

Data and Knowledge Management

What is Knowledge?

- **Data** – collection of unprocessed facts, a set of discrete facts about events
- **Information** – organized or meaningful data
- **Knowledge** – information that is contextual, relevant, and actionable
 - Strong experiential and reflective elements
 - Good leverage and increasing returns
 - Dynamic
 - Evolves over time with experience
- Knowledge is also known as **Human Capital**
- The primary difference between the terms **information** and **knowledge** is in the level of understanding of their underlying organizational data

Data:

Example: Imagine you are conducting a survey about the favorite fruits of your friends. The individual responses like "apple," "banana," "orange," etc., are raw data. They are just unprocessed facts without any organization or context.

Information:

Example: After collecting the raw data from your survey, you organize it to find out that 5 people prefer apples, 3 prefer bananas, and 2 prefer oranges. This organized data now tells you something meaningful about your friends' fruit preferences.

Knowledge:

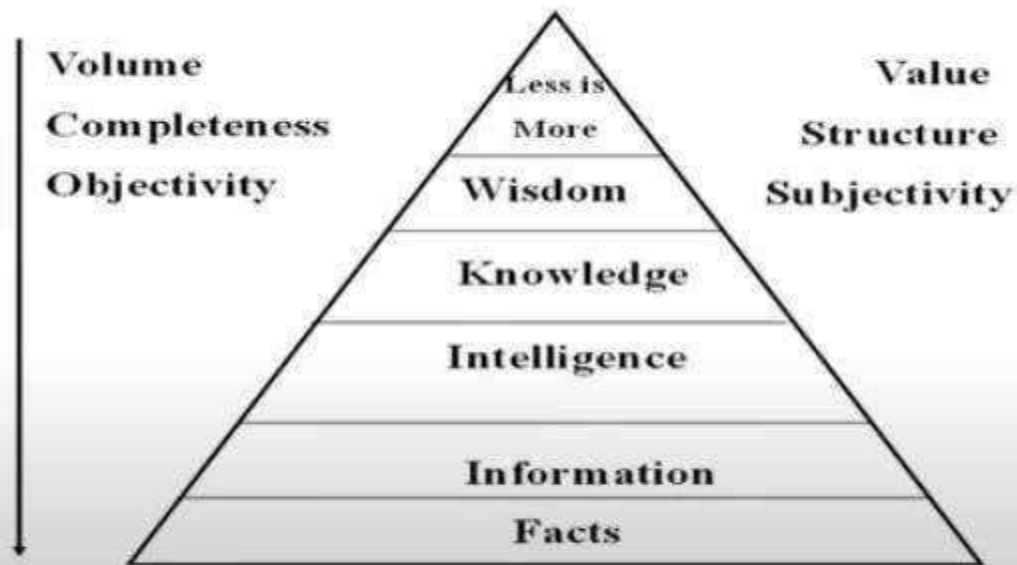
Example: With the information that most of your friends prefer apples, you decide to buy apples for your next gathering. Here, you are using the information (preferences) to make a contextual, relevant, and actionable decision. Over time, you might notice patterns, such as friends who like apples also tend to like other specific fruits, which enhances your understanding and helps you make better decisions in the future.

Data: A health app collects data on your daily steps, heart rate, and sleep duration.

