

# **INFORMATION SYSTEMS MANAGEMENT**

**INTRODUCTION TO INFORMATION  
SYSTEMS**

# SYSTEM CONCEPTS

## **System definition**

- A system is an orderly grouping of independent components linked together according to plan to achieve a specific objective.
- System is an interrelated set of business procedures (or components) used within one business unit, working together for some purpose.
- For example, a system in the payroll department keeps track of checks, whereas an inventory system keeps track of supplies. The two systems are separate.

# SYSTEM CONCEPTS

## Characteristics of a system

### 1. Organization

- Structure and order. It is the arrangement of components that helps to achieve objectives.
- Example: in business organizations Hierarchical relationships starting with the director at the top and leading downward to the blue collar workers represents organization structure.
- Computer system: organization of various components like input devices, output devices, CPU and storage devices to generate information.

# SYSTEM CONCEPTS

## 2. Interaction

- Procedure in which sub systems or the components function with each other.
- In an organization, purchasing must interact with production, advertising with sales and payroll with personnel.
- In a computer system the CPU must interact with other units to solve a problem. On the other hand the main memory holds the data that has to be operated by the ALU. The interrelationships of all units enables the computer to function

# SYSTEM CONCEPTS

## 3. Interdependence

- Independence means that components of a computer system or organization depend on one another. They are coordinated and linked together in a planned way to achieve an objective.

## 4. Integration

- How subsystems are tied together to achieve the system objective. It means that parts of a system work together within the system even though each part performs a unique function. Successful integration produces a better result as a whole rather than each component working independently.

# SYSTEM CONCEPTS

## 5. Central Objective

- Central objective means the common goal. Objectives may be real or stated.
- Although a stated objective may be real, it is quite common that an organization may state one objective and operate to achieve another.
- The most important objective is that users must be aware about the central objective well in advance.

# SYSTEM CONCEPTS

## Types of Systems

### Physical or Abstract System

- Physical system are tangible entities which are static or dynamic in nature
- Abstract systems are conceptual or non-physical entities. They may be formulas, representation or model of a real system.
- A computer system has hardware components which are static and software components which are dynamic.
- Programs, data, and applications can change according to the user's needs.

# SYSTEM CONCEPTS

## Open and Closed Systems

- Majority of systems are open systems. An **open system** has many interfaces with its environment and permits interactions across its boundaries.
- It can also adapt to changing environmental conditions
- It can receive inputs from, and delivers output to the outside of system
- **Closed systems:** Systems that don't interact with their environment. Closed systems exist in concept only. Completely closed systems are very rare.



# SYSTEM CONCEPTS

## **Deterministic & probabilistic systems:**

- **Deterministic system:** It is a system which operates in predictable manner.
- Stepwise execution is always possible & output is sure. For example: computer system.
- **Probabilistic system:** It is a system which operates in unpredictable manner & degree of error is always possible.
- Here occurrence of an event cannot be perfectly predicted. Also output is not sure. An example is s warehouse and its contents.

# **SYSTEM CONCEPTS**

## **Man-made Information System**

- Information system is the basis for interaction between the user and the analyst.
- It determines the nature of relationships among decision makers and is viewed as a decision center at all levels
- Main purpose-manage data for a particular organization.

## **Man-made Information Systems are further categorized into:**

- **Formal Information Systems**
- **Informal Information Systems**
- **Computer-Based Information Systems**

# SYSTEM CONCEPTS

- **Formal Information Systems:** It is based on the organization represented by the organization chart. Responsible for flow of information from top management to lower management. It is concerned with the pattern of authority, communication and workflow. Feedback can be given from lower authorities to top management
- **Informal Information Systems:** Informal systems are employee based. These are made to solve the day to day work related problems. It can funnel information upward through indirect channels. It is considered useful because it works within the framework of the business and its stated policies

# SYSTEM CONCEPTS

- **Computer-Based Information Systems:** This class of systems depends on the use of computer for managing business applications. Different information systems are developed to meet a variety of business needs.
- **Information systems (IS)** in organizations capture and manage data to produce useful information that supports an organization and its employees, customers, suppliers, and partners.
- Many organizations consider Information systems to be essential to their ability to compete or gain competitive advantage.
- Most organizations have come to realize that all workers need to participate in the development of information systems.
- Information systems in organizations encompass transaction processing systems, management information systems, decision support systems, and strategic information systems.

