Chapter Five

Knowledge Management in MIS

Outline

- What is knowledge
- Types of knowledge
- Important Dimensions of knowledge
- Knowledge Management
- Knowledge management value chain
- Types of knowledge management system
- Knowledge management solutions
- Knowledge Management Mechanisms
- Knowledge Management Technologies
- Knowledge Management Infrastructure

What is Knowledge

- Knowledge refers to interconnected information on what something is, why something happens, and how to do something .
  - **What:** definitions of concepts and relationships, taxonomies
  - **Why:** understanding cause-effect relationships
  - **How-to, know-how:** analysis/synthesis; methods, procedures for generating new knowledge
- Knowledge acquisition is incremental (what in layers, why with imperfect accuracy, starting from know-how and learning what/why in the process)
- Knowledge is never complete, or 100% correct, can be incoherent and controversial… is messy.

Knowledge Types

- **Source view:**
  - *Theoretical* (science, theories) vs. *Experiential* knowledge (personal, learned by doing)
- **Communication view:**
  - **Explicit**
    - ✔ can be communicated to others
    - ✔ definitions, taxonomies, theories, procedures, cases
  - **Tacit**
    - ✔ difficult to communicate
    - ✔ experiential, analytical & synthesizing skills
- Sharing and capturing tacit knowledge is one of main goals before knowledge management and knowledge support systems.

Knowledge Types – Capital View

- *Human Capital*
  - Knowledge in employees' mind
- *Structural Capital :*
  - Knowledge embedded in organizational artifacts
  - Knowledge representations in documents (patents, problem solving descriptions – different documents than reports; Accenture case)
  - Invented work procedures/processes (Pharmaceutical co.)
  - Knowledge embedded in technology (any), production floor design, products
  - Innovation Potential (e.g., educational facilities)

Important dimensions of knowledge

- *Knowledge is a firm asset.*
  - Intangible
  - Creation of knowledge from data, information, requires organizational resources
  - As it is shared, experiences network effects
- *Knowledge has different forms.*
  - May be explicit (documented) or tacit (residing in minds)
  - Know-how, craft, skill
  - How to follow procedure
  - Knowing why things happen (causality)

Cont.

- *Knowledge has a location.*
  - Cognitive event
  - Both social and individual
  - "Sticky" (hard to move), situated (enmeshed in firm's culture), contextual (works only in certain situations)
- *Knowledge is situational.*
  - **Conditional**: Knowing when to apply procedure
  - **Contextual**: Knowing circumstances to use certain tool

Knowledge Management

- Knowledge management can be defined as:-
  - Performing the activities involved in discovering capturing , sharing, and applying knowledge so as to enhance, in a cost-effective fashion the impact of knowledge on the unit's goal achievement.
  - Set of business processes developed in an organization to create, store, transfer, and apply knowledge
- The term knowledge resources refers not only to the knowledge currently possessed by the individual or the organization but also to the knowledge that can potentially be obtained (at some cost if necessary) from other individuals or organizations.

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

Knowledge acquisition

- Documenting tacit and explicit knowledge
  - Storing documents, reports, presentations, best practices
  - Unstructured documents (e.g., e-mails)
  - Developing online expert networks
- Creating knowledge
- Tracking data from TPS and external sources

Knowledge storage

- Databases
- Document management systems
- Role of management:
  - Support development of planned knowledge storage systems.
  - Encourage development of corporate-wide schemas for indexing documents.
  - Reward employees for taking time to update and store documents properly.