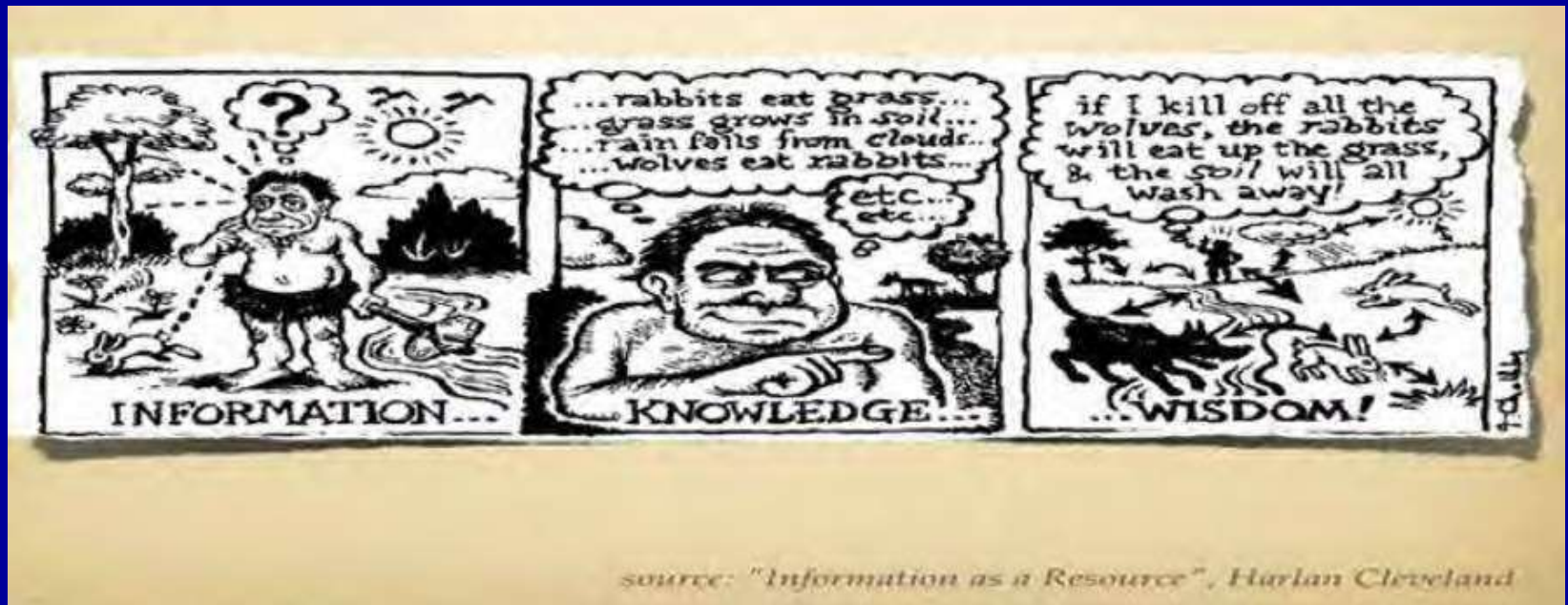
Information: The app organizes this data into daily summaries, showing your average steps, heart rate, and sleep quality.

Knowledge: By analyzing the summarized data over a few months, the app suggests that you are more active on weekends and have better sleep quality when you walk more during the day. This insight helps you plan your activities to improve your overall health.

From Facts to Wisdom (Haeckel & Nolan)



Information, Knowledge & Wisdom



From Procedural to Episodic knowledge

Procedural Knowledge

Knowledge of how to do a task that is essentially motor in nature; the same knowledge is used over and over again.

Declarative Knowledge

Surface-type information that is available in short-term memory and easily verbalized; useful in early stages of knowledge capture but less so in later stages.

Semantic Knowledge

Hierarchically organized knowledge of concepts, facts, and relationships among facts.

Episodic Knowledge

Knowledge that is organized by temporal spatial means, not by concepts or relations; experiential information that is chunked by episodes. This knowledge is highly compiled and autobiographical and is not easy to extract or capture.

Procedural Knowledge

Definition: Knowledge of how to perform tasks, often involving motor skills or actions. It is usually acquired through practice and repetition and is used repeatedly.

Example:

Driving a car: Once you learn how to drive, you don't need to consciously think about every action like pressing the brake or turning the steering wheel. This knowledge is procedural, as you perform the task almost automatically through repetition.

Typing on a keyboard: After practicing, you know how to type without looking at the keys, relying on muscle memory.

Declarative Knowledge

Definition: Surface-level information that is easily verbalized and stored in short-term memory. It is often used in the early stages of knowledge acquisition.