# INFORMATION SYSTEMS

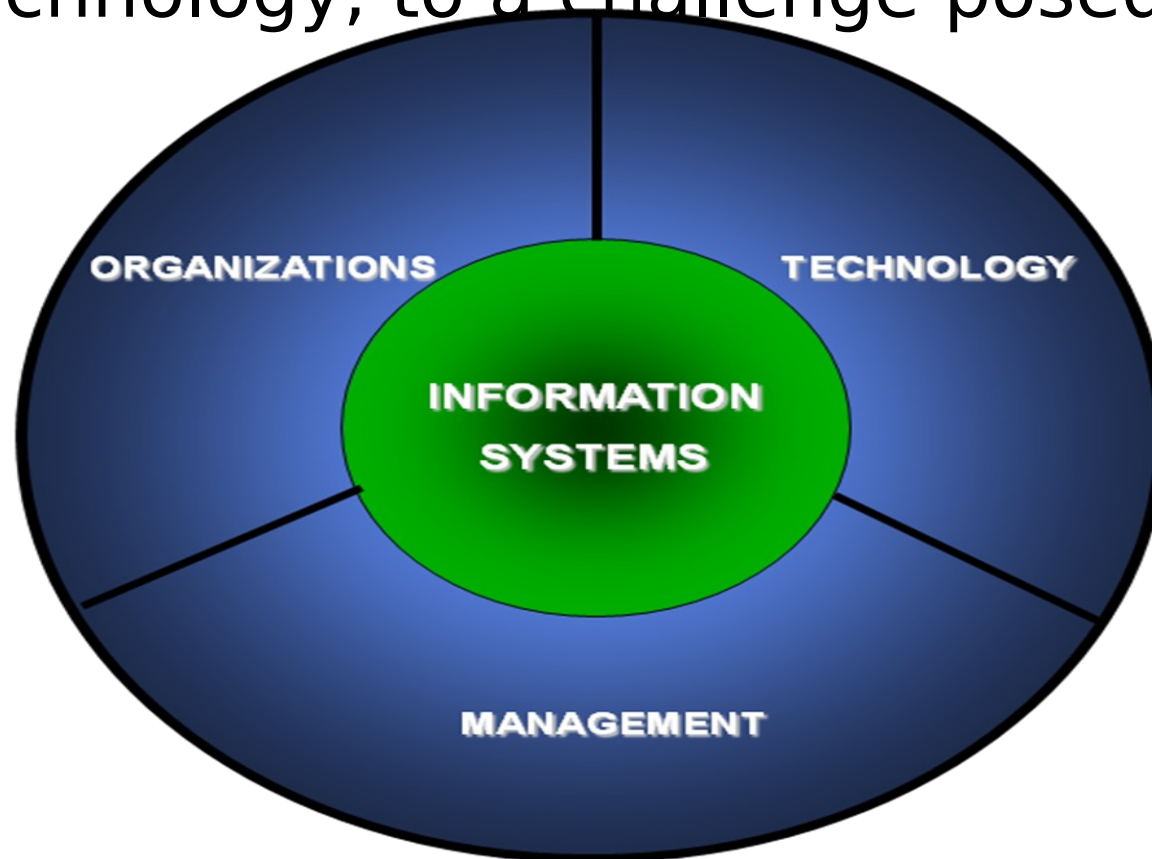
*Information System is any organised combination of people, hardware, software, communication networks, and data resources that collect, transform and disseminates information in an organisation.*

- Information systems is interrelated components working together to collect, process, store and disseminate information to support decision making, co-ordination, control, analysis and visualisation in an organisation.

