The KMS Road Map

The first phase: evaluation of the infrastructure and aligning KM and business strategy.

The second phase: KM system analysis, design, and development.
- Knowledge audit and analysis.
- Designing the KM team.
- Creating the KM system blueprint.
- Selecting KM technology
- Developing the KM system.

The third phase: KMS deployment.

The final phase: measuring ROI and performance evaluation.

Amrit Tiwana, 2002
Technology Components of KM

- a balance between "must have" tools and "should have" tools (constrained by time/costs)
- Needs to support both tacit and explicit knowledge processes

Technology is an enabler of KM systems

A KMS Technology Architecture

- User Interface: e.g. browser
- Authentication/Security Layer: includes access identification, firewalls, and user recognition
- Collaborative Intelligence and Filtering: such as intelligent robots to disseminate news, based on agent or AI technology
- Application Layer: includes collaborative work tools, video conferencing, decision support tools, yellow pages, etc
- Transport Layer including WWW, TCP/IP, e-mail, document exchange, SMTP [Assumes existence of an appropriate Physical Layer such as cables, physical wires, modems for transmission]
- Middleware and Legacy Applications
- Repositories: such as data warehouse, databases, documents and other files

(Tiwana, 2002)
Supporting technology and functionality

- local area network (LAN)
- intranet-based webs
- should work on multiple types of computer platforms
- e-mail
- on-line publishing
- application distribution
- on-line search
- distributed databases
- multimedia data management
- e-mail archives
- frequently asked questions
- minutes of the meetings
- product information
- business intelligence
- project management
- reports
- news
- personal homepages
- videoconferences

Intranet

- An intranet is the main tool for sharing knowledge and allowing staff to tap the organisations know how.
- Primary aim
  - Create and distribute up-to-date information
  - Give access to information resources within organisation
  - Give access to historical information
  - Create and maintain organisational memory
  - Link people
- Targets
  - Knowledge repositories
  - Mostly structured information (reports, manuals, and documents)
  - Discussion databases/listservers for sharing business information
  - Hyperlink-connected Internet documents;
  - Groupware databases;
  - Thesaurus is essential to most on-line repositories
Portals

- A simple concept: a personalized and customised Web-based interface that consolidates access to information, services and applications
  - provides an “Information Ecology” for KM
  - facilitates knowledge sharing
  - facilitates knowledge transfer
  - Makes organizational processes more transparent
  - is a front end and a major component of KMS

“Work is not where you go, but what you do”

Types of KM Portals

- **Information** portal provides instant access to personalised content and services.
- **Collaboration** portal facilitates online real-time communication, brainstorming sessions and allows selective push for relevant information.
- **Team** portal monitors efficient workflow-based task management among teams & members, sharing of skill sets.
- **Expertise** portal connects organisational experts to members who need their help (e.g., yellow pages, profiling, push/pull facilities, interactive sessions with experts).
- **Learning** portal maintains skill inventory, facilitates skill-upgrading through online learning sessions.

Another classification

- Corporate Portal
  - business Intelligence
  - business area
  - Horizontal (collaboration, expertise)
- e-Business (Extranet) Portals
  - connect right customer to right service;
  - provides secure channel for business transaction;
  - facilitates Customer Relations Management
- Personal Portals
- Public Portals
  - General – Yahoo.com
  - excite.com
  - Industrial – specific audience, iVillage
  - Specific purpose – healthcare portals

Role of Intelligent Technology

- Modeling expertise
  - expert systems approach ("objectified" knowledge "canned" in a computerised form)
- Solving problems by analogy
  - Case Based Reasoning (CBR) approach
- Simulating problem solving
  - neural networks
- Dealing with ambiguity
  - fuzzy logic
- Deriving rules from data
  - machine learning
- Evolving solutions
  - genetic algorithms
- Search
  - Intelligent agents
Knowledge Based Systems

- An Expert System is "a computer program that emulates the behaviour of human experts who are solving real-world problems associated with a particular domain of knowledge" - Pigford and Baur (1990)

- Knowledge Based System is a more general term than Expert Systems
  - there may be no expert for the problem
  - systems may encode policies, rules, regulations which no one person knows completely
  - system may not represent any one individual's method of problem solving
  - systems may be used to support rather than replacement of people

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Case-Based Approach

- Case-Based Reasoning (CBR) - reasoning from experience.
- Knowledge about past experience is represented as cases
- CBR is based on psychological theory of human cognition
- Assumes that when solving a new problems we rely on past experience.
- New Solution = Past Solution(s) from the Case Base + Measure of Similarity
- CBR approach is used in AI to model human memory
Machine Learning

- Many organisations maintain large data bases of past events. These data bases may “hide” relationships between data elements that are significant and unknown to the organisation and its staff.
- Machine learning is one attempt to discover these relationships.
- Once discovered, the rules may be used in rule-based systems for automated action.