Knowledge dissemination

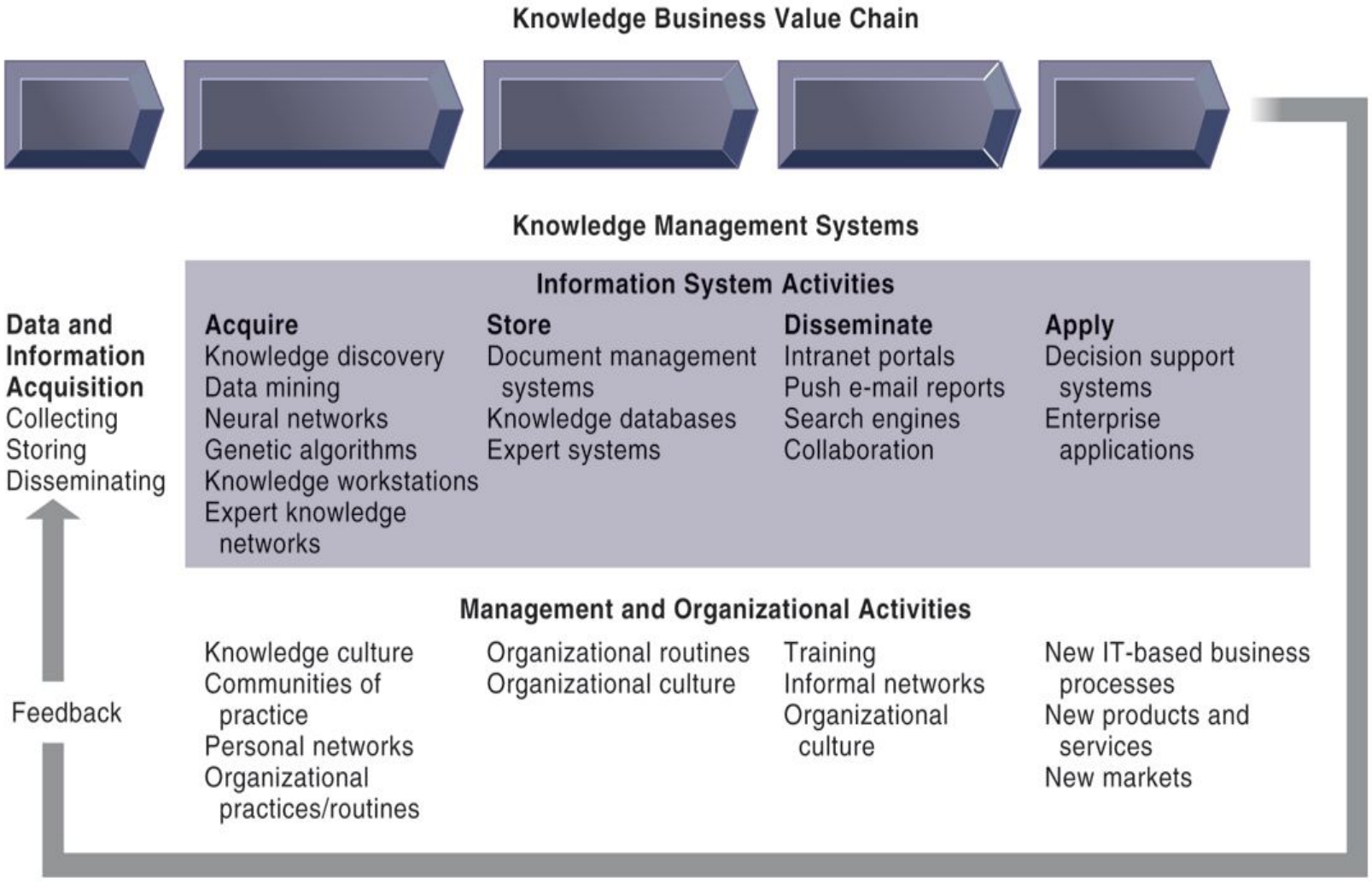
- Portals, wikis
- E-mail, instant messaging
- Search engines
- Collaboration tools
- A deluge of information?

  - Training programs, informal networks, and shared management experience help managers focus attention on important information.

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

Cont.

