

CHAPTER 1 INTRODUCTION TO INFORMATION SYSTEMS



Management Information Systems, 10th edition,
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Introduction

- The first computers were as large as a room and used light -bulb -sized vacuum tubes for much of their circuitry
- Vacuum tubes were later replaced with transistors and chips made using silicon wafer technology
- This change resulted in a dramatic and long-term lowering of costs of manufacturing leading to the high growth in the demand for computers

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HISTORY OF INFORMATION SYSTEMS

- The earliest “mainframe” computers could only process a single task by a single user
 - 1946: ENIAC (Electronic Numerical Integrator and Calculator) was developed
 - 1951: first computer installed by the U.S. Census Bureau
 - 1954: first computer used by G.E.
- Over the last half century, hardware has seen many-fold increases in speed and capacity and dramatic size reductions
- Applications have also evolved from relatively simple accounting programs to systems designed to solve a wide variety of problems

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Figure 1.1 Computer Scientists Harold Sweeney (left) and J. Presper Eckert (center) Demonstrate the UNIVAC Computer to Walter Cronkite as It Predicts the Winner of the 1952 Presidential Election



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Multitasking

- IBM revolutionized the computer industry in the mid-1960s by introducing the IBM System/360 line of computers
- These computers were the first to perform multiple processing tasks concurrently

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Smaller Computers

- The first small-scale systems, called **minicomputers**, were smaller and less powerful but could handle processing for small organizations more cheaply
- Even smaller **microcomputers** designed for individual use were later developed, first by Apple and Tandy Corp.
- In 1982, IBM introduced the first **personal computer**, or PC, in 1982, which has since become the standard for individual computing

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Figure 1.2 A Personal Computer



Source: Dell Computer Corporation.

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INTRODUCTION TO COMPUTER ARCHITECTURE

- Most computers have similar architectures that combine software and hardware
- Software includes the operating system which controls the computer hardware and application software, such as word processing, spreadsheets, etc.
- Hardware includes, processors, memory and peripheral devices

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Figure 1.4 IBM NetVista Microcomputer



Source: IBM Corporation. Photo courtesy of International Business Machines Corporation.

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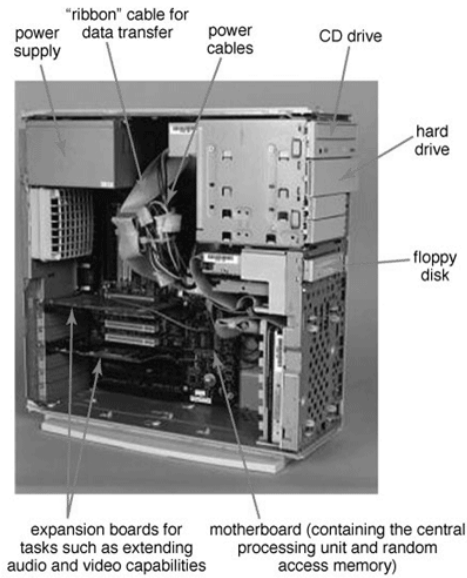
Computer Hardware

- The **processor** manages the input and output devices, data storage devices, and operations on the data
- The **central processing unit (CPU)** controls all the other components
- **Two types of memory are:**
 - **Random access memory (RAM)** acts as the temporary workspace for the CPU
 - Permanent data storage devices such as **CD-ROM, floppy** and **hard disk drives**

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Figure 1.5 Computer Hardware Components



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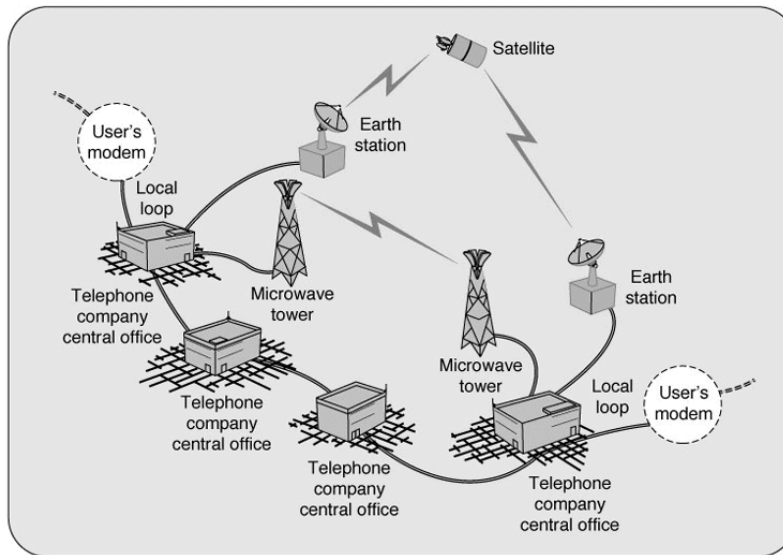
INTRODUCTION TO COMMUNICATIONS ARCHITECTURE