Example:

Remembering facts: Knowing that Paris is the capital of France is declarative knowledge. It's a piece of factual information that you can easily recall and state.

Memorizing phone numbers: When you memorize a friend's phone number, you store this specific piece of information in your short-term memory.

Semantic Knowledge

Definition: Hierarchically organized knowledge of concepts, facts, and relationships among those facts. It forms the basis for understanding and reasoning.

Example:

Understanding scientific concepts: Knowing that photosynthesis is a process by which plants convert sunlight into energy involves understanding the relationships between sunlight, chlorophyll, and the production of glucose. This is semantic knowledge as it connects various facts in a meaningful way.

Language comprehension: Knowing the meanings of words and how they relate to each other in sentences is semantic knowledge. For example, understanding that a "cat" is a small, domesticated animal that often purrs.

Episodic Knowledge

Definition: Knowledge organized by temporal and spatial means, often related to personal experiences. It is autobiographical and includes the context in which the knowledge was acquired.

Example:

Personal memories: Remembering your first day at school, including what you wore, how you felt, and what your classroom looked like, is episodic knowledge. It is specific to your personal experience and includes contextual details.

Recounting a vacation: If you recall a vacation to the beach, including the sound of the waves, the warmth of the sun, and the activities you did, this is episodic knowledge.

Two Major Types of Knowledge

☐ **Explicit knowledge**

- ☐ Deals with objective, rational, and technical knowledge
- ☐ Examples: policies, goals, strategies, papers, reports
- ☐ Structured knowledge that is easy to codify
- ☐ Easily manipulated, shared, taught or learned

☐ **Tacit knowledge**

- ☐ Unstructured knowledge – in the domain of subjective cognitive, and experiential learning
- ☐ Highly personal, hard to formalize and document
- ☐ Cumulative store of the experiences, mental maps, insights, expertise, know-how, trade secrets, skills set, understanding, etc.
- ☐ Involves a lot of human interpretation

Explicit Knowledge:

Policies and Procedures: Employee handbook

Technical Manuals: Software user manual

Reports and Papers: Market analysis report

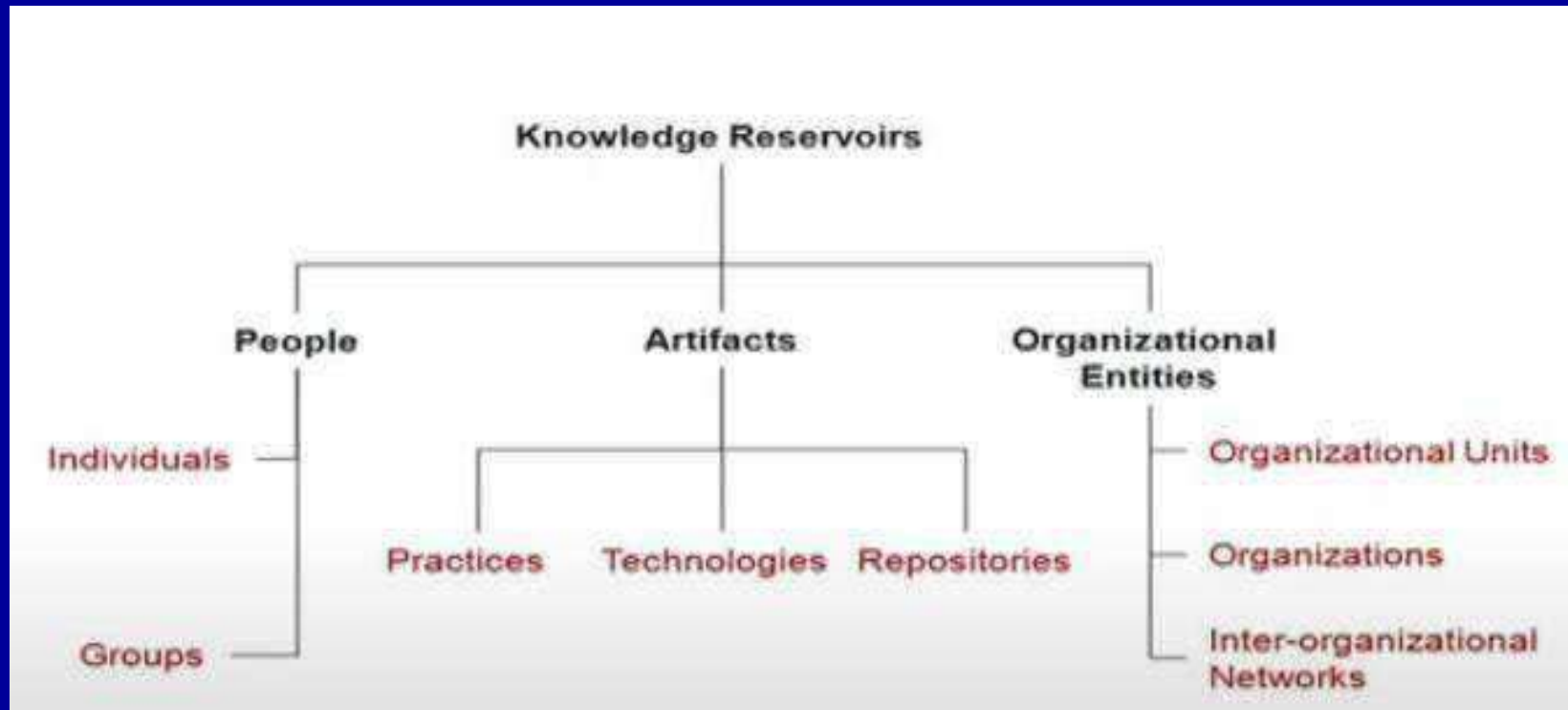
Tacit Knowledge:

