators should be achieved by 2010: 320–420 telephones/1000 people, 80–120 Internet users/1000 people, 100 computers/1000 people. The government has invested in development of the ICT infrastructure. There is also a program to computerize public administration organizations. As a result, the annual growth rate of Vietnam's ICT industry reached about 25% annually during the period 1996–2005. In 2004, about 25% of firms had local area networks (LANs), 46% had Internet connections, and 7% of firms had their own websites. These numbers are rapidly increasing. A rapid development of the ICT sector and its application will create a good precondition for the application of KM in the future.

Third, the role of science and technology is highly appreciated in Vietnam's official policy documents. Since 2000, the development of science and technology has been considered as one of the two top priorities in the development strategy. Accordingly, the government has increased the state expenditure for science and technology as well as promoted investments from other sources in this sector. It has established a Science and Technology Development Fund that finances research and development projects, especially basic scientific studies. It has also provided many kinds of incentives for firms to upgrade their technologies, such as tax reduction, grants for research and development projects, etc. This will allow firms to concentrate more on improving their technological capacity and innovation. Such an environment can only increase awareness of the role of knowledge management and enable improved knowledge management in the future.

Fourth, a program to support the development of knowledge assets in firms was initiated in 2005 by the government that aims at increasing the awareness of Vietnamese firms of the protection of intellectual property rights. It also provides support for firms to actively build, exploit, develop, and protect their intellectual assets. The government will provide funds to achieve the above objectives from 2005–10. Although this program focuses on a firm's intellectual property rights, it also helps increase awareness of ways to manage one kind of intangible asset, which is a form of knowledge, helping firms become better acquainted with the management of their intangible assets. This is a good beginning for Vietnam's firms to eventually develop a full knowledge management system.

Fifth, more and more organizations in Vietnam have been applying international standard management tools such as ISO, SA 8000, HACCP, and GMP.¹ According to a survey made by ISO (see Figure 3), by the end of 2006, there were 3,167 ISO 9001:2000 certificates awarded to organizations in Vietnam. To stimulate this initiative, in 2006 the government promulgated a decision that requires all government organizations to apply the ISO 9001:2000 management system. As a result, the number of organizations applying modern management tools is expected

¹ ISO 9000 is a family of standards applied to quality management systems; SA 8000 or Social Accountability 8000 is an international certification on working conditions; HACCP is Hazard Analysis and Critical Central Point, a process management system to reduce risks in food production; GMP is Good Manufacturing Practice, patterned after the U.S. Food and Drug Administration.

to rapidly increase in the future. This will make companies/organizations get used to these tools and lay down a good foundation for the application of KM in the future.



Source: ISO Survey 2006

Figure 3. Number of Organizations Certified to ISO 9001:2000 in Vietnam, 2002-2006

Sixth, given the important role of SMEs in the economy, this sector is increasingly being supported by the Vietnamese government. Recently, the government undertook concrete actions to develop this sector. An office on SMEs development was established. A government decree on the assistance in the development of SMEs was issued in 2001 providing government support for SMEs in several ways: providing assistance in credit, land, information, human resource development, organizational improvement, etc. In 2006, a plan to develop SMEs in 2006–10 was issued, with seven groups of measures that will provide SMEs in Vietnam with a chance to develop further. In this context, the application of KM in the SMEs sector can and should be promoted to ensure the rapid and sustainable development of this sector.

In short, the knowledge-based economy is an inevitable development trend internationally. In this context, KM will gradually become more and more important. Vietnam is not exempt from this trend. However, the country is still at a lower level on the development ladder. The economy is mainly at the stage of being factor-driven rather than innovation-driven. As a result, knowledge management has not yet received the attention it deserves. Nevertheless, in order for Vietnam to catch up with the more advanced economies, it should actively start, at this stage, to envision a way to mobilize the contribution of knowledge to its economic development. At the organizational level, the application of KM is one step in this direction. Many practices mentioned above demonstrate that some of the preconditions for KM application have already been established. However, more efforts should be undertaken to introduce the concept of KM. The Vietnam Productivity Center should continue to play an active role in introducing KM and bringing it to a wider audience, i.e., firms and organizations. It is also important that the awareness of Vietnamese leaders on the role of KM be increased so that KM applications can be widely facilitated through the government's policies.