# INFORMATION SYSTEMS

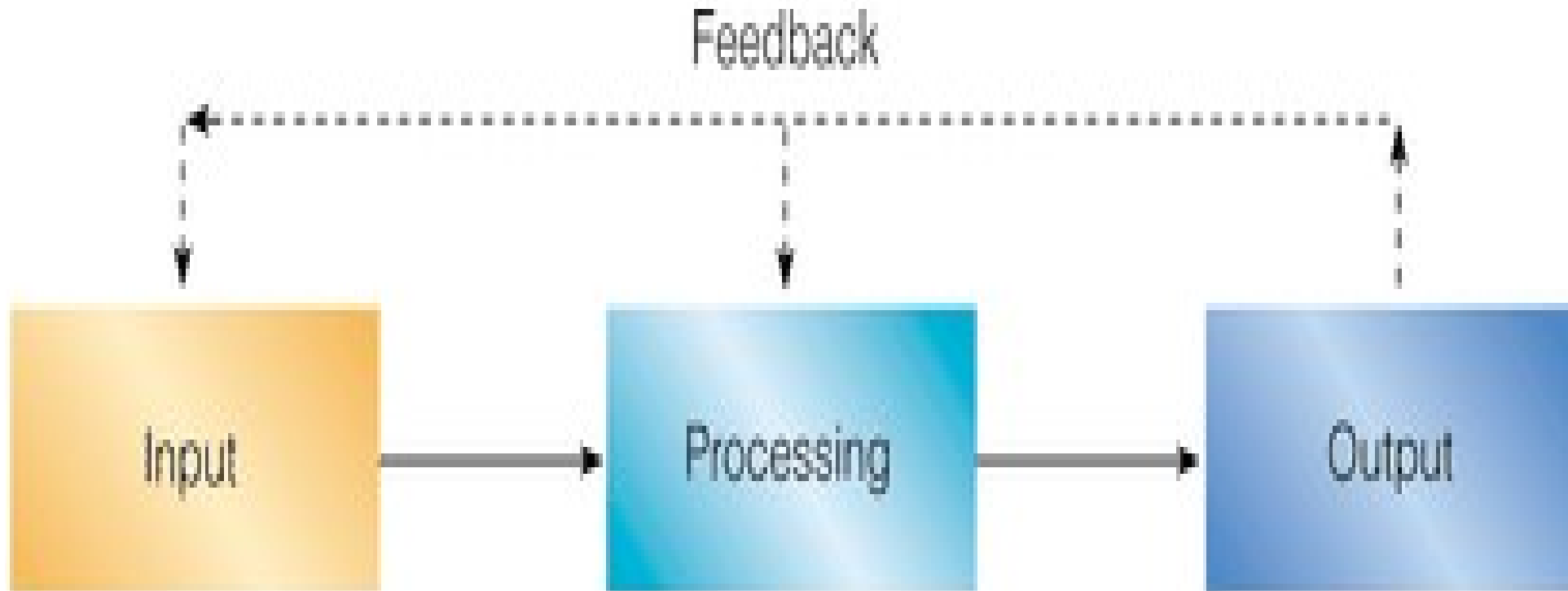
## A Business Perspective on Information System

- From a business perspective, an information system is an organizational and management solution, based on information technology, to a challenge posed by the environment.



# INFORMATION SYSTEMS

- ACTIVITIES OF AN INFORMATION SYSTEM TO PRODUCE INFORMATION



# **INFORMATION SYSTEMS**

**The following activities of information systems produce information that organizations need;**

- Input: Captures raw data from organization or external environment
- Processing: Converts raw data into meaningful form
- Output: Transfers processed information to people or activities that use it
- Feedback: Output returned to appropriate members of organization to help evaluate or correct input stage



# INFORMATION SYSTEMS

Computer-based information systems (CBIS) use computer technology to perform some or all of their tasks and are composed of:

- **Hardware** – *are the tangible parts of a computer based information system. These are the physical resources that perform the required computing tasks such as data gathering or input, data output, data processing and storage.*
- **Software** - *programs and their documentations that govern the operation of the computer. There are Systems software, applications software, programming utilities and programming languages.*
- **Database** - *an organized collection of facts and information, typically consisting of two or more related*

# INFORMATION SYSTEMS

- **People (Users)** - important element, people element can be categorized as users and professionals. Users include the systems processes and people.
- The people provide the skills needed to develop, design, implement and manage the IT systems. People also serve as the customers for the IT services and products, suppliers to the IT business, owners of the IT systems, etc.
- The system processes also serve as users to other processes. Processes need to communicate and pass relevant data to one another during processing.  
Some most common roles played by people include:-
- Systems Analyst
- Programmer
- Technician
- Engineer
- Network Manager
- MIS (Manager of Information Systems)
- Data entry operator

# INFORMATION SYSTEMS

- **Procedures** –include the strategies, policies, methods, and rules for using the CBIS.
- **Telecommunication System/Communication network**