- **Modem:** a hardware device that sends the computer's digital signals by modulating an analog carrier wave
- Data rates for various communications systems:
 - Telephone lines: 56 kbps
 - Cable modem: up to 2 Mbps
 - WiFi: 11 Mbps
 - Local Area Networks: 10 to 100 Mbps
- Wireless has recently taken off because it's cheap and easy to install

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Figure 1.6 Communications Architecture



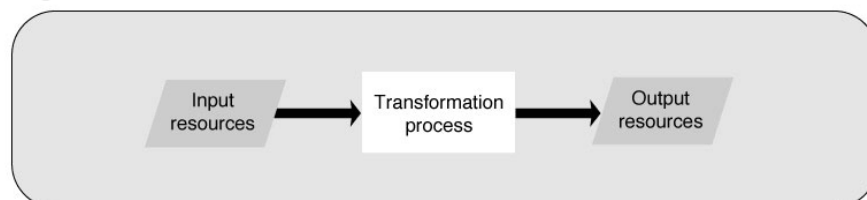
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THE EVOLUTION IN COMPUTER APPLICATIONS

- An information system is a **conceptual system** that enables managers to control and monitor a firm's **physical systems** used to transform input resources into output resources

Figure 1.7 The Physical System of the Firm



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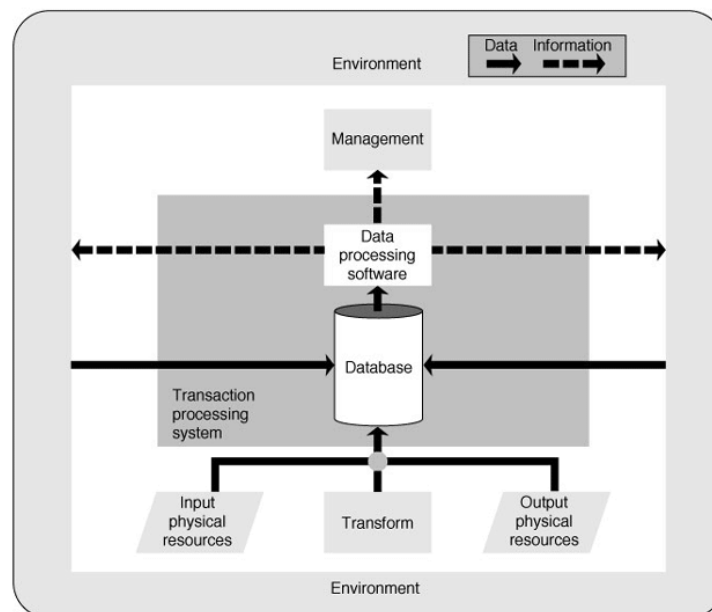
Transaction Processing Systems

- A **transaction processing systems** is shown in Figure 1.8
- It gathers data from the firm's physical system and environment and enters it into its database
- The software also transforms the *data* into *information* for the firm's managers and other individuals in the firm's environment

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Figure 1.8 A Model of a Transaction Processing System



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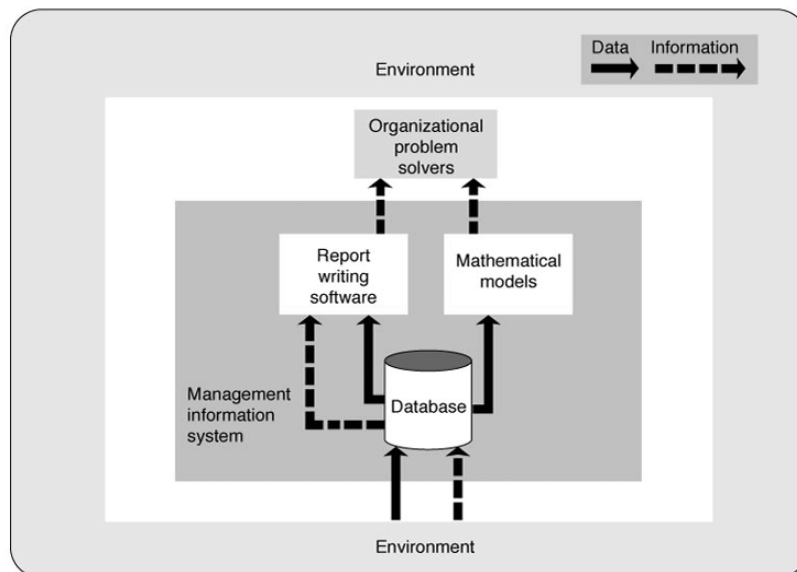
Management Information Systems