Expertise and Skills: Master chef's intuitive cooking skills Problem-

Solving Abilities: Manager's conflict resolution techniques Trade

Secrets: Secret recipe for a soft drink

Reservoirs of Knowledge



Knowledge to Knowledge Management

- Process of capturing and making use of a firm's collective expertise anywhere in the business
- Doing the right thing, NOT doing things right
- Viewing company processes as knowledge processes
- Knowledge creation, dissemination, upgrade, and application toward organizational survival

Knowledge Management

- **Knowledge management (KM)** is managing the organization's knowledge (both explicit and tacit) through the process of creating, structuring, disseminating and applying knowledge to enhance organizational performance and create value
- KM requires a major transformation in organizational culture to create a desire to share
- Structuring enables problem-solving, dynamic learning, strategic planning, decision-making
- Leverage value of intellectual capital through reuse

KM Cycle

- Effective knowledge management requires an organization to identify, generate, acquire, diffuse, and capture the benefits of knowledge that provide a strategic advantage to that organization.
- A knowledge management cycle can be perceived as the route information follows in order to become transformed into a valuable strategic asset for the organization via a knowledge management cycle.

Knowledge Management Cycle Processes

- **Knowledge Capture**
- **Knowledge Creation**
- **Knowledge Codification**
- **Knowledge Sharing**
- **Knowledge Access**
- **Knowledge Application**
- **Knowledge Re-Use**

1. Knowledge Creation

This is the first stage where new knowledge is generated. It can come from various sources such as internal research and development, customer feedback, or market analysis.

Example: A software development company conducts a brainstorming session with its developers to come up with innovative features for its new product. During this session, developers share their insights and ideas, creating new knowledge about potential features and improvements.

Knowledge Storage

In this stage, the created knowledge is documented and stored in a way that it can be easily retrieved and used later. This involves organizing the knowledge in databases, document management systems, or knowledge repositories.

Example: The ideas and insights from the brainstorming session are documented in detail and stored in the company's knowledge management system. Each idea is categorized based on its relevance and potential impact, making it easy for future reference.