The electronic transmission of signals for communications, through networks - used to connect computers and computer equipment to enable electronic communications. Internet - the world's network consisting of thousands of interconnected networks

# INFORMATION SYSTEMS

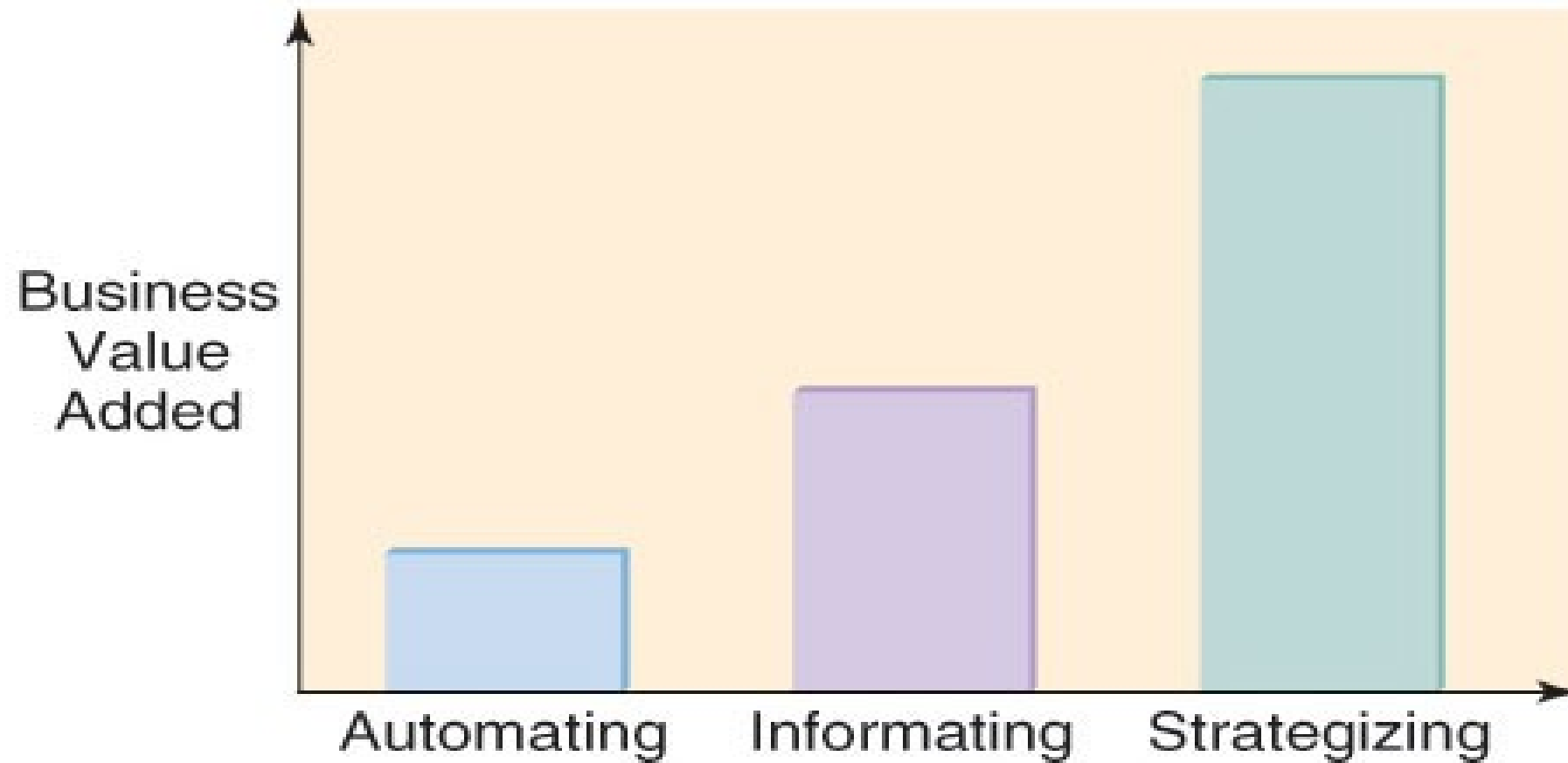
## Valuing Information Systems

**Information systems can be used in three ways to add value to an organization:**

- Automating
- Informating
- Strategizing

# INFORMATION SYSTEMS

## Valuing Information Systems



# INFORMATION SYSTEMS

## 1. IS for Automating: Doing Things Faster

- With automation, tasks can be completed:
  - Faster
  - Cheaper
  - More accurately
  - With greater consistency
- **Automating example:** Loan processing comparison for 3 methods (from the moment the customer takes the application until the applicant is notified of decision)
  - Manual loan process – 25 to 40 days
  - Technology-supported process – 5 to 20 days
  - Fully automated process – 1 hour to 15 days