- **Management information systems (MIS)** transform the *data* in frontline systems, such as transaction processing systems into *information* useful to managers
- Typical MIS modules are report-writing software, and models that can simulate firm operations
- Information from the MIS is then used by organizational problem solvers as an aid in decision-making, as illustrated in Figure 1.9
- Firms can also interact with suppliers or others to form **inter organizational information systems (IOS)**, in which the MIS supplies information to the other members of the IOS as well as the firm's users

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Figure 1.9 An MIS Model



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Virtual Office Systems

- **Office automation** - the use of electronics to facilitate communication, began with **word processing**
- Subsequent applications include electronic mail, voice mail, electronic calendaring, and audio and video conferencing
- These **personal productivity systems** now account for a large portion of a firm's use of the computer as a communications vehicle
- With improvements in networking, the concept of a **virtual office** has developed, in which office activities can be performed without the need for an employee to be in a specific location

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Decision Support Systems (DSS)

- A DSS is a system used to assist managers in making decisions to help solve a specific problem
- Figure 1.10 shows the 3 sources for the information to be delivered to users: a relational database, a knowledge base, and a multidimensional database
- Two additional types of DSS-related software are:
 - **group decision support systems**: used in aiding a group of managers work out decisions, and
 - **artificial intelligence**: in which a program is created for a computer to logically analyze a problem on its own

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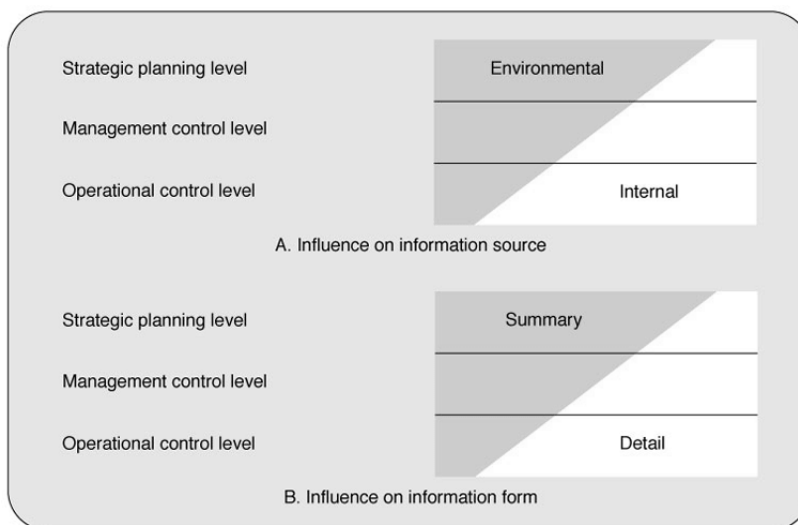
MANAGERS AS INFORMATION SYSTEM USERS

- Managers exist at various **managerial levels** and within various **business areas** of the firm
- What level an IS is developed for influences how it operates (see Figure 1.11)
- The 3 primary management levels are (see Figure 1.12):
 1. Strategic planning level
 2. Management control level
 3. Operational control level

