Managing Data

All the value of this company is in its people. If you burned down all our plants, and we just kept our people and our information files, we should soon be as strong as ever.

Thomas Watson, Jr. Former chairman of IBM
Individual data management

- Individual internal memory is limited
- External memory extends internal memory
Calendar

Organizing principles
- Set amount of space
- Ordering
- Rapid access
Address book

🌟 Organizing principles

♦ Pre-formatted storage space
♦ Ordering
♦ Rapid access
To do list

Organizing principles

- Structure
- Rapid scan support
Comparison of data management systems

**Internal**
- Small
- Fast for limited retrieval
- Convenient

**External**
- Large
- Slow for limited retrieval
  - Overhead of using a device
- Need to have handy

Much smaller creatures than humans could not develop the complexity necessary for intelligence; much larger ones would be limited by the time it takes information to travel across their brains
Organizational data management

- Organizations, like people, need to remember many things
- Deciding where and how to store data frequently involves a trade-off
- Organizational data are used by a variety of information systems
Types of information systems

<table>
<thead>
<tr>
<th>Type of IS</th>
<th>System's purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPS</td>
<td>Transaction processing system: Collects and stores data from routine transactions</td>
</tr>
<tr>
<td>MIS</td>
<td>Management information system: Converts data from a TPS into information for planning, controlling, and managing an organization</td>
</tr>
<tr>
<td>DSS</td>
<td>Decision support system: Supports managerial decision making by providing models for processing and analysing data</td>
</tr>
<tr>
<td>EIS</td>
<td>Executive information system: Provides senior management with information necessary to monitor organizational performance, and develop and implement strategies</td>
</tr>
<tr>
<td>OLAP</td>
<td>Online analytical processing: Presents a multidimensional, logical view of data</td>
</tr>
<tr>
<td>Data mining</td>
<td>Uses statistical analysis and artificial intelligence techniques to identify hidden relationships in data</td>
</tr>
<tr>
<td>BI</td>
<td>Business intelligence: Systems for gathering, storing, analyzing, and accessing data to improve decision-making</td>
</tr>
</tbody>
</table>
The information systems cycle

Remembering the past (databases and data warehouse)

Transactions

Data

People & technology

Preparing for the future (BI, data mining, DSS, EIS, MIS, OLAP)

Handling the present (TPS)

New business systems
Desirable attributes of a data management system

- Shareable
- Transportable
- Secure
- Accurate
- Timely
- Relevant
Components of organizational memory

Organizational memory
- People
  - Role
  - Position
- Text
  - Culture
  - Social network
- Multimedia
  - Document
    - Table
    - Image
      - Audio
      - Video
  - Graphic
- Model
- Knowledge
People

The linchpin
- Create, maintain, evolve, and use organizational memory

Role and position

Organizational culture

Social networks

Standard operating procedures
## Table

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>Pocket knife - Nile</td>
<td>4.50</td>
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<tr>
<td>Compass</td>
<td>10.00</td>
</tr>
<tr>
<td>Geo positioning system</td>
<td>500.00</td>
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<tr>
<td>Map measure</td>
<td>4.90</td>
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</tbody>
</table>
Content Management

- Reports
- Manuals
- Brochures
- Memos
- Letters
- Email
Multimedia Management

- Images
- Graphics
- Audio
- Video

Image

Graphic
Models

- Decision support systems
  - Mathematical models
  - Spreadsheets
Decisions

- Decision making is the central activity of modern organizations
- Minutes of a meeting
  - Usually not an audit trail of decisions
- Reusable decisions
  - Take advantage of past deliberations
Specialized memories

- Smells
- Colors
Problems with data management systems

- Redundancy
- Lack of data control
- Poor interface
- Delays
- Lack of reality
- Lack of data integration
Data management systems timeline

  - Relational: 1972 – 2014
  - Graph: 1984 – 2014
  - Object-oriented: 1990 – 2014
Data, information & knowledge

Data

- Raw, unsummarized, and unanalyzed facts
Data, information & knowledge

Information
- Data processed into a meaningful form
- One person's information can be another's data
Data, information & knowledge

Knowledge

- Knowing what information is required
- Knowing what the information means
Data, information & knowledge

Data → Conversion → Information → Request → Interpretation → Knowledge → Decision
The challenge

- Organizations that effectively use data, information, and knowledge are more successful.
- The challenge is to develop data management and exploitation skills across an organization.
- Many organizations do not make effective use of the data they already have.
- Data management is an enduring problem for nearly all organizations and societies.