INFORMATION MANAGEMENT

Five Main Resources:
A manager is required to manage five main types of resources effectively:

- Personnel
- Material
- Machines (including facilities and energy)
- Money
- Information (including data)

INTEREST IN INFORMATION MANAGEMENT

1. Increasing complexity of business activity
   - International economy
     Firms of all sizes are subject to economic influences that can originate anywhere in the world. Such influences can be seen in the relative values of the currencies of each nation, where purchases are made in those countries with the highest currency value.

   - Worldwide competition
     Competition exists on a worldwide scale. Its effects can be seen in the imports from foreign countries.

   - Increasing complexity of technology
     Technology is used everywhere in business. Examples are bar code scanners, computer based airline reservation systems, automated teller machines, factory robots ..etc.

   - Shrinking time frames
     All phases of business operations are performed more rapidly than ever
before. (telemarketing, electronic sales orders, “just in time “ delivery of raw materials .etc)

– Social constraints
  Some products and services are found undesirable by society. Therefore, business decisions must be based on economic factors, but social costs and payoffs must be considered as well. Plant expansion, new products, new sales outlets and similar actions must all be weighed in terms of their environmental impact.

2. Improved computer capabilities
  – Size
  – Speed

  *Today’s users, have keyboard terminals or microcomputers in their offices. Many of the micros are connected to other computers in a network and users know how to use them.*

WHO ARE THE INFORMATION USERS?

- Managers
  The idea of using the computer as a management information system was a breakthrough because it recognized managers’ need for problem solving information. Embracing the MIS concept made several firms develop applications specifically aimed at management support.

- Non-managers
  Non-manages and staff specialists also use the MIS output.

- Persons & organizations in the firm’s environment
  Users outside the company benefit from the MIS as well. They can be customers receiving invoices, stockholders getting dividend checks, and the federal government checking tax reports.
Management Levels

Strategic Planning Level
The strategic planning level involves managers at the top of the organizational hierarchy. The term strategic indicates the long-term impact of top managers’ decisions on the entire organization. The term executive is often used to describe a manager on the strategic planning level.

Management Control Level
Middle-level managers include regional managers, product directors, and division heads. Their level is called “management control level” due to their responsibility of putting plans into action and ensuring the accomplishment of goals.

Operational Control Level
Lower level managers are persons responsible for carrying out the plans specified by managers on upper levels. Their level is called the “operational control level” because this is where the firm’s operations occur.

Influence of Management Level on Information Source and Form
When designing information systems, it is important to consider the manager’s level. Such levels can influence both the source of information and how it is presented. Managers on the strategic level place greater emphasis on environmental information than do managers on the lower levels. Managers on the operational control level regard internal information as vital.

The second figure shows that strategic planning-level managers prefer information in a summary format, whereas operational control-level managers prefer detail.

![Figure 2.1](image-url)
**Business Areas**

Managers are found in various business areas of the firm. The three traditional business areas are marketing, manufacturing, and finance in addition to other two areas that have gained major importance—human resources and information services.

**What managers do**

According the French management theorist, Henri Fayol, managers perform five major functions.

- They **plan** what they are to do
- They **organize** to meet the plan.
- They **staff** their organization with the necessary resources.
- They **direct** the available resources to execute the plan.
- Finally, they **control** the resources, keeping them on course.
All managers perform these functions, however with varying emphasis as shown below.

![Diagram showing strategic, management, and operational levels with Plan, Organize, and Direct categories]

**Management Knowledge**

- **Computer literacy**
  This knowledge includes an understanding of computer terminology, a recognition of its strengths and weaknesses, an ability to use the computer, etc.

- **Information literacy**
  A manager should also have information literacy which consists of understanding how to use information at each step of the problem-solving process, where this information can be obtained from, and how to share information with others.

  *Information literacy is not dependent on computer literacy. A manager can be information literate but computer illiterate.*

**THE MANAGER AND SYSTEMS**

**System Components**

A system is a group of elements that are integrated with the common purpose of achieving an objective.

Not all systems have the same combination of elements, but a basic configuration is illustrated in the figure below:
Input resources are transformed into output resources. The resources flow from the input element, through the transformation element, and to the output element. A control mechanism monitors the transformation process to ensure that the system meets its objectives. The control mechanism is connected to the resource flow by means of a feedback loop, which obtains information from the system output and makes it available to the control mechanism. The control mechanism compares the feedback signals to the objectives and directs signals to the input element when it is necessary to change the system operation.

**Open Loop and Closed Loop Systems**

Not all systems are able to control their own operations. A system without the control mechanism, feedback loop, and objective elements is called an open loop system. A system with the three control elements is called a closed loop system.

**Open and Closed Systems**

- **Open system**: Connected to its environment by means of resource flows (e.g., heating system)
- **Closed system**: Not connected to its environment. They usually exist in tightly
controlled laboratory systems.

**What is a subsystem?**

A subsystem is simply a system within a system. This means that systems exist on more than one level and can be composed of subsystems or elemental parts.