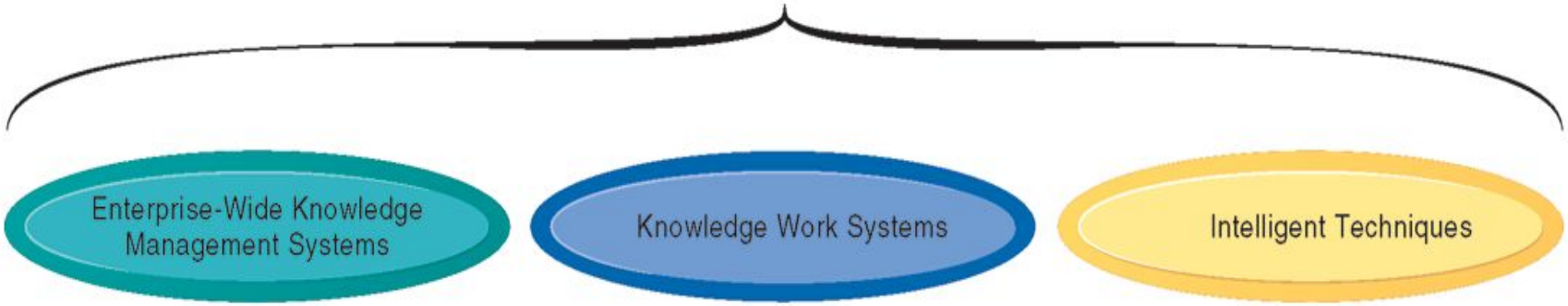

Knowledge Business Value Chain
Knowledge Management Systems
Information System Activities
Data and Information Acquisition
Collecting
Storing
Disseminating
Acquire
Knowledge discovery
Data mining
Neural networks
Genetic algorithms
Knowledge workstations
Expert knowledge networks
Store
Document management systems
Knowledge databases
Expert systems
Disseminate
Intranet portals
Push e-mail reports
Search engines
Collaboration
Apply
Decision support systems
Enterprise applications
Management and Organizational Activities
Knowledge culture
Communities of practice
Personal networks
Organizational practices/routines
Organizational routines
Organizational culture
Training
Informal networks
Organizational culture
New IT-based business processes
New products and services
New markets
Feedback

Three major types of knowledge management systems

- **Enterprise-wide knowledge management systems**
  - General-purpose firm-wide efforts to collect, store, distribute, and apply digital content and knowledge
- **Knowledge work systems (KWS)**
  - Specialized systems built for engineers, scientists, other knowledge workers charged with discovering and creating new knowledge
- **Intelligent techniques**
  - Diverse group of techniques such as data mining used for various goals: discovering knowledge, distilling knowledge, discovering optimal solutions

Cont.

- The three types of KMS can be broken down further into more specialized types of knowledge management systems.



General-purpose, integrated, firmwide efforts to collect, store, disseminate, and use digital content and knowledge

Enterprise content management systems
Collaboration tools
Learning management systems
Knowledge network systems

Specialized workstations and systems that enable scientists, engineers, and other knowledge workers to create and discover new knowledge