Part IV

Concluding Observations

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THE ASIAN KNOWLEDGE MANAGEMENT LANDSCAPE: UNEVEN

The extent of adoption of knowledge management (KM) and knowledge-based development (KBD) among the member countries of the Asia Productivity Organization (APO) has been very uneven.

- On the basis of its assessment of the extent of KM practice, APO selected only 10 of the 19 member countries for this survey project: India, Indonesia, Japan, Republic of Korea, Malaysia, the Philippines, Singapore, Republic of China, Thailand, and Vietnam.¹
- Most of the winners of the annual MAKE Asia award come from only three countries: Japan, India, and Republic of Korea. The number of winners of the Global MAKE award from Asia had caught up with the number from Europe from 1998 to 2006, but it still lags behind that of North America. Many of the criteria in the MAKE award revolve around how an organization manages its intellectual capital or knowledge assets to create value.² The global trend has been an increase in the contribution of intangible knowledge assets to the market value of corporations compared to their tangible assets.³
- The same three countries, plus Hong Kong, Republic of China, and Singapore, create more wealth through services—a very knowledge-intensive sector. The global trend in most national economies has been an increase in the contribution of services to GDP.⁴
- Professional KM associations exist in Japan, Hong Kong, the Republic of Korea, Singapore, the Philippines, Malaysia, and Indonesia. Thailand has a government-supported KM Institute, and there is a KM Research Center in the Republic of China.⁵
- A few Asian governments have adopted national strategies or roadmaps towards a knowledge-based economy (KBE) or society (or a broader knowledge-based development or KBD), which are often linked with the development of ICT infrastructure, education, and enabling policies: e-Korea Vision 2006, Malaysia's KBE Master Plan (2002), Thailand's IT 2010 (2001), Singapore 21 (1997) and the ICT 21 Master Plan (2000) of Singapore, India Vision 2020 (2002), and e-Japan Strategy (2001).⁶ The government of India has created a National Knowledge Commission to promote KM and KBE.⁷

¹ APO was unable to recruit a National Expert for Japan, so Japan was unfortunately not included among the 10 countries surveyed.

² Chase, R.L., Innovation and Intellectual Capital Management Set the Agenda. In: *Knowledge Management, from Brain to Business. Proceedings of the IPC 2007 Conference* (Bangkok; January 2007). The Most Admired Knowledge Enterprises (MAKE) is a global KM award run by Teleos, U.K.; Dr. Chase is the CEO of Teleos.

³ For example, see Blair, M.M., and Wallman, S.M.H., Unseen Wealth. *Report of the Brookings Task Force on Intangibles* (Brookings Press; 2001).

⁴ *World Development Report 2007*, World Bank (http://www-wds.worldbank.org/external/default/ WDSContent Server/WDSP/IB/2006/09/13/000112742_20060913111024/additional/indicators.pdf), Asian Development Outlook 2007, Asian Development Bank (http://www.adb.org/Documents/Books/ADO/2007/ ado2007.pdf).

⁵ http://www.ikms.org.sg/partners/index.html. See also Bunyagidj, B., Knowledge Management in Thailand (in this volume).

⁶ Moving Toward Knowledge-Based Economies: Asian Experiences (Asian Development Bank; 2007).

⁷ See Sharma, S., Knowledge Management in India (in this volume).

The other Asian member countries of APO are less active or less visible in their KM practice: Bangladesh, Cambodia, Fiji, Iran, Laos, Mongolia, Nepal, Pakistan, and Sri Lanka. In any case, it is apparent that APO has to exert extra efforts to assist these member countries in catching up with the rest in the practice of KM. A capacity-building program for their NPOs can be the start of this assistance scheme. Such a program can draw from the expertise and experience available from North America and Europe, as well as from those Asian countries which are well ahead of the others or which are strong in specific areas.

SPECIFIC STRENGTHS OF ASIAN COUNTRIES IN KM

The national surveys reported in this volume show that some Asian member countries possess unique or distinctive strengths in KM that can provide the basis for mutually beneficial collaboration and capacity-building among NPOs.

