**Definition and views of Information Systems**

- **IS – Definition, larger scope**
  - System to store and process information used by organizations
    - Includes paper, people, computers and software
- **(CB)IS – Definition, reduced scope**
  - Computer based system to store and process information used by organizations
  - Also known as CBIS (Computer based IS)

**IS, high level functions**

- **IS – Definition, Laudon**
  - Interrelated components working together to
    - collect, process, store, and disseminate
  - decision making, coordination, control, analysis, and visualization
  - in an organization

- **Input**
  - The capture or collection of raw data from within the organization or from its external environment for processing in an information system

- **Output**
  - The distribution of processed information to the people who will use it or to the activities for which it will be used

- **Processing**
  - The conversion, manipulation, and analysis of raw input into a form that is more meaningful to humans

- **Feedback**
  - Output that is returned to the appropriate members of the organization to help them evaluate or correct input
Data vs. information

- Information
  - Data that have been shaped into a form that is meaningful and useful to human beings in processes such as decision making
- Data
  - Streams of raw facts representing events occurring in organizations (e.g. business transactions) or the physical environment before they have been organized and arranged into a form that people can understand and use

Organizations

- People
  - Managers, knowledge workers, data workers, production or service workers
- Structure
  - Organization chart, geography, groups of specialists, products
- Business function
  - Special task performed in a business organization
- Business process

Major business functions

- Manufacturing
- Sales & marketing
- Finance
- Accounting
- Human resources
- Software integrates all facets
  - Planning, manufacturing, inventory, sales, finance, accounting

Business process

- The unique ways in which organizations coordinate and organize work activities, information, and knowledge to produce a product or service

Example business process

- SPRUEHOLZ
  - Schutzmaßnahmen vor Tiefenlochschäden
  - Anlage der Tragwerkssicht für die Anordnung der Schutzmaßnahmen
  - Verfolgung und Kontrolle der Schutzmaßnahmen
- CONELENE
  - Anpassung der Tragwerkssicht für die Anordnung der Schutzmaßnahmen
  - Ermittlung der notwendigen Maßnahmen
  - Ermittlung der notwendigen Maßnahmen
  - Ermittlung der notwendigen Maßnahmen
  - Ermittlung der notwendigen Maßnahmen
  - Ermittlung der notwendigen Maßnahmen
  - Ermittlung der notwendigen Maßnahmen
Views on IS

- Computer system view
- Application view
- Technological view
- Logical view
- Process/activity view
- Functional view
- Data/information view
- Organizational view

Application view

- IS as software at application level, with three layers
  - Data
  - Presentation
    - Interaction with end user via GUI (or character based forms)
  - Business rules
    - Algorithms and rules to process, control and extract data
- cfr. three tier architecture in technological view

Ex:

<table>
<thead>
<tr>
<th>Strato di presentazione</th>
<th>Strato delle applicazioni</th>
<th>Strato dei dati</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visualizzazione (GUI)</td>
<td>Dati &amp; Business rules</td>
<td>Interazione con l'utente</td>
</tr>
<tr>
<td>Presentazione</td>
<td>Presentazione</td>
<td>GUI o forme a caratteri basate</td>
</tr>
<tr>
<td>Business rules</td>
<td>Business rules</td>
<td>Algoritmi e regole per processare, controllare e estrarre dati</td>
</tr>
<tr>
<td>cfr. tre strati architettura in tecnologico view</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ex: presentation, customer data

Ex: business rules
Technological view

- IS as hardware systems and their connections
- Client server architectures
  - Two tiers
    - Data + application server;
  - Three tiers
    - Data server, application server (business rules), presentation server
  - ...

Three tiers

CS – fat to thin client

Logical view

- IS as functions to be offered
  - Disregarding how implemented
  - Process view
    - UML activity diagram
    - DFD
  - Information view
    - UML class diagram
  - Functional view
    - UML use cases
    - DFD

Process view

Ex: acquisto libro, internet
Ex: acquisto libro, libraio

Information view

Functional view

Organizational view

- IS as service offered to organizational level (and group) of organization

Organizational view
Example of process/levels

**City:**
- **Operativo** – contabilizzazione dei pagamenti dei cittadini, manutenzione delle strade
- **Gestionale** – controllo dei pagamenti, solleciti, confronti mensili tra entrate previste ed effettive, monitoraggio dell’inquinamento
- **Direzionali** – verifica dei costi e dei ricavi relativi ai servizi sociali, definizione di nuove tariffe, piani regolatori

Example of process/levels

**Bank:**
- **Operativo** – gestione movimenti dei conti correnti
- **Gestionale** – revisione degli scoperti
- **Direzionali** – verifica dell’andamento di un servizio, decisione di aprire nuovi servizi

Example of process/levels

**Company:**
- **Operativo** – registrazione costi delle commesse
- **Gestionale** – controllo scostamenti settimanali tra preventivo e consuntivo
- **Direzionali** – scelta delle aree di mercato più convenienti

Operational level

- Importance of IS = f (IO, IP)
  - IO – Information intensity of product
  - IP – Information intensity of process

[Porter Millar 1985]
### Strategic level

- Volumes of data available for analysis via business intelligence, data warehouse

<table>
<thead>
<tr>
<th>Source</th>
<th>Minimum/maximum values (data warehouse)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>0.0 M/1.0 M</td>
</tr>
<tr>
<td>Finance</td>
<td>0.0 M/1.0 M</td>
</tr>
<tr>
<td>HR</td>
<td>0.0 M/1.0 M</td>
</tr>
<tr>
<td>Marketing</td>
<td>0.0 M/1.0 M</td>
</tr>
<tr>
<td>HRM</td>
<td>0.0 M/1.0 M</td>
</tr>
</tbody>
</table>

### Business function view

- IS as high level business function offered/supported

### Wrap-up session

#### Definition of information systems
- Represent an organizational and management solution based on IT
- Transform raw data into useful information
- Collect, store, and disseminate information from an organization's environment and internal operations to
- Support organizational functions, communication, coordination, control, analysis, and decision making

#### Role of information systems
- Provide tools for conducting trade and managing businesses on a global scale
- Are the foundation of new knowledge-based products and services
- Make it possible for businesses to adopt flatter, more flexible, more decentralized structures

#### Benefits of IS
- More efficiency and effectiveness
- Support to externalization of activities/processes
- Support to delegation and decentralization
- Reduction of control and coordination costs
- Higher control width and lower hierarchical depth
- Reduction of administrative jobs
- Supports teamwork
Wrap-up session

- Challenges of information systems
  - Understanding the system requirements of a global business environment
  - Designing systems and IT infrastructure that people can control, understand, and use (support to the organization’s goals)
  - Determining the business value of information systems

Why learning IS?

- Most organization need information system to survive and prosper
- Information system knowledge is essential for managers
  - IS directly affect how managers decide, plan, and manage their employees
  - Responsibility for systems cannot be delegated to technical decision makers

Why learning IS?

- Most organization need information system to survive and prosper
- Information system knowledge is essential for IS designers
  - Understand system requirements of global business environment
  - Create information architecture that supports organization’s goals
  - Design competitive & efficient systems