(CAD)
3-D virtualization
Virtual reality
Investment workstations

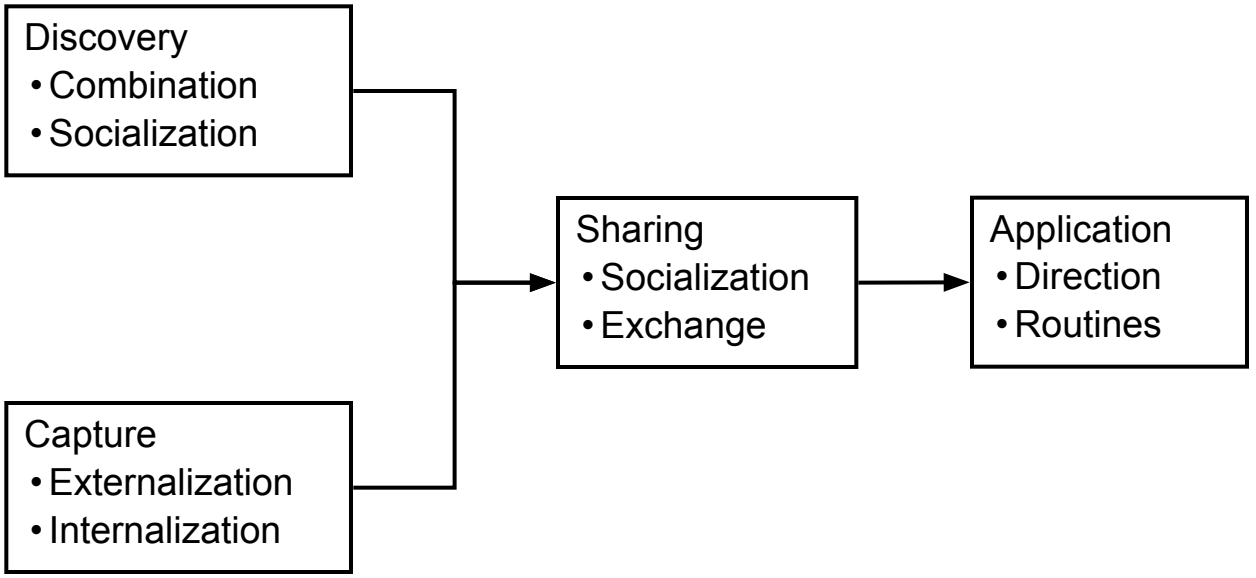
Tools for discovering patterns and applying knowledge to discrete decisions and knowledge domains

Data mining
Neural networks
Expert systems
Case-based reasoning
Fuzzy logic
Genetic algorithms
Intelligent agents

Knowledge Management Solutions

- Knowledge management solutions refer to the variety of ways in which KM can be facilitated
  - KM processes
  - KM systems
  - KM mechanisms and technologies
  - KM infrastructure

Knowledge Management Processes



Knowledge Discovery

- Knowledge discovery may be defined as the development of new tacit or explicit knowledge from data and information or from the synthesis of prior knowledge
  - **Combination:** enabling the discovery of new explicit knowledge
  - **Socialization:** enabling the discovery of new tacit knowledge

Knowledge Capture

- Knowledge capture is defined as the process of retrieving either explicit or tacit knowledge that resides within people, artifacts, or organizational entities.
- Knowledge captured might reside outside the organizational boundaries, including consultants, competitors, customers, suppliers, and prior employers of the organization's new employees
  - **Externalization** involves converting tacit knowledge into explicit forms such as words, concepts, visuals, or figurative language
  - **Internalization** is the conversion of explicit knowledge into tacit knowledge. It represents the traditional notion of "learning"

Knowledge Sharing

- Knowledge sharing systems support the process through which explicit or implicit knowledge is communicated to other individuals
- It may take place across individuals, groups, departments or organizations
- Discussion groups or chat groups facilitate knowledge sharing by enabling individuals to explain their knowledge to the rest of the group

KM Application

- Mechanisms and technologies support knowledge application systems by facilitating routines and direction.
  - **Direction** refers to the process through which individuals possessing the knowledge direct the action of another individual without transferring to that person the knowledge underlying the direction
  - **Routines** involve the utilization of knowledge embedded in procedures, rules, and norms that guide future behavior

Knowledge Management Systems

- Knowledge management systems are the integration of technologies and mechanisms that are developed to support KM processes

Knowledge Management Mechanisms

- Mechanisms facilitating direction include traditional hierarchical relationships in organizations, help desks, and support centers
- Mechanisms supporting routines include organizational policies, work practices, and standards
- KM mechanisms are organizational or structural means used to promote KM
- Examples of KM mechanisms include learning by doing, on-the-job training, learning by observation, and face-to-face meetings

Knowledge Management Technologies

- Technologies that support KM include
  - Artificial intelligence (AI) technologies encompassing those used for knowledge acquisition and case-based reasoning systems
  - Electronic discussion groups
  - Computer-based simulations
  - Databases
  - Decision support systems
  - Enterprise resource planning systems
  - Expert systems
  - Management information systems
  - Expertise locator systems
  - Video conferencing and
  - Information repositories encompassing best practices databases and lessons

