COMPREHENSIVE KNOWLEDGE MANAGEMENT

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by

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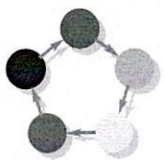

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COMPREHENSIVE KNOWLEDGE MANAGEMENT

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Comprehensive knowledge management (CKM) is undertaken to support enterprise viability and success. It pursues explicit, systematic, and enterprise priority-driven approaches to:

1. Identify which Intellectual Capital (knowledge) needs to be created and maintained – **including which knowledge needs to be available at the PoAs for delivery of desired competitive service paradigms and work products;**
2. Provide and transform the required knowledge **and ascertain that it is continually renewed; and**
3. Ascertain that **all available** knowledge assets **(Intellectual Capital)** are diligently leveraged **wherever appropriate.**
4. Govern **knowledge management-related processes and relationships by providing enterprise-wide support, infrastructure, and leadership.**

Incremental knowledge management (IKM), on the other hand, tends to almost arbitrarily identify and pursue a knowledge-related action, often as an extension of an already occurring activity – an incremental improvement on 'business-as-usual' and does not focus on ascertaining that the knowledge assets are applied.

Enterprises that pursue broad and systematic knowledge management – 'comprehensive KM' – find that they pursue several sub-practices that in total contribute to the overall success. They are vigilant in their focus on making knowledge work effectively as the chief enabler of enterprise success. These sub-practices include efforts to:

Foster Knowledge-Supportive Culture – Characteristics of the general culture include a safe environment, ethical and mutually respectful behavior, minimal politicking, collaboration, and a common focus on delivering quality work without delay – i.e., "getting the right thing done as soon and with as little fuss as possible!"

Provide Shared Understanding – Develop a broadly shared understanding of the enterprise's mission, current direction, and the role of the individual in support of the enterprise and of the individual's own interest.

Focus the Knowledge Management Practice to Align with Enterprise Direction – Practitioners of comprehensive KM identify the intended business direction of the enterprise to ascertain that the associated knowledge-related factors receive appropriate attention and are well maintained.

Practice Accelerated Learning – Pursue a broad range of knowledge transfer activities to ascertain that valuable knowledge is captured, organized and structured, deployed widely, and used and leveraged. The impetus is on making important knowledge flow rapidly, in proper quantities, in well-represented and effective ways, and to all valuable destinations.

Pursue the 'Four Success Factors' – These factors focus on providing employees with:

1. Knowledge and Resources – Professional, craft, and navigational knowledge and metaknowledge, information, and other necessary resources must be made available for employees to deliver quality work products that satisfy the requirements of the situation and the general service paradigm. Employees must also possess requisite skills and attitudes (that is, personality traits). They must be supported by their ability to think critically and creatively by being provided with relevant metaknowledge.

2. Opportunities – Employees must be placed in situations where they have opportunity use their capabilities. Workflows must be organized to take advantage of people's capabilities and to exploit the potentials for innovation and application of diversity.

3. Permission – Employees must be provided safe environments in which to do their work. That means that they must be given permission to innovate, improvise, and "stretch" enterprise policies and practices beyond predetermined scopes to serve the enterprise's, and the stakeholders', best interest.

4. Motivation – Employees must be motivated to act intelligently – 'to do the right thing' – by being provided with understanding and emotional acceptance of how their actions will be of value to stakeholders, the enterprise, and most importantly, to themselves. This factor is most important, and difficult to effectuate. It requires approaches to effective and active communication that will be new to most.

Create Supportive Infrastructure Capabilities – Implement new or adapt existing capabilities to provide needed and effective supports for KM.

Provide Effective Governance for the Knowledge Management Practice – Monitor, evaluate, and guide the KM activities and their plans, results, and opportunities.

The models that comprehensive KM practices often use to structure their activities and priorities include the 'Institutional Knowledge Evolution Cycle' indicated in Figure 1 and the 'Personal Knowledge Evolution Cycle' indicated in Figure 2.

The Institutional Knowledge Evolution Cycle considers five stages in the pathway:

- ✓ **Knowledge Development**. Knowledge is developed through learning, innovation, creativity, and importation from outside;
- ✓ **Knowledge Acquisition**. Knowledge is captured and retained for use and further treatment;
- ✓ **Knowledge Refinement**. Knowledge is organized, transformed, or included in written material, knowledge bases, and so on to make it available to be useful;
- ✓ **Knowledge Distribution and Deployment**. Knowledge is distributed to Points-of-Action (PoAs) through education, training programs, automated knowledge-based systems, expert networks, to name a few – to people, practices, embedded in technology and procedures, etc.; and
- ✓ **Knowledge Leveraging**. Knowledge is applied or otherwise leveraged. By using (applying) knowledge, it becomes the basis for further learning and innovation as explained by other mechanisms.