![Diagram of System and Subsystems]

**What is a Super System?** (not frequently used)

When a system is part of a larger system, the larger system is the super system.

**Physical and Conceptual Systems**

**Physical system**

The business firm is a physical system, composed of physical resources

**Conceptual system**

It’s a system that uses conceptual resources-information and data- to represent a physical system.

Eg. : The Computer is a physical system, but the data and information stored in it can be viewed as a conceptual system.

**The Importance of a System View**

A systems view regards business operations as systems embedded within a larger environmental setting. It’s an abstract way of thinking, but it has potential value to the manager. The systems view:
– reduces complexity
– requires good objectives
– emphasizes working together
– acknowledges interconnections
– values feedback

DATA VERSUS INFORMATION

- Data consists of facts and figures that are relatively meaningless to the user.
  (e.g., number of hours worked by an employee)
- Information is processed data or meaningful data. (e.g., multiplying the hours
  worked by the hourly rate to get each employee’s gross earnings).

The transformation of data into information is performed by an information processor. The information processor is one of the key elements in the conceptual system and can include:

- Computer components
- Non-computer components
- Combination of the two

THE EVOLUTION OF COMPUTER BASED INFORMATION SYSTEMS

- Data Processing (DP) during the first half the twentieth century
- Management Information Systems (MIS) 1964
  - IBM promoted the concept as a means of selling disk files and terminals
  - The MIS concept recognized that computer applications should be implemented
    for the primary purpose of producing management information.
- Decision Support Systems (DSS) 1971
  - A DSS is an information-producing system aimed at a particular problem that a
    manager must solve and at decisions that the manager must make.
  - Notes distinction: MIS: Organizational/group - general
    DSS: Individual - specific
- Office Automation (OA) 1964
  - Facilitates communication
- Increases productivity among managers and office workers through the use of electronic devices.
- Includes a variety of applications such as video conferencing, voice mail, electronic mail, desktop publishing...etc.

- Artificial Intelligence (AI)/ Expert Systems (ES) - 1990s
  - AI is an application that enables the computer system to perform some of the same logical reasoning tasks as humans.
  - An expert system is a special subclass of AI that functions as a specialist in a certain field. For example, it can provide management consultancy.
  - Limitation of ES: It doesn’t improve its intelligence over time. One way to overcome this limitation is to use neural networks, electronic and mathematical analogs of the human brain.

**THE CBIS MODEL**

Managers make decisions to solve problems, and information is used in making these decisions. Information is presented in both oral and written forms by an information processor. The computer portion of the information processor contains each of the computer-based application areas- AIS, MIS, DSS, the virtual office and knowledge based systems.
THE INFORMATION SERVICES ORGANIZATION

Information Specialists
Those are the ones who have full-time responsibility for developing and maintaining computer based systems. There are five categories of information specialists:

- **System analysts** work with users to define the requirements for developing new systems and improving existing ones.
- **Database administrators** work with users and system analysts to create databases that contain the data needed to produce the user’s information.
- **Network specialists** work with system analysts and users to establish the data communication networks that tie together widespread computing resources.
- **Programmers** use the documentation prepared by the systems analysts to encode the instructions that cause the computer to transform the data into information needed by the user.
- **Operators** handle the large-scale computing equipment such as mainframe computers and mini-computers.

THE TREND TO END USER COMPUTING

Information specialists do not always participate in the development of computer-based systems as shown in the figure below. That is the traditional approach, the way all systems were developed during the 1950s—1970s.

The trend towards **End user Computing** began by the late 1970s and then kept growing. **EUC is the development by user of all or part of their computer bases systems.**
Stimulants to EUC

- Increased computer literacy
- Information Services backlog. Information specialists have always had more work than they can handle. Backlogs began to build up in the 1980s, when information specialists could not respond quickly to users’ increasing demands.
- Low-cost hardware (the PC)
- Prewritten software (electronic spreadsheets)

The Role of Information Specialists in EUC

The EUC concept doesn’t mean that there will be no more need for information specialists. Rather, it means that information specialists will assume more of a consulting role than they used to have in the past.
JUSTIFYING THE CBIS

The CBIS should be justified in the same manner as any other large investment of the firm.

- **Economic**
  - Cost reduction
  - Reduced inventory investment
  - Increased productivity (CAD/CAM)

- **Non-economic**
  - Perceived value

ACHIEVING THE CBIS

In some respects, each subsystem of the CBIS is like a living organism: it is born, it grows and matures, it functions, and eventually it dies. This evolutionary process is called the *system life cycle* (SLC). It consists of the following phases:

![System Life Cycle Diagram](image)

Figure 2.11

REENGINEERING THE CBIS

The process of reworking a system is called reengineering or business process redesign.

- A reengineered system is not always a clean-slate approach
- Good features of the system can be retained
- BPR will be the development methodology of choice, rather than the SLC.
The manager is the one responsible for managing the CBIS. Among his responsibilities are:

- Planning the life cycle
- Controlling the information specialists involved.
- Ensuring that the CBIS provides the desired support.