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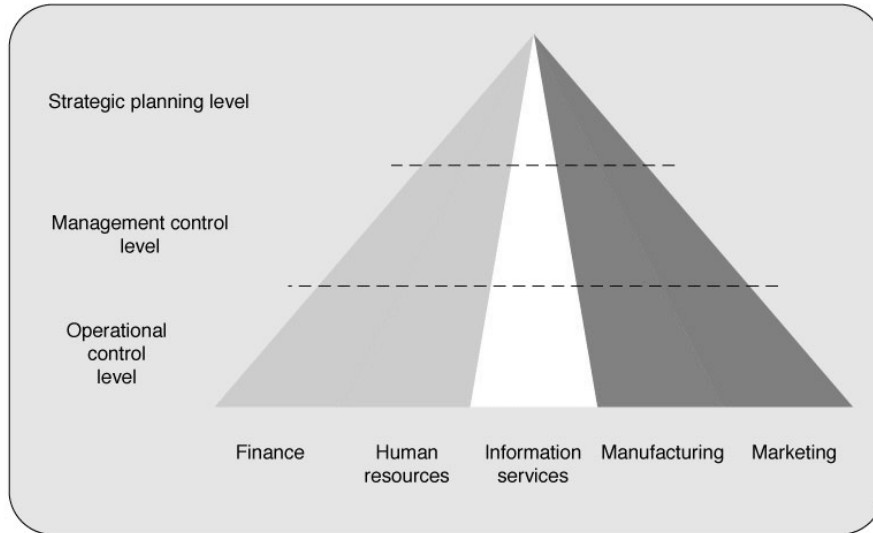
Figure 1.11 Management Level Can Influence Both the Source and Presentation Form of Information



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Figure 1.12 Managers Can Be Found on All Levels in All Business Areas of the Firm



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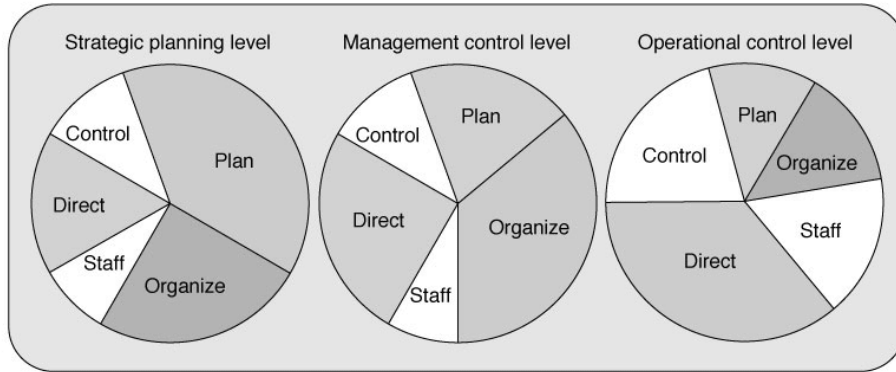
What Managers Do

- Managerial Functions (Managers do the following):
 - **Plan** what they are to do
 - **Organize** to meet the plan
 - **Staff** their organization with resources
 - **Direct** them to execute the plan
 - **Control** the resources, keeping them on course (see Figure 1.13)
- Managerial Roles:
 - Mintzberg's framework is made of 10 roles that managers play, grouped into interpersonal, informational, and decisional activities (see Table 1.1)

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Figure 1.13 Management Level Can Influence the Relative Emphasis on the Management Functions



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Table 1.1

Mintzberg's Managerial Roles	
INTERPERSONAL ROLES	<p><i>Figurehead</i> The manager performs ceremonial duties, such as giving visiting dignitaries tours of the facilities.</p> <p><i>Leader</i> The manager maintains the unit by hiring and training the staff and providing motivation and encouragement.</p> <p><i>Liaison</i> The manager makes contacts with persons outside the manager's own unit—peers and others in the unit's environment—for the purpose of attending to business matters.</p>
INFORMATIONAL ROLES	<p><i>Monitor</i> The manager constantly looks for information bearing on the performance of the unit. The manager's sensory perceptors scan both the internal activity of the unit and its environment.</p> <p><i>Disseminator</i> The manager passes valuable information along to others in the unit.</p> <p><i>Spokesperson</i> The manager passes valuable information along to those outside the unit—superiors and persons in the environment.</p>
DECISIONAL ROLES	<p><i>Entrepreneur</i> The manager makes rather permanent improvements to the unit, such as changing the organizational structure.</p> <p><i>Disturbance handler</i> The manager reacts to unanticipated events, such as the devaluation of the dollar in a foreign country where the firm has operations.</p> <p><i>Resource allocator</i> The manager controls the purse strings of the unit, determining which subsidiary units get which resources.</p> <p><i>Negotiator</i> The manager resolves disputes both within the unit and between the units and its environment.</p>