The Personal Knowledge Evolution Cycle also has five stages that depict how knowledge, as it becomes better established in a person's mind, migrates from barely perceived notions to be better understood and useful. The five stages are:

1. **Tacit Subliminal Knowledge**. This knowledge is mostly nonconscious and is not well understood. It is often the first glimpse we have of a new concept.
2. **Idealistic Vision and Paradigm Knowledge**. Part of this knowledge is well known to us and explicit -- we work consciously with it. Much of it -- our visions and mental models -- is not well known, it is tacit, and only accessible nonconsciously
3. **Systematic Schema and Reference Methodology Knowledge.** Our knowledge of underlying systems, general principles, and problem-solving strategies is, to a large extent, explicit and mostly well known to us
4. **Pragmatic Decision-Making and Factual Knowledge.** Decision-Making knowledge is practical and mostly explicit. It supports everyday work and decisions, is well known, and is used consciously
5. **Automatic Routine Working Knowledge.** We know this knowledge so well that we have automated it. Most has become tacit -- we use it to perform tasks automatically -- without conscious reasoning

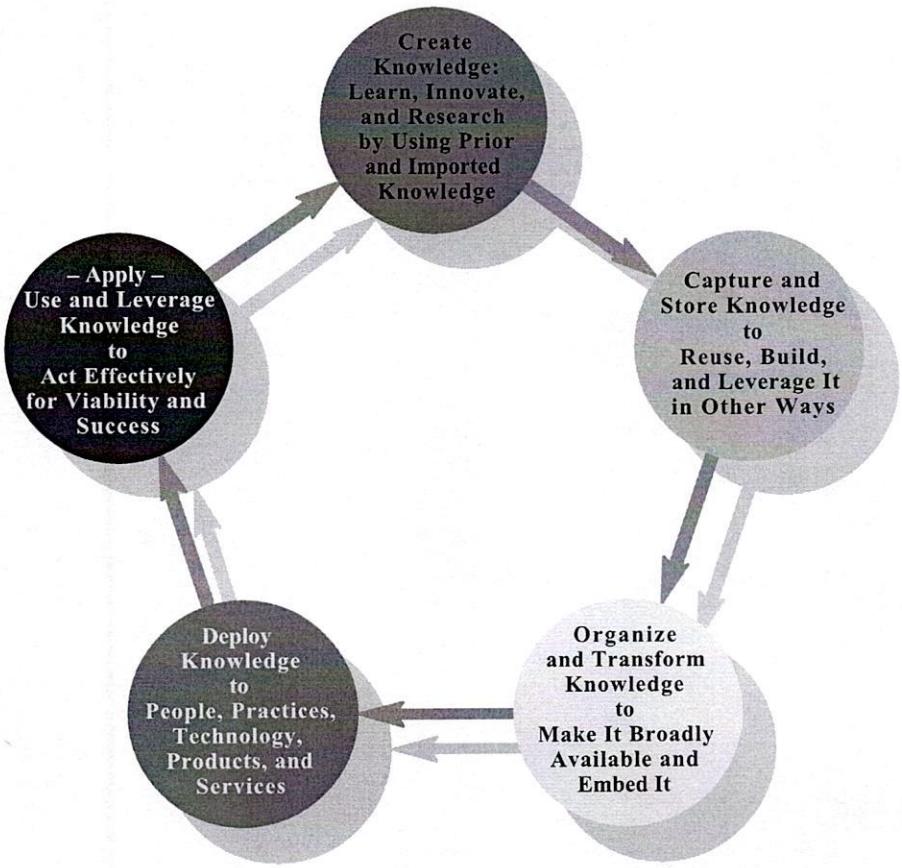

Figure 1. The Institutional Knowledge Evolution Cycle.

Knowledge may grow from subliminal to idealistic as it becomes better established and understood, then to systematic, then to pragmatic, and finally to automatic knowledge when very well understood. From well established knowledge we then start to glimpse new ideas and concepts through creativity and innovation.

