## Lecture 2:
Knowledge Management Foundations

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Knowledge Management

- Perform activities involved in **discovering, capturing, sharing, and applying** knowledge
- Enhance the impact of knowledge on the unit's goal achievement
- in cost-effective ways

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Data, Information & Knowledge: Hierarchy

Date → Information → Knowledge → Wisdom

Wisdom

Knowledge
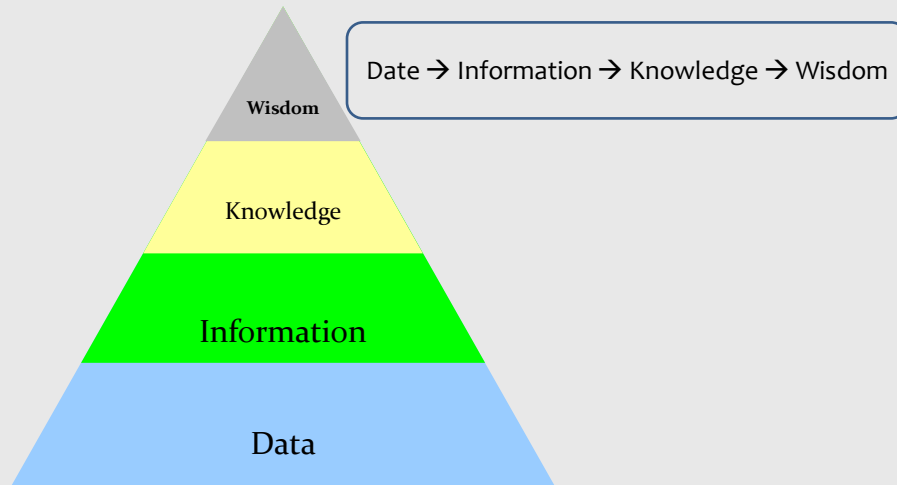
Information

Data

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What is Data?

- Data comprises facts, observations, or perceptions
- Data represents raw numbers or assertions

Example:
- A restaurant sales order including <u>two large burgers and two medium-sized vanilla</u> milkshakes.

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What is Information?

- Information is processed data
- Information is a subset of data, only including those data that possess **context, relevance, and purpose**
- Information involves manipulation of raw data (using knowledge) – data processing / information processing
  - Information systems must meet organizational / user requirements

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Information - Example

- Consider the numbers indicating the <u>daily sales of burgers, vanilla milk-shakes,</u> and other products of a restaurant

  - For the restaurant manager
    - *information* – he can use such to make decisions concerning pricing and raw material purchases.
  - For the CEO of the restaurant chain
    - *data* only – he need processing to consolidate such *data* of all the restaurants for his *information*.
  - For most customers
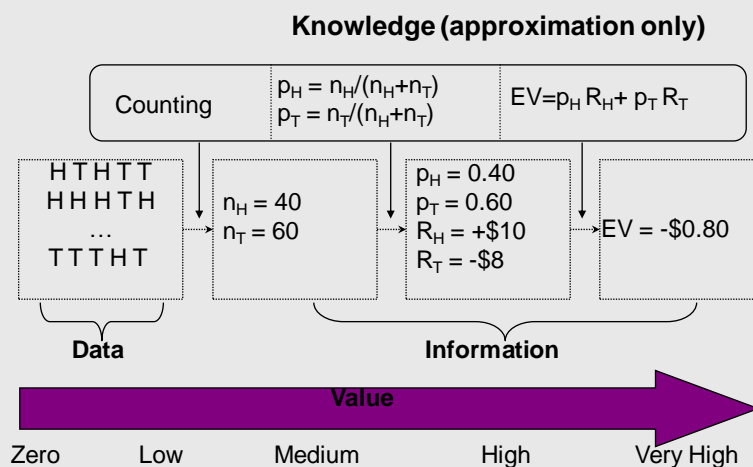   - *data* – uninteresting things.

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What is Knowledge?