Intelligent Agents

- Agents can help in:
  - Knowledge creation (templates, reminders, automatic agenda management);
  - Knowledge classification (intelligent indexing);
  - Knowledge distribution (filtering rules, push technology, profiling);
  - Knowledge retrieving (content and context-based retrieval, automatic query generation, intelligent portals and EIP)
Currently Use of KM Technologies

<table>
<thead>
<tr>
<th>Technology</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intranet</td>
<td>60</td>
</tr>
<tr>
<td>Internet</td>
<td>55</td>
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<tr>
<td>Online information sources</td>
<td>50</td>
</tr>
<tr>
<td>Groupware</td>
<td>45</td>
</tr>
<tr>
<td>Electronic bulletin boards</td>
<td>40</td>
</tr>
<tr>
<td>Document repositories</td>
<td>35</td>
</tr>
<tr>
<td>Search and retrieval agents</td>
<td>30</td>
</tr>
<tr>
<td>Expert systems</td>
<td>25</td>
</tr>
<tr>
<td>Data warehousing/mining</td>
<td>20</td>
</tr>
<tr>
<td>CDRoms</td>
<td>15</td>
</tr>
<tr>
<td>Video conferencing</td>
<td>10</td>
</tr>
</tbody>
</table>

Source: S. Zyngier, KM Survey in Australian corporate environment

Exploring Technology for KMS

- There are many classifications of KMS. You could see an example of such a classification used to search Monash KM Laboratory products database at http://km-svr.sims.monash.edu.au/.
- There is another one provided within KM TOOLS part of ICASIT'S, a resource KMCentral (http://www.icasit.org/km/tools/index.htm).
- KMWorld's "100 Companies that Matter in Knowledge Management 2004" (http://www.kmworld.com/100.cfm) is a list worth exploring for up to date information about technological solutions for KM projects.
Can’t live with IT – Can’t live without IT

- IT design is driven by the needs of knowledge workers
- KM strategy has to be aligned with the organisational IT strategy
- The value of IT investment needs to be justifiable

(Aumann, 2002)

The IT Infrastructure
- What systems are already in place?
- What is the opportunity for integration?
- Buy or build?

Software for Knowledge Management

- Creativity Tools
- Document Management
- Data Warehouses
- Data Mining

- Enterprise Modelling
- Editorial Systems
- Workflow Mgt.

- OLAP
- Intra-/Internet-Standards
- User Modelling
- Content Management

- Text Mining
- Case Based Reasoning
- Search Engines

H. Shauer, 2002
Elements of the Technology Infrastructure

- Knowledge Repositories
  - provides organisational knowledge assets, (information resources, knowledge-based products and organisational records) that are identifiable, reliable, authentic and flexible (eg Lotus Notes, intranets, Grapevine)
- Categorizing and Contextualizing Knowledge Assets
  - based on a common understanding of contexts and terminology explicitly expressed in metadata
- Performance Management
  - to manage the work process (eg workflow) and model work practices with intelligent technologies
  - support for sense making, learning and memory (functional dimension)
- Communications
  - to transform personal knowledge into organisational knowledge

Approaches to KMS

Codification – product-based approach
- Create knowledge object;
- Create knowledge base/archive/library/repository
- Index and store knowledge object in the knowledge base;
- Subject matter expert or information manager acts as a Knowledge Integrator/Broker

Personalization – people/process-based approach
- Identify knowledge processes
- Create knowledge flow support facilities
- Integrate knowledge base with the knowledge processes
- Align knowledge objects with knowledge flows
- Requires KM specialist, KM coordinator, support from the CE manager as well as Knowledge Integrator/Broker

Functional - an intelligent decision support approach
- KMS provides access to organisational knowledge for intelligent decision support
- Intelligent decision support includes functionality for learning, reasoning, memory and explanation
- Builds on, and combines, the first two approaches
“Pull” principle in KM Infrastructure

- User needs to be actively involved in the search of information/knowledge
- They need to “go and get” what they want when they want it
- Agents and web crawlers/spiders can be set up to help with topic-based search

“Push” Principle in KM Infrastructure

- Identifies what knowledge you need to perform your task and provides it to you at the right time and in a right form (Microsoft Paperclip?);
- Based on knowledge replication;
- Organisational level decision on what is needed;
- Can include setting up training sessions for staff;
- Channels for knowledge transfer have to be clearly defined

(Probst, Raub and Ronhards, 2000)
Core Knowledge Services

- **Knowledge generation** services create new knowledge in forms that can be stored in the repository (e.g., data mimes, pattern recognition, collaborative creation of documents, etc.)
- **Knowledge capture** services facilitate addition to repositories
- **Knowledge organisation** services arrange items in the repository to facilitate retrieval and use (add or modify indexes, directories)
- **Access management** services facilitate the control of access to the knowledge repository
- **Retrieval** services make knowledge available for specific users (include searching, navigation, translation, integration)  
  (Housel & Bell 2001)

Other Knowledge Services

- **Electronic Communication** services – e.g., email, chats
- **Collaboration** services – online meetings, discussion groups, groupware
- **Translation** services - from one file format to another, language to language
- **Work management** services – built upon collaboration services (define work activity, view the status of tasks, share results, etc...)
- **Search and Intelligence** services - Intranet, extranet, intelligent agents
Issues for the Technology Infrastructure

- Privacy
- Intellectual property
- Confidentiality
- Copyright
- Change of media
- Change of work practices
  (20%technology-80%culture)

References