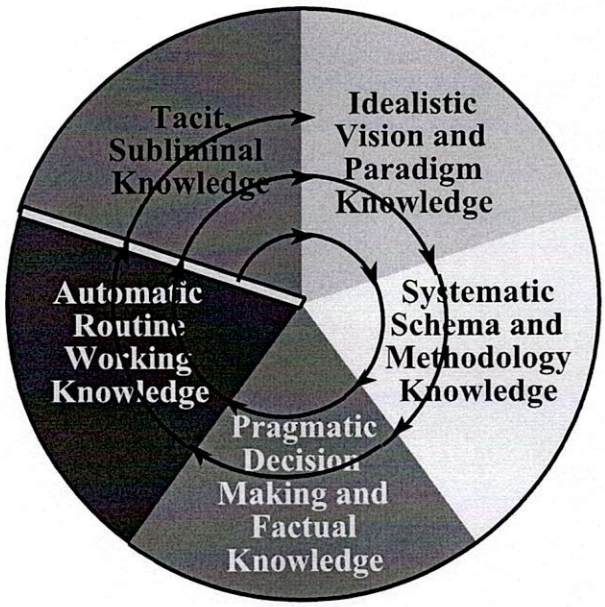

Figure 2. The Personal Knowledge Evolution Cycle.

Personal knowledge can be characterized to cover separate domains: (a) topic knowledge that deals with competencies – expertise and understanding – related to performing routine and more complex but expected tasks; and (b) metaknowledge that deals with general strategies and approaches.

Comprehensive KM does not mean top-down autocratic determination of which knowledge must be made utilized to be competent to perform desired work. Instead, it means the creation of a knowledge-vigilant culture guided from the top where each individual and each department as part of their daily work, continually look out for the knowledge-perspective to ascertain that appropriate expertise and understanding are brought to bear to deliver the desired work. The culture leads to creation of synergistic orchestration environments (see Appendix below). A particular aspect of personal behavior is also recognized by the comprehensive KM culture. This aspect deals with the realization that many individuals deliver outstanding work in unusual situations without having extensive topic knowledge. Instead, they have strong metaknowledge that provides capabilities to make sense of novel situations and create effective approaches to handle them.

Appendix
Examples of Comprehensive Knowledge Management Approaches

In the following a small selection of KM practices and methods are outlined. Further discussions of additional approaches can be found in the literature (Cortada & Woods 1999, Liebowitz 1999, Sveiby 1997, Thierauf 1999, Tiwana 2000, Wiig 1995 and others). The practices and methods included below are:

Create Synergistic Orchestration Environments
Map Knowledge Capabilities, Opportunities, Needs, and Constraints
Measure Intellectual Capital and Create an Intangible Asset Monitor
Change Cultural Drivers
Create Collaborative Work Practices
Foster Communities and Networks of Practice
Conduct Knowledge Cafés
Capture and Transfer Expert Know-How
Capture and Transfer Expertise from Departing Personnel
Capture Decision Reasoning
Lessons Learned Systems
After Action Reviews (AAR)
Outcome Feedback
Expert Networks
Knowledge Discovery from Data (KDD)
Performance Support Systems (PSS) and Knowledge-Based System (KBS)
Build and Deploy Knowledge Bases
Information Technology Tools for Knowledge Management

- **Create Synergistic Orchestration Environments** – When an enterprise builds and orchestrates an internal practice to deal systematically and deliberately with knowledge by having people share insights and seek assistance from one another, a new and open culture emerges. People open up and discuss difficult issues, emerging ideas, and tentative opportunities with one another. They take 'mental' risks that would be unthinkable in conventional environments. They seek collaboration to achieve better results quicker, and build upon ideas of others and let others build on their own ideas. By opening up to new approaches and perspectives, and by building on the capabilities of others instead of only relying on their own, they expand their 'action space.'[1] As people expand action spaces, and become more effective through capable collaboration, the enterprise becomes more effective. Complex tasks are addressed better and faster, and innovations abound and make the enterprise more capable and able to engage in activities that previously were infeasible.
- **Map Knowledge Capabilities, Opportunities, Needs, and Constraints** – Mapping (auditing -- surveying -- determining the general conditions of) the enterprise's knowledge landscape provides insights for enterprise governance and other high-level functions and is often a top-down effort. In addition, knowledge landscape mapping (KLM) can provide important details for focusing on particular areas that need management attention. It consists of auditing knowledge-related conditions, programs, activities, capabilities, assets, etc. to identify Capabilities, Opportunities, Needs, and Constraints (CONC) of the overall knowledge situation and of potential future developments.
- **Measure Intellectual Capital and Create an Intangible Asset Monitor** – Provide overview by auditing the intangible assets of the enterprise with focus on the intellectual capital. Create a permanent IC management capability by implementing an intangible asset monitoring system for regular updates. <http://www.sveibytoolkit.com>

[1] Action Space – The domain that lie within the perspectives span and the boundaries that circumscribe the outer limits of the actions that the person (or enterprise) is comfortable to operate within.