- A justified true belief (Nonaka and Takeuchi)
- It is different from data & information
- <u>Knowledge is at the highest level in a hierarchy</u> with information at the middle level, and data to be at the lowest level
- It is the richest, deepest & most valuable of the three
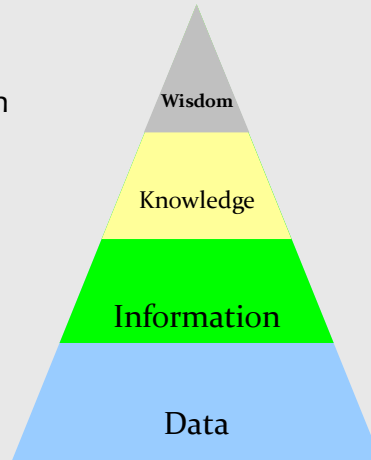- **Information with direction**, i.e., <u>leads to appropriate actions</u>

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Value of Data, Information, & Knowledge

Knowledge (approximation only)

Counting	$p_H = n_H/(n_H+n_T)$ $p_T = n_T/(n_H+n_T)$	$EV = p_H R_H + p_T R_T$

H T H T T H H H T H … T T T H T	$n_H = 40$ $n_T = 60$	$p_H = 0.40$ $p_T = 0.60$ $R_H = +\$10$ $R_T = -\$8$	$EV = -\$0.80$

Data **Information**
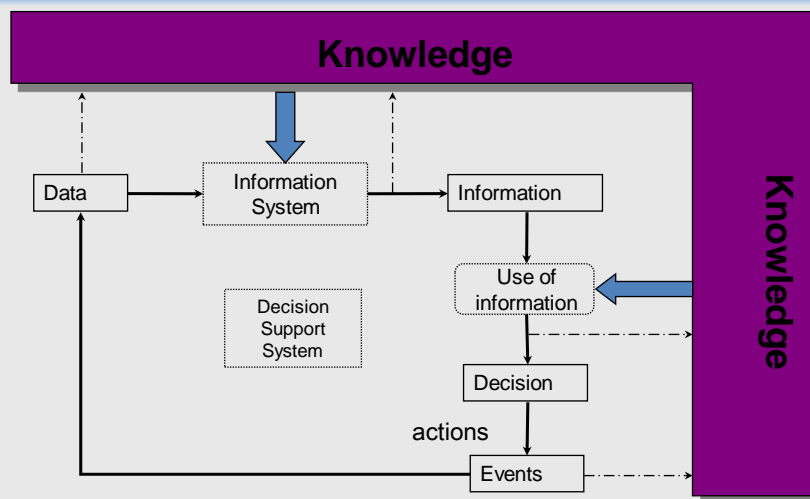
Value

Zero   Low   Medium   High   Very High

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Beyond Knowledge

- Knowledge – the know how
  - actionable information
  - e.g., Increasing the production capacity before X'mas each year to handle the extra sales volume;

- Wisdom – the know why
  - e.g., why there is increasing sales volume just before X'mas?
  - inclination to adjust