- India. KM as practiced by India-based global information and communication technology (ICT) players such as the Tata Group, Infosys, Satyam, and AirTel Bharti Teleservices is a demonstration of the use of leading-edge ICT support systems for KM and organizational learning. About 70% of ICT companies surveyed in India practice KM a very high proportion. India's National Knowledge Commission, established in mid-2005, is a good KBD governance model for other Asian governments to study and emulate.⁸
- Indonesia. The growth of KM in Indonesia demonstrates the value and widespread results from the work of many institutional champions in the government (e.g., Bank Indonesia), academe (e.g., Institut Teknologi Bandung), and the private sector (e.g., Dunamis). The positive results from Dunamis' implemention of the MAKE Indonesia award system in terms of raising the nationwide awareness and appreciation of KM are noteworthy.⁹
- **Republic of Korea**. Because KM was started early and has now been widely adopted among Korean companies, many companies, such as the Asian MAKE awardees Samsung Institute of Advanced Technology, POSCO, and LG Electronics, have much to share and demonstrate to other Asian companies trying to learn KM, especially in terms of embedding KM and organizational learning in all business processes. The Republic of Korea has achieved a high level of connectivity nationwide and offers another successful model in e-governance and in government institutions, laws, and regulations to support the growth of e-commerce.¹⁰
- Malaysia. Malaysia's progress in KM has been a demonstration of the value of national leadership and vision. The Multimedia Super Corridor is only one of many examples. Its e-government and e-commerce development programs, particularly for the social sectors, provide useful models for Asian countries concerned with narrowing the digital divide as well as knowledge divide.
- Philippines. While many institutional and individual KM champions are promoting KM in various sectors, the KM experience in the Philippines shows the crucial leadership role of the NPO (the Development Academy of the Philippines) in these efforts. Substantial progress in KM has been driven by international and bilateral donor institutions, and as a result, KM applications in the development and non-government sectors have progressed.¹¹

⁸ Sharma, S., Knowledge Management in India (in this volume)

⁹ Purnomo, A., Knowldge Management in Indonesia (in this volume).

¹⁰ Sohn, J.H.D. Knowledge Management in Korea (in this volume).

¹¹ Talisayon, S., Knowledge Management in the Philippines (in this volume).

- **Singapore**. e-Governance and KM in government agencies and government-linked companies are advanced and mature in Singapore. The government of Singapore was among the first to adopt a national strategy and roadmap towards KBE/KBD. Recognizing early the need to sustain its competitive advantage through innovation, the Singaporean government established institutions and programs to promote innovation throughout its society. Its NPO—the Standards, Productivity and Innovation Board—illustrates this crucial shift in mindset from productivity to a mix of productivity and innovation.¹²
- Republic of China. KM has been widely adopted by companies in the Republic of China, according to a recent survey: 47% in large companies and 28% in small- and medium-scale enterprises (SMEs). The level of development of ICT support systems for KM is well advanced. The government is actively assisting SMEs in KM through the SME Administration under the Ministry of Economic Affairs. The Republic of China is ahead of many Asian countries in developing KM for SMEs. Through its Industrial Development Bureau, the government has also mandated KM in government agencies.¹³
- Thailand. By royal decree in 2003, the Thai government, as part of its public sector reform policy being overseen by the Office of Public Sector Development Commission (OPDC), mandated that public sector organizations become learning organizations and adopt KM. As a result, nearly 96% of government agencies were implementing KM by 2007. The government set up the Office of Knowledge Management and Development to promote KM. Under this office are several agencies, which include the National Center for the Gifted and Talented, Thailand Knowledge Park, the National ICT Learning Center, and the National Institute for Brain-based Learning. The government also created and funded a KM Institute to catalyze the development of Thailand towards becoming a learning society.¹⁴
- Vietnam. The government of Vietnam has taken effective steps towards implementing KBD: development of ICT infrastructures, support for development of knowledge assets in firms, and greater expenditure and incentives for R&D. The use of productivity improvement tools is increasing rapidly, and the next challenge is how to bring in and integrate KM with these tools.¹⁵

EMERGING ISSUES AND NEXT AREAS OF DEVELOPMENT IN KM AMONG NPOS

The 22 case studies in this volume suggest a number of emerging issues as well as the next areas of development in KM in APO member countries.

