Topic 2

Computer Information Systems
Information Infrastructure

Everything that supports information processing except information itself:

- computer hardware
- general-purpose software
- networks and communication facilities
- database
- information management personnel
- procedures
Information Architecture

- is a general scheme of the information requirements in the organization (including information flows)
- Information architecture vs. hardware architecture
- Information architecture vs. concept model of organization
Centralized Information Architecture

*(background)*

- Input transactions do not need to be processed in real time;
- On-line-data-entry personal can be centrally located;
- Large number of periodic outputs are produced by the system.
Centralized Information Architecture

- **Single-computer architecture**
  - Mainframe environment;
  - PC environment

- **Multi-computer architecture**
  - Group of similar computers
  - Group of different computers implementing different tasks.
Decentralized (Distributed) Information Architecture

- PC in a LAN or WAN
- Client/Server
  - Client/Server in a LAN
  - Enterprisewide computing
- Client/Server evolution into Internet-based architecture
Several computers share resources and are able to communicate with each other

- A client - a computer attached to the network, which is used to request and access shared network resources
- A server - a machine that is attached to the same network and provides clients with these services

Purpose: optimize the use of computer resources
Enterprisewide Architectures

➢ Access to data, applications, services, and real-time flows of data in different LANs or databases
➢ Use client/server architecture to create a cohesive, flexible, and powerful computing environment
➢ Provide total integration of departmental and corporate IS resources
➢ Increase the availability of information and thereby maximize the value of information
Internet-based Architectures

- Based on the concepts of client/server architecture and enterprisewide computing
- The Internet is the basis for a network connection from the outside world to the company, as well as with the organization’s web site
- Organization’s internal private Internet (intranet) - useful for distributing information within the organization
Organizations: Structure and IT Support

- The nature of organizations determines their activities, the information support they need, and the type of information systems they use.
  - Profit-making business versus not-for-profit organizations exist.
  - Manufacture goods versus services are delivered.
  - Can be located in one place or in several places, some are global or multinational organizations.
Organizations : Structure

- Hierarchical Structure
- Team-based structure
  - Project management structure
  - Matrix organizational structure
Hierarchical Structure

Headquarters

Division A
- Plant C
- Plant D
- ISD
- Accounting

Division B
- Plant E
- Plant F
- Marketing

Overseas Division
- Administration Services (legal, etc.)
- Finance
- HRM
Figure 2.3  *Typical matrix organization.*
Organizations: IT Support

- The Corresponding Information Systems
  - Departmental Information Systems
  - Plant Information Systems
  - Divisional Information Systems
  - Enterprisewide Information Systems
  - Interorganizational Information Systems (IOS)
  - Global Information System for an International or Multinational Corporation
Transaction Processing Systems

- Organizations perform routine, repetitive tasks
- A TPS supports the monitoring, collection, storage, processing, and dissemination of the organization’s basic business transactions
- Frequently, several transaction processing systems exist in one company
- Modern transaction processing systems are much more sophisticated and complex
Management Information Systems (MIS)

- provide periodic reports
- generate weekly and monthly summaries by product, customer, or salesperson
- MIS reports may include summary reports, for the current period or for any number of previous periods - used for monitoring, planning, and control
Functional Management
Information Systems

- geared toward middle managers
- Access data, organize, summarize, and display information for supporting routine decision making in the functional areas
- Examples: financial, manufacturing, marketing management, human resources management information systems
### Major Outputs of a Functional Management Information System

<table>
<thead>
<tr>
<th>OUTPUT</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistical summaries</td>
<td>Summaries of raw data such as daily production, and weekly and monthly usage of electricity.</td>
</tr>
<tr>
<td>Exception reports</td>
<td>Highlights of data items that are larger or smaller than designated levels.</td>
</tr>
<tr>
<td>Periodic reports</td>
<td>Statistical summaries and exception reports provided at scheduled, regular periods.</td>
</tr>
<tr>
<td>Ad hoc reports</td>
<td>Special, unscheduled reports provided on demand.</td>
</tr>
<tr>
<td>Comparative analysis</td>
<td>Performance comparison to that of competitors, past performance, or industry standards.</td>
</tr>
<tr>
<td>Projections</td>
<td>Advance estimates of trends in future sales, cash flows, market share, etc.</td>
</tr>
</tbody>
</table>
Support Systems

- office automation systems (OAS)
- computer-aided design and manufacturing (CAD/CAM)
- decision support systems (DSS)
  - executive information systems (EIS)
  - group support systems (GSS)

Intelligent Systems
- Expert systems (ES)
- Intelligent agents
Integrated Systems

➢ various computerized systems are being integrated to increase their functionalities
➢ one popular form of integrated system is enterprise resources planning (ERP)

   ERP supports planning and management all of an organization’s resources and their use, including contacts with business partners
The Evolution
Computer Based Information Systems

1940  Scientific, military applications
1950  Routine business applications, TPS
1960  MIS, office automation
1970  DSS, LANs
1980  Client/server executive information system, PC’s, AI, Groupware
1990  Integration, intelligent systems, the Web, intranets, extranets, ERP software
2000  Internet, Electronic commerce, Smart systems
Clerical Staff

➢ Data workers - use, manipulate, or disseminate information
   ➢ bookkeepers, secretaries who work with word processors, electronic file clerks, and insurance claim processors

➢ Supported by office automation and groupware, including document management, workflow, e-mail, and other personal productivity software
Managers

- Implement major functions of organization on almost all levels of an organization
  - Top managers make strategic decisions
  - Middle managers make tactical decisions
  - Line managers make operational decisions
- correspondent Information Systems
  - Executive Information Systems or DSS
  - Management Information Systems
  - Operation Information Systems
Knowledge Workers

Engineers, financial and marketing analysts, production planners, lawyers, and accountants (60-80%):

- finding or developing new knowledge and integrating it with existing knowledge
- Advising and consulting the members of the organization
- introducing new procedures, technologies, or processes
- Supported by a large variety of information systems from Internet search engines to expert systems, to CAD, and by organizational knowledge bases
The information systems support of people in organizations

**IT Support at Different Organizational Levels**

- **Information Infrastructure and TPS**
- **Office Automation and Communication Systems**
- **POM Systems**
- **Managerial Systems**
- **Staff Support**
- **Strategic Systems**

- **Clerical Staff**
- **Line Managers, Operators**
- **Middle Managers**
- **Knowledge Workers, Professionals**
- **Top Managers**
Managing IT Resources

- IT resources are scattered throughout the organization
- Information systems have enormous strategic value
- Some IT resources change frequently.
- The responsibility for the management of IT is divided between a usually centralized information systems department (ISD) and the end users
  - ISD is responsible for corporate-level and shared resources,
  - The end users are responsible for departmental resources
Managing Information Technology

Key MIS issues in two recent time periods

Key Issues, 1994/1995
1. Building a responsive IT infrastructure
2. Facilitating and managing business process redesign
3. Developing and managing distributed systems
4. Developing and implementing an information architecture
5. Planning and managing communication networks

Key Issues, 1997
1. Improving productivity
2. Reducing costs
3. Improving decision making
4. Enhancing customer relationships
5. Developing new strategic applications