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        Wisdom
      Knowledge
    Information
      Data
```

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Relating Data, Information, Knowledge to Events

Knowledge

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Data → Information System → Information

Decision Support System

Use of information

Decision

actions

Events
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Knowledge

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Knowledge Classification

- Procedural Vs. Declarative Knowledge
- Tacit Vs. Explicit Knowledge
- General Vs. Specific Knowledge
  - Technically Vs. Contextually Specific Knowledge

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Procedural Vs. Declarative Knowledge

- *Declarative knowledge* (substantive knowledge)
  - focuses on beliefs about relationships among variables
    - e.g., moon is round, Peter get married with Susan
    - Round (moon), married (Peter, Susan)

- *Procedural knowledge*
  - focuses on beliefs relating sequences of steps or actions to desired (or undesired) outcomes
    - Run a lecture: take attendance, open PPT, …
    - Flowcharts
    - Procedure manuals

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Tacit Vs. Explicit Knowledge

- **Tacit (implicit) knowledge** includes insights, intuitions, and hunches
  - e.g., don't dive on PP island when something wrong (tsunami's coming)

- **Explicit knowledge** refers to knowledge that has been expressed into words and numbers
  - e.g., $E=mc^2$

- We can convert explicit knowledge to tacit knowledge or vice versa

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General Vs. Specific Knowledge

- **General knowledge** is possessed by a large number of individuals and can be <u>transferred easily across individuals</u>
  - e.g. operating MS Windows

- **Specific knowledge,** or "idiosyncratic knowledge," is possessed by a very limited number of individuals, and is <u>expensive to transfer</u>
  - e.g. writing programs for MS Windows

Question: How about "Installing MS Windows"?

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Technically Vs. Contextually Specific Knowledge

- Technically specific knowledge is deep knowledge in a specific application domain
  - e.g, information technology, financial investment, etc.

- Contextually specific knowledge refers to the <u>knowledge of particular circumstances</u> of time and place in which work is to be performed
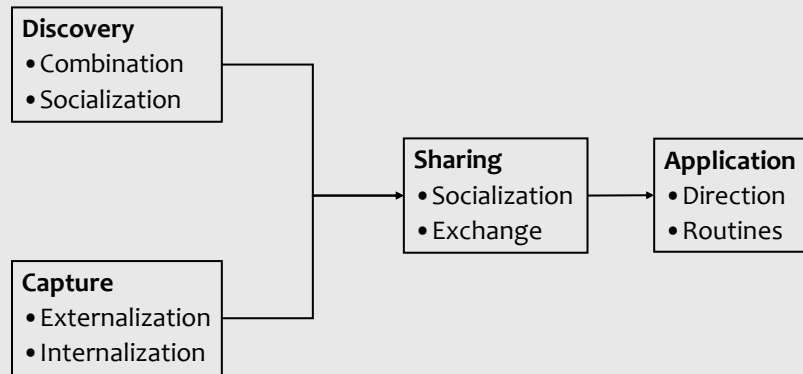 - e.g., work knowledge in a particular organization

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Different Types of Knowledge

		General	Contextually Specific	Technically Specific
Declarative	Explicit	A book describing factors to consider when deciding whether to buy a company's stock. This may include price to earnings ratio, dividends	A company document identifying the circumstances under which a consultant team's manager should consider replacing a team member who is having problems with the project.	A manual describing the factors to consider in configuring a computer so as to achieve performance specifications
Declarative	Tacit	Knowledge of the major factors to consider when deciding whether to buy a company's stock.	A human relations manager's knowledge of factors to consider in motivating an employee in a particular company.	A technician's knowledge of symptoms to look for in trying to repair a faulty television set.
Procedural	Explicit	A book describing steps to take in deciding whether to buy a company's stock.	A company document identifying the sequence of actions a consultant team's manager should take when requesting senior management to replace a team member having problems with the project.	A manual describing how to change the operating system setting on a computer so as to achieve desired performance changes.
Procedural	Tacit	Basic knowledge of the steps to take in deciding whether to buy a company's stock.	A human relations manager's knowledge of steps to take in motivating an employee in a particular company.	A technician's knowledge of the sequence of steps to perform in repairing a television set.

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Knowledge Management Processes

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┌─────────────────┐
│ Discovery       │
│ • Combination   │───┐
│ • Socialization │   │