KM is Still a Growing Discipline

Knowledge management is still poorly understood or understood differently. Equating KM with information management is quite common. This is indicative of the fact that KM is still a growing discipline. In addition, the use of the common word "knowledge" in KM practice makes it prone to many different and confusing meanings and even to debate. Perhaps another factor is that KM started from among business practitioners,¹⁶ for whom practical application is more important.

¹² Menkhoff, T. Knowledge Management in Singapore (in this volume).

¹³ Lin, F.-H., Knowledge Management in Taiwan (in this volume).

¹⁴ Bunyagidj, B. Knowledge Management in Thailand (in this volume).

¹⁵ Dan, V.H., Knowledge Management in Vietnam (in this volume).

¹⁶ Personal communication from Dr. Rory L. Chase.

Even if the term "knowledge management" may eventually fade from use, it is nevertheless clear that enduring changes in the global economy require new frameworks and tools for recognizing and managing the increasingly more important intangible assets in organizations and in societies. Most of these assets consist of, or are produced by and from, human knowledge and human creativity. Such tools for enhancing learning and innovation will be increasingly needed in the new economy, regardless of how their labels may change.

The case studies and national surveys reveal a wide variety of terms used in KM. It is clear that NPOs and KM practitioners need a common KM language to make effective communication and collaboration possible. There is a need to develop a standard KM glossary—a "K-glossary"—among NPOs to complement the existing "P-glossary" of APO. A basic glossary can also serve as a convenient initial list when organizations develop their own knowledge taxonomy for classifying documents, expertise and other knowledge assets relevant to their specific organizational contexts.

Aligning KM with Organizational Goals

Knowledge is capacity for effective action (see Overview). KM is good if it enables action that is effective in contributing to organizational goals. Yet the causal link between KM and business results or government objectives is sometimes absent or only implicit in the planning and execution of KM initiatives. The ready availability of many ICT solutions in the market may predispose would-be adopters towards jumping ahead to ICT solutions instead of first clarifying important business problems and the broad range of solutions, whether ICT or non-ICT, that may be appropriate to each problem.

A good KM framework makes this linkage explicit to decision-makers who may need to be convinced of the business advantages of a KM proposal. A KM framework provides the basis for KM measurement. The scarcity of good KM frameworks is partly indicative of the infancy of KM as a management discipline. Our knowledge of the cause-and-effect relationships between KM interventions and enablers, on the one hand, and the corporate bottom line, on the other hand, is still incomplete.

At Airtel in India, KM managers asking "What problem are we solving [with KM]?" are ensuring that the issue of linking KM to business results is addressed. Financial savings or revenue generation is part of the information required in filling up their KM best practice template. Airtel uses performance and output measures to link KM objectives to business unit objectives. "KM and quality at Airtel are not only for fashion but are purely for business results," according to an Airtel executive.¹⁷

At Goldsun in Vietnam, KM drivers and KM goals were formulated in line with business goals.¹⁸ At Samsung Advanced Institute of Technology (SAIT) in the Republic of Korea, KM measures are linked with business objectives and track knowledge content, knowledge processes, and knowledge structures.¹⁹ At the Department of Health in the Philippines, identification of priority knowledge gaps is geared towards enhancing performance by its various functional units.²⁰

KM Measurements

A variety of KM measurements are employed in these APO member countries, ranging from the level of individual action to the organizational level, looking at various stages: inputs,

¹⁷ Sharma, S. Airtel Broadband and Telephone Services (in this volume).

¹⁸ Dan, V.H., Goldsun Company (in this volume).

¹⁹ Sohn, J.H.D., Samsung Advanced Institute of Technology (in this volume).

²⁰ Talisayon, S., Department of Health (in this volume).
processes, outputs and outcomes, and for various purposes such as pre-KM diagnostics and KM outcomes.

Since knowledge is capacity for effective action, a common KM measurement approach is the use of key performance indicators (KPI) at the level of action, business process, project, or unit in an organization. Measuring capacity for effective action and verifying the effectiveness of action is central to KM. This is the reason behind the great overlap between KM and productivity/quality improvement.