Knowledge Sharing

Here, the stored knowledge is disseminated throughout the organization. This can be done through meetings, training sessions, intranet portals, or collaborative tools.

Example: The documented ideas are shared with the entire development team through the company's intranet portal. Additionally, a meeting is held where the team discusses these ideas in depth, allowing everyone to understand and contribute further to the development process.

Knowledge Application

In this stage, the shared knowledge is applied to make decisions, solve problems, and improve processes or products. This is where the theoretical knowledge is put into practice.

Example: The development team uses the shared ideas to create new features for the software product. They apply the innovative concepts generated during the brainstorming session to develop and implement these features, enhancing the product's value to customers.

Real-Life Example of KM Cycle in an Organization

Let's consider a consulting firm specializing in market research:

Knowledge Creation: The firm conducts a market analysis for a client in the automotive industry, generating new insights about consumer preferences for electric vehicles.

Knowledge Storage: The insights and data from the market analysis are stored in the firm's central knowledge repository, organized by industry and topic.

Knowledge Sharing: The findings are shared with consultants across the firm through internal newsletters, an online knowledge portal, and dedicated workshops. This ensures that all consultants have access to the latest market trends and insights.

Knowledge Application: Consultants use the shared knowledge to advise other clients in the automotive industry, helping them to develop strategies for entering the electric vehicle market. They apply the insights to create tailored solutions that meet their clients' needs.

1. ERP Implementation in a Manufacturing Company

Topic: Analyze the implementation of an Enterprise Resource Planning (ERP) system in a manufacturing company.

Focus: Challenges faced during implementation, integration with existing systems, training of staff, and the impact on productivity and operations.

2. CRM System Adoption in a Retail Chain

Topic: Study the adoption of a Customer Relationship Management (CRM) system in a large retail chain.

Focus: Improvements in customer service, sales tracking, customer data management, and the overall customer experience.

3. MIS for Supply Chain Management in a Global Corporation

Topic: Examine the use of MIS in managing the supply chain of a global corporation.

Focus: Optimization of logistics, inventory management, supplier relationships, and cost reduction.

4. Healthcare Information System Implementation in a Hospital

Topic: Investigate the implementation of a Healthcare Information System (HIS) in a hospital.

Focus: Patient data management, integration with medical equipment, improvements in patient care, and compliance with healthcare regulations.

5. Big Data Analytics in Financial Services

Topic: Analyze the use of big data analytics in a financial services company.

Focus: Risk management, fraud detection, customer segmentation, and personalized financial products.

6. Cloud Computing Adoption in a Technology Startup

Topic: Study the adoption of cloud computing services in a technology startup.

Focus: Scalability, cost efficiency, data security, and the impact on business agility.

7. Implementation of Business Intelligence (BI) Tools in a Marketing Firm

Topic: Examine the implementation of Business Intelligence tools in a marketing firm.

Focus: Data-driven decision-making, campaign performance analysis, customer insights, and competitive analysis.

8. Cybersecurity Measures in a Financial Institution

Topic: Investigate the cybersecurity measures implemented in a financial institution.

Focus: Protection against cyber threats, incident response strategies, regulatory compliance, and customer trust.

9. E-commerce Platform Development for a Retail Business

Topic: Analyze the development and implementation of an e-commerce platform for a retail business.

Focus: Platform features, integration with existing systems, customer experience, and sales growth.

10. Digital Transformation in a Traditional Business

Topic: Study the digital transformation journey of a traditional brick-and-mortar business.

Focus: Adoption of digital tools, process automation, impact on business operations, and customer engagement.

11. AI Integration in Customer Support Services

Topic: Examine the integration of artificial intelligence in the customer support services of a telecommunications company.

Focus: Chatbots, automated ticketing systems, customer satisfaction, and cost savings.

12. Implementation of a Knowledge Management System in a Consulting Firm

Topic: Investigate the implementation of a knowledge management system in a consulting firm.

Focus: Knowledge sharing, collaboration among consultants, project management, and impact on service quality