└─────────────────┘   │      ┌─────────────────┐     ┌─────────────────┐
                      ├─────▶│ Sharing         │────▶│ Application     │
┌─────────────────┐   │      │ • Socialization │     │ • Direction     │
│ Capture         │   │      │ • Exchange      │     │ • Routines      │
│ • Externalization│──┘      └─────────────────┘     └─────────────────┘
│ • Internalization│
└─────────────────┘
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Knowledge Discovery

- **Development of *new* tacit or explicit knowledge**
  - from data and information
  - or from the synthesis of prior knowledge

- 2 main ways
  - Combination
  - Socialization

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Knowledge Discovery: Combination

- The process of *synthesizing explicit knowledge*
  - create new, more complex sets of explicit knowledge
- Multiple bodies of *explicit knowledge*
  - also involve data and information
- Incremental
  - e.g., "new" proposal
- Radical
  - e.g., data mining

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Knowledge Discovery: Socialization

- The process of *synthesis of tacit knowledge* across individuals
  - usually through joint activities instead of written or verbal instructions
  - e.g. chatting about how to find a good job

- Facilitation by technologies
  - Groupware
  - Web 2.0 – forums, chat-room, Facebook

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Knowledge Capture

- 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 Vs. Internalization

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Externalization Vs. Internalization

- **Externalization**
  - *converting **tacit knowledge** into *explicit* forms* such as words, concepts, visuals, or figurative language.

- **Internalization**
  - conversion of **explicit knowledge into tacit** knowledge.
  - traditional notion of "**learning**".
  - e.g., after reading a book, you learn *in your mind*

Discussion: How does IT help?

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Knowledge Sharing

- The process through which explicit or tacit knowledge is communicated to other individuals.
  - i.e. process of communication

- *effective transfer*
  - so that the recipient of knowledge can *understand it well* enough for actions.
  - may take place across individuals, groups, departments or organizations.

- Knowledge is *shared* (**internalized**) and not recommendations (no internalization occurs) based on knowledge.

- Socialization Vs. Exchange.

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Knowledge Sharing: Socialization

- Focuses on the **sharing of *tacit knowledge*** among individuals, groups, and organizations
  - e.g., talking to a senior year student about how to finish your degree course with minimal amount of effort in the orientation camp.
  - e.g., apprenticeships

Note: one may also use socialization to *synthesize* tacit knowledge for knowledge discovery.

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Knowledge Sharing: Exchange

- Focuses on the **sharing of *explicit knowledge.***
- Communicate or transfer *explicit knowledge* between individuals, groups, and organizations.
  - e.g., passing a computer manual from one to another.

Discussion: How does IT help?

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Knowledge Application

- **The process of applying explicit or tacit knowledge** to carry out some tasks.
- The knowledge may have been internalized (exist in one's mind) or not (e.g., work according to a manual).

- Direction Vs. Routines.

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Direction

- Individuals possessing the knowledge direct the action of another individual *without transferring to that person the knowledge underlying the direction.*
  - e.g., calling the help desk to solve your PC problems.

- Experts' knowledge embedded in knowledge-base, expert systems and decision support systems.
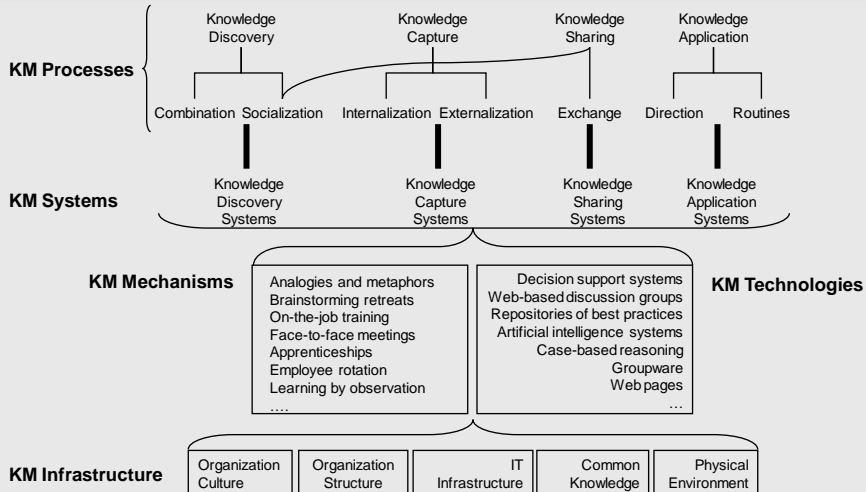
Routines

- Involve the utilization of knowledge *embedded* in procedures, rules, and norms that guide future behavior.
- *Economize on communication* more than directions because they are embedded in procedures or technologies.
  - e.g., inventory management system for automatic re-ordering.
- general information systems and automation helps:
  - Enterprise resource planning systems
  - Management information systems …

Discussion: How does IT help?

KM Solutions (Summary)

Question Please ?