- **Change Cultural Drivers** – by introducing more effective communication practices, peer reviews, and specifics such as incentives, guidelines and policies, and corresponding employee evaluations to influence the behavior of people within an organization.
- **Create Collaborative Work Practices** – Many factors affect capability to collaborate. Some of these are associated with attitudes. Others are associated with understanding and knowledge. Yet others are associated with compatibility and sharing views, thinking styles, and backgrounds. A set of important factors for being able to collaborate include: Sufficient, complementary, and diverse expertise for creativity, versatility, and flexibility; Shared and well understood goals and objectives; Shared knowledge to mutually understand the situation's needs and nature; Personal security and knowledge that collaborating is "safe"; Understanding of others' expertise to accept the value and relevance of their potential contributions; Mutual respect, tolerance, and trust; Compatible work styles and ability to work together
- **Foster Communities and Networks of Practice** – by facilitating collaboration and socializing by people with similar or identical responsibilities within an organization (Community of Practice). The purpose is for these individuals to share experiences and insights, collaborate to find innovative solutions applicable to their daily work. Networks of practice are formed by people with similar functions from different organizations.
- **Conduct Knowledge Cafés** – Knowledge Cafés is a term used for group sessions where a number of people (from a small number to several hundred) are assembled to discuss implications of some topic that affects them and their organization. Typically, the knowledge café is conducted by presenting the topic and its background to the group. This presentation is followed by brief (5-15 minutes) discussions small groups (five or fewer persons) of the implications and what they may mean for the participants. The groups are then scrambled and discussions are repeated – often for four or five cycles before summaries are collected. Often, continued informal discussions are encouraged for days or weeks..
- **Capture and Transfer Expert Know-How** – are used to communicate concepts, judgments, and thinking by exceptional performers, experts, to other knowledge workers to help them develop improved knowledge to perform better.[2] One approach uses a KM professional to assist experts to identify and characterize their associations, concept hierarchies, mental models, content knowledge, and metaknowledge through observing experts at work and in simulated situations. Using this material as illustrations and examples, the experts communicate directly to other workers. They explain their approaches, thinking and perspectives for handling routine and particularly, nonroutine, situations and engage less experienced workers in discussions and explorations. This approach allows these workers to learn by building and internalizing new knowledge – they build mental models in the form of operational models, scripts, schemata, and general abstractions.
- **Capture and Transfer Expertise from Departing Personnel** – is a valuable practice when competent people retire – or are promoted. Many approaches are used. For example, some use trained observers who document routine and semi-routine work in job descriptions, reports, or video recordings. Others utilize 'self elicitation' by writing or audio or video recording explanations of their expertise. Others use KM professionals to elicit and document pertinent knowledge. Still others use apprenticing or shadowing to learn on-the-job. Shadowing is particularly useful when the expertise covers a highly variable domain such as for managers, internal consultants, 'trouble shooters,' and similar broad fields.
- **Capture Decision Reasoning** – is very important but rarely performed. It involves identifying and making explicit the reasons why a particular decision was created and chosen and other pertinent aspects regarding the situation. Capture of what is behind the decision involves identifying the context and circumstance of the situation, the perspectives that dominated the which options were considered and rejected with reasons noted. The context is described

[2] Transfer of cognitive skills has proven difficult. Under the best of circumstances at most ten percent of expert knowledge can be elicited and transferred during a project period. See Anderson, 1981 and Singley & Anderson, 1989.