KM Processes, Mechanisms, and Technologies

KM Processes	KM Systems	KM Sub-Processes	Illustrative KM Mechanisms	Illustrative KM Technologies
Knowledge Discovery	Knowledge Discovery Systems	Combination	Meetings, telephone conversations, and documents, collaborative creation of documents	Databases, web-based access to data, data mining, repositories of information, Web portals, best practices and lessons learned
		Socialization	Employee rotation across departments, conferences, brainstorming retreats, cooperative projects, initiation	Video-conferencing, electronic discussion groups, e-mail
Knowledge Capture	Knowledge Capture Systems	Externalization	Models, prototypes, best practices, lessons learned	Expert systems, chat groups, best practices, and lessons learned databases.
		Internalization	Learning by doing, on-the-job training, learning by observation, and face-to-face meetings	Computer-based communication, AI-based knowledge acquisition, computer-based simulations
Knowledge Sharing	Knowledge Sharing Systems	Socialization	See above	See above
		Exchange	Memos, manuals, letters, presentations	Team collaboration tools, web-based access to data, databases, and repositories of information, best practices databases, lessons learned systems, and expertise locator systems
Knowledge Application	Knowledge Application Systems	Direction	Traditional hierarchical relationships in organizations, help desks, and support centers	Capture and transfer of experts' knowledge, troubleshooting systems, and case-based reasoning systems; decision support systems
		Routines	Organizational policies, work practices, and standards	Expert systems, enterprise resource planning systems, management information systems

Knowledge Management Infrastructure

- Organizational Culture
- Organizational Structure
- Communities of Practice
- Information Technology Infrastructure
- Common Knowledge

Organizational Culture

- Organizational culture reflects the norms and beliefs that guide the behavior of the organization's members
- Attributes of an enabling organizational culture include
  - understanding of the value of KM practices
  - management support for KM at all levels
  - incentives that reward knowledge sharing and
  - encouragement of interaction for the creation and sharing of knowledge

Organizational Structure

- Hierarchical structure of the organization affects the people with whom individuals frequently interact, and to or from whom they are consequently likely to transfer knowledge
- Organizational structures can facilitate KM through communities of practice
- Organization structures can facilitate KM through specialized structures and roles that specifically support KM

Information Technology Infrastructure

- The IT infrastructure includes data processing, storage, and communication technologies and systems
- One way of systematically viewing the IT infrastructure is to consider the capabilities it provides in four important aspects:
  - Reach
  - Depth
  - Richness
  - Aggregation

Common Knowledge

- Common knowledge also refers to the organization's
  - cumulative experiences in comprehending a category of knowledge and activities and
  - the organizing principles that support communication and coordination
- Common knowledge helps enhance the value of an individual expert's knowledge by integrating it with the knowledge of others