KPIs are used to evaluate the results or progress of KM initiatives at the Bank Negara Malaysia, Bank Indonesia, Techcombank and Goldsun in Vietnam, and Siriraj Hospital in Thailand. Goldsun in Vietnam, for example, uses indicators to track knowledge contributed, knowledge utilized, and satisfaction by knowledge users.²¹

Siriraj Hospital also uses indicators under the learning and growth perspective of the Balanced Scorecard (BSC). PT Wijaya Karya (Wika) employs a modified BSC scorecard called "Wika scorecard."²² Because BSC tracks intangible that which include the components of intellectual capital, it can be used for tracking the results of KM initiatives: some indicators under the learning and growth perspective correspond to human capital, those under the internal process perspective correspond to structural capital, and those under customer perspective fall under stakeholder capital.

SAIT employs seven composite KM indices that track both processes and outputs:²³

- Patents: number and a measure of quality (output or product).
- Business applicability: business performance outcomes of an innovation (commercialization or business result).
- R&D effectiveness: magnitude of value added, efficiency gained, and time saved in the R&D process (effectiveness and efficiency).
- Core knowledge: identification of core knowledge through internal CoPs and CoPs with customers (content).
- Customer satisfaction (value to internal customers).
- Fusion and synergy (collaboration).
- Idea generation (creativity).

A genre of KM measurements consists of pre-KM diagnostics: KM audits, KM readiness tests, knowledge taxonomy and knowledge gap surveys, and various types of KM maturity scales. Some of these were employed at the Department of Health in the Philippines and reported in the survey of KM in the Philippines.²⁴

Overall, the most commonly mentioned KM measurements are those that pertain to the individual, activity, or business process level. Some measurement gaps at the organizational level are evident and as such need further research to identify and describe cases in APO member countries that could fill these gaps:

• Aside from monitoring customer satisfaction, no wider tracking of stakeholder capital was seen from the twenty-two case studies;

²¹ Yasin, I. Bank Negara Malaysia, Purnomo, A. Bank Indonesia, Dan, V.H., Goldsun Company, Dan, V.H., Techcombank, and Bunyagidj, B., Faculty of Medicine Siriraj Hospital, Mahidol University (all in this volume).
²² Purnomo, A. PT Wijaya Karya (in this volume).

²³ Derick Sohn, J.H.D. Knowledge Management in Korea (in this volume).

²⁴ Talisayon, S., Suministrado, J., and Dolor, D. Department of Health, and Talisayon, S., KM in the Philippines (both in this volume).

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- Measures of impact of behavioral enablers (policies, leadership style, organizational or team culture, incentive systems) were not mentioned or are absent from the organizations studied;
- Financial impact at the organizational level was not mentioned; for example, intellectual capital accounting was not mentioned in any case study.

Motivating Knowledge Workers: Attending to Both Heart and Head

It is interesting that many case studies touch on the challenge of motivating knowledge workers toward knowledge-sharing and other desirable behaviors and describe the approaches that were tried.

- **Rewards and recognition** schemes are often used. Airtel in India instituted the Knowledge Dollar (K\$) as the unit of performance credit and the Joint President's and CEO's Knowledge Management Award. A Learning Award for knowledge transfer and an Enterprise Award for intrapreneurship were established by Unilever Indonesia. Wika in Indonesia instituted 10 different awards. According to Purnomo, the Learning Award resulted in "new enthusiasm for learning, confidence in trainers to conduct sessions, new standards of module development ... and preservation of knowledge not captured before."
- Infosys uses **measurable returns** from KM initiatives to demonstrate the benefits and rationale for engaging in KM. Initial positive feedbacks on outputs/benefits of KM were encouraging and provided motivation for the continuing development of KM at Goldsun in Vietnam.
- At the Department of Health in the Philippines, members of the KM Team, through a workshop surfaced their personal talents, passions, and life goals and each member clarified how he or she could optimize the conscious **convergence between personal and organizational goals**.
- Management of Qian Hu in Singapore designed a **mix of informal and formal communication** modes to strengthen buy-in from employees and customers. This includes "floor walks," tea sessions, and informal gatherings in addition to more formal modes such as seminars and focus group discussions.
- At SCG Paper in Thailand, a balance of virtual interaction and physical or face-to-face meetings is employed. **Physical spaces for interactions** are provided that can foster openness and trust among employees. Similarly, Bank Negara Malaysia redesigned its library environment to make it more reader-friendly, using ergonomic furniture and encouraging a more cheerful mood with paintings and appropriate color schemes for walls and furniture.
- The importance of **senior management commitment** or executive sponsorship was mentioned in many case studies. In a survey of more than 200 organizations in Thailand, this factor was ranked highest among critical success factors for KM. At Siriraj Hospital in Thailand, the CKO (Chief Knowledge Officer) was selected on the basis of commitment, leadership ability and recognition from other staff. Leadership and policy were ranked second in a study in Malaysia of success factors in KM. According to Menkhoff, JTC Corporation's managers created "a motivational organizational culture characterized by a **caring leadership** behavior which supports active questioning and allows for mistakes. ... Employees are thus able to trust each other and to share their opinions about work-related issues more freely."
- Learning is a win-win activity for employees and the company. CAPCO in the Republic of China established an online learning program for its employees, the Multimedia

