CHAPTER 11

Managing Knowledge
Important Dimensions of Knowledge

• Data: Flow of events or transactions captured by organization’s systems
• Information: Data organized into categories of understanding
• Knowledge: Patterns, rules, and situational know-how for using information

Continued …
• Knowledge is an asset of a firm:
  – Tacit and explicit
  – Intangible asset
  – Requires organizational resources
  – Can be a source of competitive advantage

Continued …
The Knowledge Management Value Chain

Each stage adds value to raw data and information as they are transformed into usable knowledge

- Knowledge acquisition
- Knowledge storage
- Knowledge dissemination
- Knowledge application
The knowledge management value chain

**FIGURE 11-1** The knowledge management value chain.

Knowledge Business Value Chain

Knowledge Management Systems

**Information System Activities**

- **Acquire**
  - Knowledge discovery
  - Data mining
  - Neural networks
  - Genetic algorithms
  - Knowledge workstations
  - Expert knowledge networks

- **Store**
  - Content management systems
  - Knowledge databases
  - Expert systems

- **Disseminate**
  - Intranet portals
  - Search engines
  - Collaboration and social business tools

- **Apply**
  - Decision support systems
  - Enterprise applications

**Management and Organizational Activities**

- Knowledge culture
- Communities of practice
- Social networks
- Organizational practices/routines

- Organizational routines
- Organizational culture

- Training
  - Informal networks
  - Organizational culture

- New IT-based business processes
- New products and services
- New markets

Knowledge management today involves both information systems activities and a host of enabling management and organizational activities.
Knowledge Application

To provide return on investment, organizational knowledge must become systematic part of management decision making and become situated in decision-support systems

• New business practices
• New products and services
• New markets
Types of Knowledge Management Systems

1. Enterprise-wide knowledge management systems
   • General-purpose firm-wide efforts to collect, store, distribute, and apply digital content and knowledge

2. Knowledge work systems (KWS)
   • Specialized systems built for engineers, scientists, other knowledge workers charged with discovering and creating new knowledge

Continued …
3. Intelligent techniques
   • Diverse group of techniques such as data mining, case-based reasoning, intelligent agents; used for various goals: discovering knowledge, distilling knowledge, driving decision making
FIGURE 11-2 Major types of knowledge management systems.

Enterprise-Wide Knowledge Management Systems
General-purpose, integrated, firmwide efforts to collect, store, disseminate, and use digital content and knowledge
Enterprise content management systems
Collaboration and social tools
Learning management systems
Knowledge network systems

Knowledge Work Systems
Specialized workstations and systems that enable scientists, engineers, and other knowledge workers to create and discover new knowledge
Computer-aided design (CAD)
3-D virtualization
Virtual reality
Investment workstations

Intelligent Techniques
Tools for discovering patterns and applying knowledge to discrete decisions and knowledge domains
Data mining
Neural networks
Expert systems
Case-based reasoning
Fuzzy logic
Genetic algorithms
Intelligent agents

There are three major categories of knowledge management systems, and each can be broken down further into more specialized types of knowledge management systems.
Enterprise-Wide Knowledge Management Systems

- Knowledge repository: a collection of internal and external knowledge in a single location for management of the organization
- Structured knowledge systems: formal documents and reports; needs to be accessible
- Semistructured knowledge systems: for less structured documents, digital assets (e.g. e-mails)
- Tools for communication and collaboration
Must create a classification scheme, a taxonomy for easy retrieval; tagging
Knowledge Network Systems

- Provide online directory of corporate experts in well-defined knowledge domains
- May systematize solutions developed by experts and store them in knowledge database
- Best-practices
Learning Management Systems

Learning Management Systems: Provide tools for management, delivery, tracking, and assessment of various types of employee learning and training

- Support multiple modes of learning
- Measure learning effectiveness (identify and quantify impact of employee learning programs)
Knowledge Work Systems

Systems for knowledge workers to help create new knowledge and integrate that knowledge into business

Knowledge workers

• Researchers, designers, architects, scientists, engineers who create knowledge for the organization

• Three key roles:
  1. Keeping organization current in knowledge
  2. Serving as internal consultants regarding their areas of expertise
  3. Acting as change agents, evaluating, initiating, and promoting change projects
FIGURE 11-4 Requirements of knowledge work systems.

Knowledge work systems require strong links to external knowledge bases in addition to specialized hardware and software.
Examples of Knowledge Work Systems, Intelligent Systems

- CAD (computer-aided design): Automates creation and revision of engineering or architectural designs
- Virtual reality systems: Software and special hardware to simulate real-life environments
- Knowledge discovery: identification of patterns in data using techniques such as data mining
- Intelligent agents: automating tasks like searching for information for e-commerce, supply chain management (attuned to goals, needs)
Capturing Knowledge: Expert Systems

Expert systems:

• an intelligent technique for capturing tacit knowledge in a very specific and limited domain of human expertise.

• capture the knowledge of skilled employees in the form of a set of rules in a software system that can be used by others in the organization.
how expert systems work:
knowledge engineer encodes expertise as rules
knowledge base, inference engine
forward chaining: begin with information, search rule base for conclusion
backward chaining: begin with hypothesis, prove or disprove based on information
An expert system contains a number of rules to be followed. The rules are interconnected; the number of outcomes is known in advance and is limited; there are multiple paths to the same outcome; and the system can consider multiple rules at a single time. The rules illustrated are for simple credit-granting expert systems.
An inference engine works by searching through the rules and “firing” those rules that are triggered by facts gathered and entered by the user. Basically, a collection of rules is similar to a series of nested IF statements in a traditional software program; however, the magnitude of the statements and degree of nesting are much greater in an expert system.
Organizational Intelligence: Case-Based Reasoning

- Case base
- New cases authored if no match
- Try to match current case to one in the case base
  - Due to similarity, learn actions to take
FIGURE 11-7 How case-based reasoning works.

Case-based reasoning represents knowledge as a database of past cases and their solutions. The system uses a six-step process to generate solutions to new problems encountered by the user.

1. User describes the problem
2. System searches database for similar cases
3. System asks user additional questions to narrow search
4. System finds closest fit and retrieves solution
5. System modifies the solution to better fit the problem
6. System stores problem and successful solution in the database

Successful?

Case database

NO

YES
**FIGURE 11-11** Intelligent agents in P&G’s supply chain network.

1. Software agents schedule deliveries from suppliers. If a supplier can’t deliver on time, agents negotiate with other suppliers to create an alternative delivery schedule.

2. Software agents collect real-time sales data on each P&G product from multiple retail stores. They relay the data to P&G production for replenishing orders and to sales and marketing for trend analysis.

3. Software agents schedule shipments from distributors to retailers, giving priority to retailers whose inventories are low. If a shipment to a retailer is delayed, agents find an alternative trucker.

Intelligent agents are helping P&G shorten the replenishment cycles for products such as a box of Tide.
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