- **Lessons Learned Systems** – are provided to support existing work and capture new knowledge. Lessons Learned systems (LLS) include procedures for sequestering the persons directly involved when a notable situation has occurred. LLS consist of several elements including: (a) Individuals involved in the target lesson learned (LL) situation; (b) Procedures for the capture process; (c) Repository for initial, unedited capture information; (d) Editing process; (e) Approval process for including LL into final knowledge base (KB); (f) Resulting KB consisting of all LLs; (g) KB access methods (such as Case-Based Reasoning – or CBR); (h) User community that will access and use the LLs in their work; (i) Information technology environment in which LLS is implemented. The target LL situation may be a solved problem, a preventable mishap, a recognizable opportunity, and so on. LLS procedures call for quick assembly of participants to capture all relevant information, often in a predefined, structured format to make such knowledge available when required. The LLS may use CBR technology to store and locate applicable knowledge in the form of representative cases to provide guidance when a new situation arises (Wiig 1995, 295-304).
- **After Action Reviews (AAR)**[3] – were first developed by the armed forces to learn from experience by identifying what the mission was, how it was approached, what went right, what went wrong, what the situation was relative to what was expected, and which learnings should be recognized. Three questions drive the AAR method: What happened? Why did it happen? What should we do about it? The purposes of AAR are to: Improve the accuracy and detail of feedback available to sector leaders and employees; Identify collective and individual strengths and how to leverage them; Identify collective and individual deficiencies and how to correct them; Reinforce and increase the learning that took place during a business activity; Increase interest and motivation; Guide the individuals and groups towards achieving performance objectives; Identify lessons learned so that they can be applied to subsequent activities or tasks; Increase confidence in performance capability; and Increase proficiency of all participants. These learnings are compiled, edited, and stored in a structured knowledge base for further studies and to be available in future situations.
- **Outcome Feedback** – of how work products perform in the external or internal customer environment – is necessary information on which to base work performance assessments. Unfortunately, it frequently is not regularly available. Consequently, organizations and individuals have limited insights into how they may improve their performance, improve products and services, or otherwise innovate. Outcome feedback is provided in several ways. One approach is a formalized system for internal and external customers to evaluate received products or services. Use of questionnaires in merchandizing and many service industries is typical but not considered very effective. Other, more effective approaches include on-site studies of how work products are utilized by recipients and how well they satisfy real requirements.[4]
- **Expert Networks** – are used to provide formalized capabilities for workers in the field to consult or collaborate with topic experts on complex or unfamiliar tasks. Several mechanisms and infrastructure elements may be used to create and support an expert network. They include: (a) Guides to "who knows what" in the form of "yellow page" systems on intranets, knowledge inventories, or knowledge roadmaps; (b) Policies that permit knowledge worker access to experts; (c) Budgets for experts to help knowledge workers; (d) Communication channels that range from on-site expert visits, face-to-face meetings, telephone consultations, e-mail, groupware-based communication, video conferencing, and so on; (e) Learnings capture systems to build frequently asked questions (FAQ) help systems; and (f) Outcome feedback analysis and capture systems.
- **Knowledge Discovery from Data (KDD)** – uses sophisticated statistical or automatic reasoning methods to identify patterns of interesting cause-effect relationships. An example is the discovery of intervention

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[3] For description of AAR, see for example <http://www.luminella.com/aar.htm> (May 22, 2000) and <http://www-dcst.monroe.army.mil/wfxxi/op-anx-f.htm> (May 22, 2000).

[4] For complex work products highly effective outcome feedback includes studies of potentials for: (a) Innovation to improve product performance in customer environment; (b) Including additional features in the products and services such as embedded or companion knowledge and expertise; (c) Different products and services; and (d) Education of users in how better to use and leverage products and services.

methods that had proven effective for treatment of mental disorders in large populations (USA and the Netherlands).

- **Performance Support Systems (PSS) and Knowledge-Based System (KBS) Applications** – A computer-based system which contains explicit or implicit domain knowledge used specifically for reasoning about specific situations. Examples of KBSs are case-based reasoning (CBR) systems, expert systems, and neural nets. Recently, as a result of the systematic perspectives encouraged by explicit KM, the reliance of automated knowledge and reasoning has changed within many organizations. Instead of being considered as stand-alone or relatively isolated solutions to relieve particular critical knowledge-related functions, knowledge-based systems (KBSs) are now often considered as integral building blocks within a larger knowledge management (KM) perspective.
- **Build and Deploy Knowledge Bases** – A knowledge base (KB) is a component of a knowledge-based system which contains the system's domain knowledge in some representation suitable for the system to reason with. Knowledge in knowledge bases is typically represented in a standard format. KBs are important repositories for explicit knowledge. They can contain "knowledge" in the form of unstructured natural language documents, or in many other representations. For structured KBs, editing ("rational reconstruction") of the acquired knowledge is needed. KBs are also equipped with retrieval mechanisms that can range from simple query languages to sophisticated intelligent agents.
- **Information Technology Tools for Knowledge Management** – A large number of IT tools are available for KM support. These tools are under constant development and new capabilities are introduced repeatedly.

  A class of IT-based will operate on and support categorization and linking of natural language documents. Most of these tools will also create intranet portals. Many have limited natural language (concept) understanding and indexing capabilities.