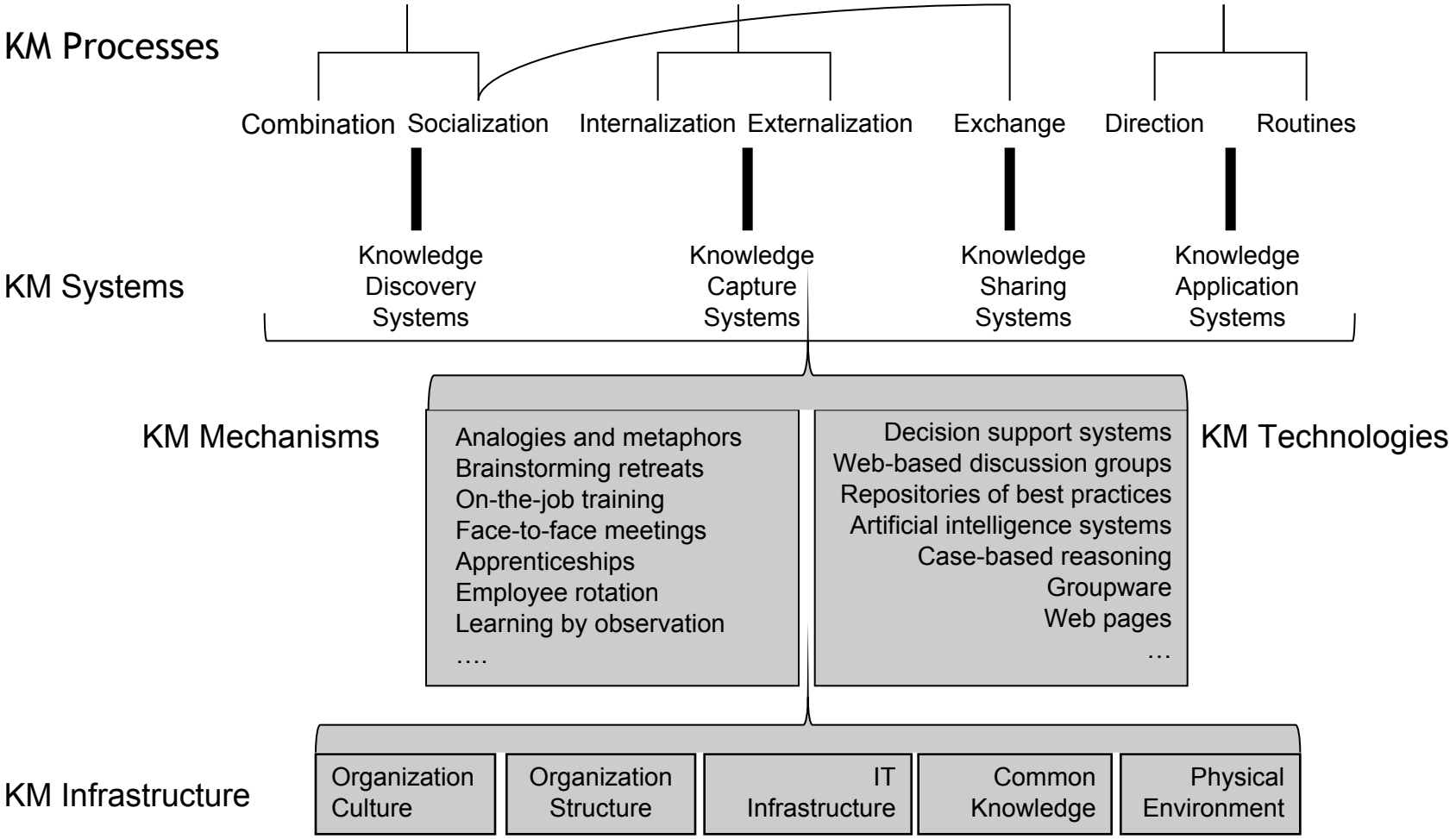
Physical Environment

- Physical environment includes
  - the design of buildings and the separation between them
  - the location, size, and type of offices
  - the type, number, and nature of meeting rooms

Knowledge Management Infrastructure

Dimensions of KM Infrastructure	Related Attributes
Organization Culture	Understanding of the value of KM practices Management support for KM at all levels Incentives that reward knowledge sharing Encouragement of interaction for the creation and sharing of knowledge
Organization Structure	Hierarchical structure of the organization (decentralization, matrix structures, emphasis on "leadership" rather than "management") Communities of practice Specialized structures and roles (Chief Knowledge Officer, KM department, traditional KM units)
Information Technology Infrastructure	Reach Depth Richness Aggregation
Common Knowledge	Common language and vocabulary Recognition of individual knowledge domains Common cognitive schema Shared norms Elements of specialized knowledge that are common across individuals
Physical Environment	Design of buildings (offices, meeting rooms, hallways) Spaces specifically designed to facilitate informal knowledge sharing (coffee rooms, cafeterias, water coolers)

Overview of Knowledge Management Solutions



Thank you !!!!