Cyber College. It has motivated its employees by including online training and certification as part of the employee evaluation and promotion processes.

- The motivational value of learning through face-to-face interaction in a team or CoP is mentioned in many case studies. Unilever Indonesia, SCG Paper, and Siriraj Hospital in Thailand and SAIT in the Republic of Korea are examples of organizations that set up and nurture many CoPs. To sustain employee interest in KM activities, Bank Negara Malaysia initiated cross-functional teams, benchmarking projects, and study visits or attachments.
- At SCG Paper, the honor of being a mentor or coach is seen as a motivating element in tacit knowledge transfer processes such as the buddy system, job rotation, and crossfunctional group activities. Designating functional heads as the knowledge champions and setting up a community of experts were instrumental methods of gaining buy-in for KM at Airtel. Wika and Bank Indonesia created the role of "begawan" (sage) for mature and experienced mentors.
- "Praise Ground," an avenue for peer-to-peer public compliments for exemplary KM behavior, is an innovative process at Samsung Advanced Institute of Technology. According to Sohn:

A member identifies another employee who has done something worthy to be praised and writes a short but entertaining note about it on the website. That member then identifies another employee to praise, and the process is repeated over and over ... The Praise Ground is one of the most popular and most frequently visited websites at SAIT. Most, if not all, members at SAIT consider it a great personal honor to be mentioned at the Praise Ground.

From Productivity to Innovation

Many organizations studied are successful practitioners of various productivity and quality improvement tools, which have subsequently decided to also embrace KM and enhance learning and innovation. The effort to shift mindsets and practices from productivity to a mix of productivity and innovation is noticeable in many case studies: SK Energy, Wika, Bank Negara Malaysia, Airtel, Bank Indonesia, Unilever Indonesia, Malampaya MMT, Qian Hu, Sunon, SCG Paper, and Siriraj Hospital. How leading Asian companies are able to integrate various productivity/quality management tools with knowledge management/innovation into one coherent framework for business excellence and competitiveness will be an important concern for APO and the NPOs. Another important concern is how to complement the more common objective of productivity at operational levels with the more strategic objective of innovation of business models.

The above observation from the case studies is consistent with the observation of Rory Chase, CEO of Teleos, that winners of MAKE Asia had surpassed those of MAKE Europe in innovation.²⁵ This transition is a strategic one for many Asian organizations. According to APO Secretary-General Shigeo Takenaka,²⁶

The days of incremental or continuous improvement preoccupying corporate managers are over. It is to innovation and breakthroughs that those managers have turned their attention. For achieving innovation, the most relevant tool is no longer quality control or quality management. It is knowledge management in its broadest sense, with value creation or knowledge creation being the most relevant.

²⁵ Chase, *ibid.* See also Chase, R.L., Innovation and Intellectual Capital Management Set the Agenda. In: *Proceedings of KM4Dev Forum* (Asian Development Bank; February, 2007).

²⁶ Takenaka, S., Welcome Address, IPC 2007 Conference. Bangkok; 2007.

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Ms. Vu Hong Dan joined the Vietnam Productivity Centre (VPC) as a quality management consultant in 1996 after graduating from the Economic Management Faculty of the National Economy University, Vietnam. Her special interests include diverse areas such as new management solutions, productivity, and quality improvement tools in industry and organizations, including ISO 9000, CRM, KM, TPS, BSC, FMEA, OFD, OC, and Kaizen. In the consultancy area, Ms. Dan has developed many schemes and provided her services to hundreds of companies and organizations ranging from industrial manufacturing to public services, most of whom have been awarded ISO

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