Information Systems Concepts

What are Information Systems?

Roman Kontchakov

Birkbeck, University of London

Outline

- Information and Information Systems
  - Section 1.5 (pp. 33 – 38)
IS – Types

- **Operational Systems** automate the routine, day-to-day record-keeping tasks
- **Management Support Systems** help managers to decide or to communicate
- **Office Systems** automate or assist in the work of office workers, e.g. clerks, secretaries, typists and receptionists.
- **Real-Time Control Systems** typically operate physical equipment, often in safety-critical settings

*such as .......*
IS for three management levels

- **Operational Systems**
  - Operational

- **Management Support Systems**
  - Tactical
  - Strategic

## Three levels of management

<table>
<thead>
<tr>
<th>Level of decision making</th>
<th>Focus of decision making</th>
<th>Typical IS applications</th>
<th>Typical IT solutions</th>
<th>Pivotal concept</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operational</strong>&lt;br&gt;(operative management)</td>
<td>Day-to-day staff activities and production support</td>
<td>Payroll, Invoicing, Purchasing, Accounting</td>
<td>Database, Transactional processing, Application generators</td>
<td><strong>Data</strong></td>
</tr>
<tr>
<td><strong>Tactical</strong>&lt;br&gt;(line management)</td>
<td>Policies in support of short-term goals and resource allocation</td>
<td>Budget analysis, Salary forecasting, Inventory scheduling, Customer service</td>
<td>Data warehouse, Analytical processing, Spreadsheets</td>
<td><strong>Information</strong></td>
</tr>
<tr>
<td><strong>Strategic</strong>&lt;br&gt;(executive/senior management)</td>
<td>Strategies in support of organizational long-term objectives</td>
<td>Market and sales analysis, Product planning, Performance evaluation</td>
<td>Data mining, Knowledge management</td>
<td><strong>Knowledge</strong></td>
</tr>
</tbody>
</table>

Data, Information and Knowledge

- **Data**
  - raw facts representing values, quantities, concepts and events pertaining to business activities

- **Information**
  - data that have been processed and summarized to produce value-added facts, revealing features and trends

- **Knowledge**
  - understanding of information, obtained by experience or study, and resulting in the ability to do things effectively and efficiently.
    - tacit: in a person’s mind
    - documented: in some structured form

---

Data, Information and Knowledge

- **Data**
  - e.g., telephone numbers

- **Information**
  - e.g., telephone numbers grouped by their areas, industries etc.

- **Knowledge**
  - e.g., how the telephone numbers can be used in telemarketing to entice people to buy products

IS: operational systems

- OnLine Transaction Processing (OLTP) systems
  - *Transaction* – a logical unit of work that accomplishes a particular business task and guarantees the integrity of the database after the task completes
  - *Database* technology
    - persistent storage
    - concurrency control
    - integrity constraints
    - security

IS: tactical management systems

- OnLine Analytical Processing (OLAP) systems
  - *Analysis* of pre-existing historical data to facilitate decision making
  - Data warehouse technology
    - summarizing (aggregation)
    - packaging (into graphs, charts, spreadsheets, animations, ...)
    - partitioning (reducing amount of data)
  - Data marts
    - subset of data relevant to a particular dept/function
  - Data webhouses

Knowledge Processing Systems

- “know-how” – intellectual capital accumulated through experience
- Knowledge Management – to help organizations discover, organize, distribute and apply the knowledge encoded in information systems

Data mining

- association (patterns of one event leading to another)
- classification (facts that fall into predefined categories)
- clustering (categories discovered by an algorithm)

AI techniques → predictive rather than retrospective models

Take Home Messages

- Different Types of Information Systems
  - 3 Management Levels
- Data, Information and Knowledge