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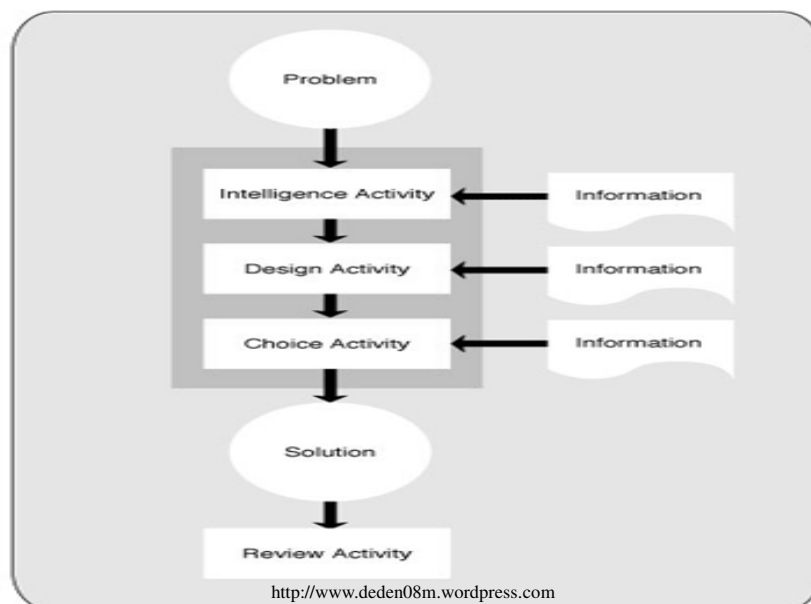
THE ROLE OF INFORMATION IN MANAGEMENT PROBLEM SOLVING

- While a **problem** can be harmful or potentially harmful to a firm in a negative way, *it can also be beneficial or potentially beneficial in a positive way*
- The outcome of the problem-solving activity is a **solution**
- A **decision** is a particular selected course of action
- Simon described problem-solving as being made up of four phases:
 - Intelligence activity
 - Design activity
 - Choice activity
 - Review activity

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Figure 1.14 Information Supports Each Problem-Solving Phase



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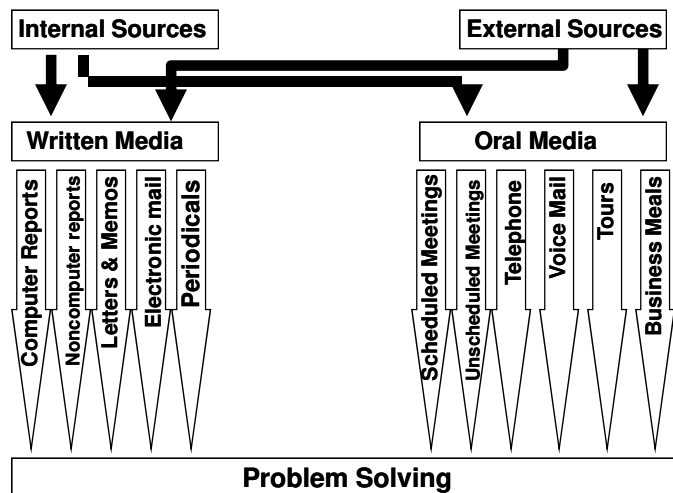
Management Skills

- Communications
 - Problem solving
- } How can an information specialist help?

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Problem Solving Information Comes in Many Forms



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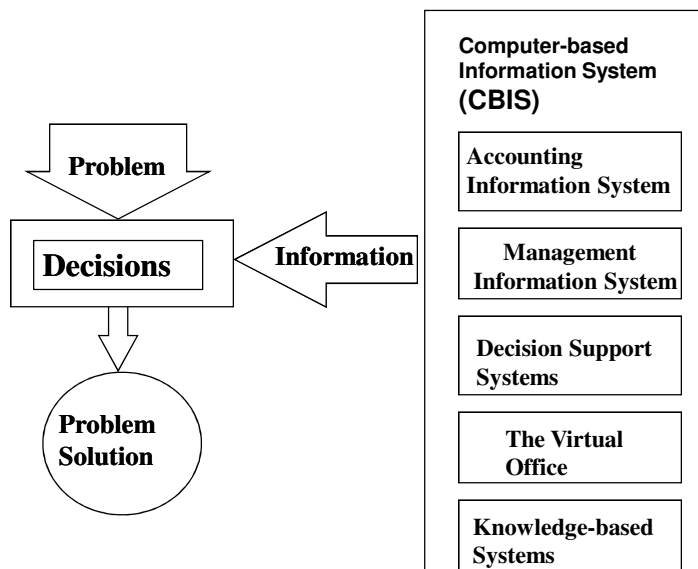
Management Knowledge

- Computer literacy
- Information literacy
- What's the difference?

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The CBIS Model



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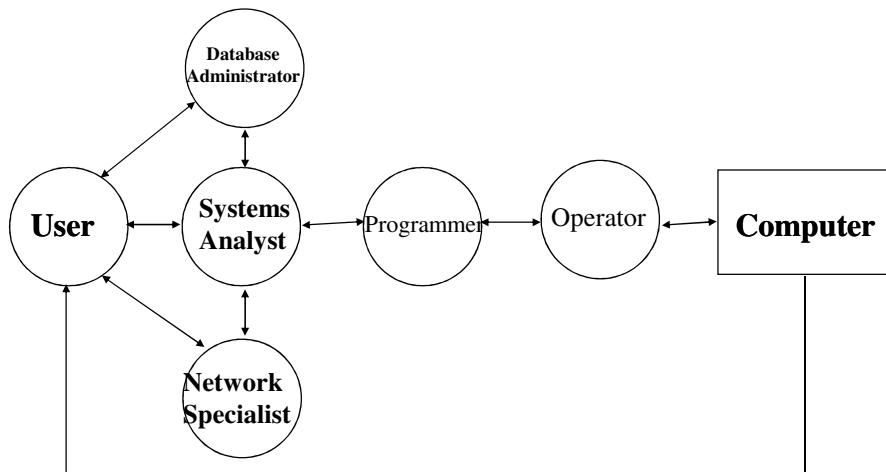
Information Services

Information specialists have full-time responsibility for developing and maintaining computer-based systems

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Traditional Communication Chain



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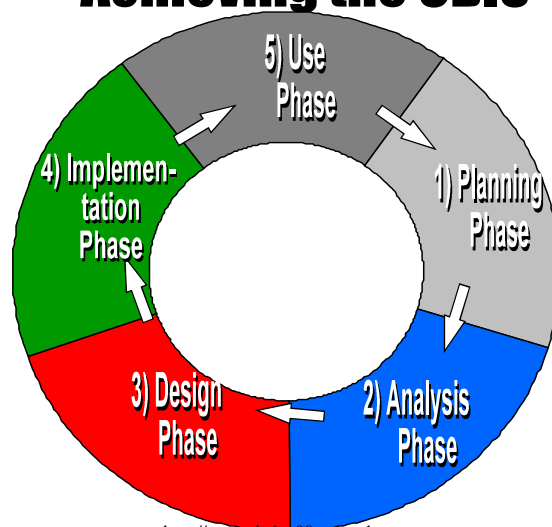
Justifying the CBIS

- **Justify in the same manner as any other large investment**
- **Economic**
 - Cost reduction
 - Reduced inventory investment
 - Increased productivity (CAD/CAM)
- **Noneconomic**
 - Perceived value

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Achieving the CBIS



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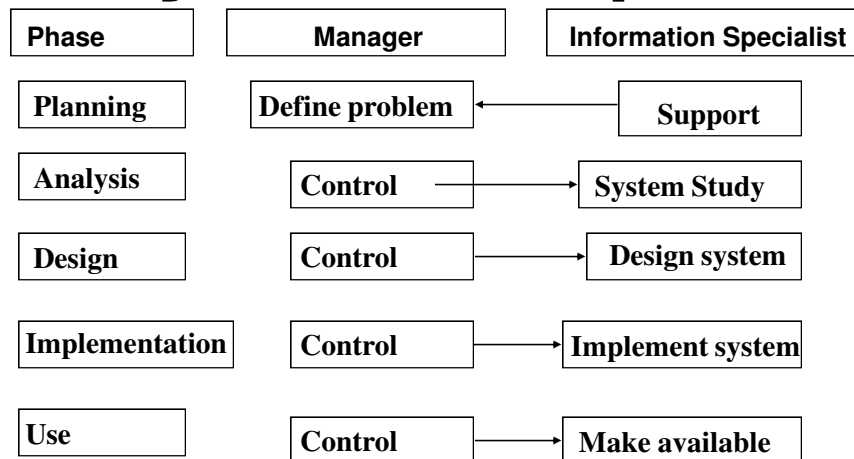
Reengineering the CBIS

- **Business Process Reengineering (BPR)**
 - Reworking systems
 - Good system features retained
 - Becoming development methodology of choice

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Roles Played by the Manager and by the Information Specialist



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THE FUTURE OF INFORMATION TECHNOLOGY

- The future of information technology will be driven by the following two trends:
 - Ongoing cost reductions and increased power of information technologies
 - Convergence between computers and communications
- To take advantage of these new possibilities, managers must learn to incorporate information systems into decision making

END OF CHAPTER 1