# INFORMATION SYSTEMS

## 2. IS for Organizational Learning (Informating): Doing Things Better

- Information systems can also be used to:
  - Learn about processes
  - Improve processes
  - Support organizational learning
- **Informating example:** Computer-based loan system identifies peak times during the year when specific loans are processed.

## 3. IS for Supporting Strategy: Doing Things Smarter

- IS used to gain or sustain competitive advantage
  - Turning benefits of *automating* and *informating* into strategic advantage
- How do you identify Opportunities/Problems? Use Porter's Value Chain Model and Five Forces Model

# **INFORMATION SYSTEMS**

## **Why Organizations Build Information Systems**

- The following are some benefits for organizations building information systems:
- More efficient.
- Save money.
- Reduce work force.
- Become important and to stay in business.
- A source of competitive advantage.
- More innovative than others.
- Satisfy the ambitions of various groups within an organization.



# INFORMATION SYSTEMS

## **Functions of an information system**

The functions of an information system can be generally classified into those functions involved in:

- Transaction processing
- Management reporting
- Decision support

# INFORMATION SYSTEMS

## 1. Transaction processing

Major processing functions include:

- Process transactions – Activities such as making a purchase or a sale or manufacturing a product. It may be internal to the organization or involve an external entity.
- Maintain master files – Many processing activities require operation and maintenance of a master file, which stores relatively permanent or historical data about organizational entities. E.g. processing an employee paycheck needs data items such as rate of pay, deductions etc. transactions once processed will update data items in the master file to reflect the most current information.
- Produce reports – reports are significant products of an information system. Scheduled reports are produced on a regular basis. An information system should also be able to produce special reports quickly based on 'ad hoc' or random requests.

# INFORMATION SYSTEMS

## Transaction processing cont'd

- Process inquiries – Other outputs of the information system are responses to inquiries using the databases. These may be regular or ad hoc inquiries.
- Process interactive support applications – The information system contains applications to support systems for planning, analysis and decision making.
  - The mode of operation is interactive, with the user responding to questions, requesting for data and receiving results immediately in order to alter inputs until a solution or satisfactory result is achieved.

# INFORMATION SYSTEMS

## 2. Management reporting

This is the function involved in producing outputs for users. These outputs are mainly as reports to management for planning, control and monitoring purposes. Major outputs of an information system include:

- Transaction documents or screens
- Preplanned reports
- Preplanned inquiry responses
- Ad hoc reports and ad hoc inquiry responses
- User-machine dialog results

# INFORMATION SYSTEMS

## 3. Decision support

Types of decisions

- Structured/programmable decisions
- Semi-structured/semi-programmable decisions
- Unstructured/non-programmable decisions

# INFORMATION SYSTEMS

## **1. Structured/programmable decisions**

- These decisions tend to be repetitive and well defined e.g. inventory replenishment decisions.
- A standardized pre-planned or pre-specified approach is used to make the decision and a specific methodology is applied routinely.
- Also the type of information needed to make the decision is known precisely.
- They are programmable in the sense that unambiguous rules or procedures can be specified in advance. These may be a set of steps, flowchart, decision table or formula on how to make the decision.
- The decision procedure specifies information to be obtained before the decision rules are applied. They can be handled by low-level personnel and may be completely automated.

# INFORMATION SYSTEMS

## Structured decisions cont'd

- It is easy to provide information systems support for these types of decisions.
- Many structured decisions can be made by the system itself e.g. rejecting a customer order if the customer's credit with the company is less than the total payment for the order.
- Managers must be able to override these systems' decisions because managers have information that the system doesn't have e.g. the customer order is not rejected because alternative payment arrangements have been made with the customer.
- The system might also make only part of the decision e.g. quantities of each inventory item to be re-ordered. The manager may then select the most appropriate vendor for the item on the basis of delivery lead time, quality and price.
- Examples of such decisions include: inventory reorder formulas and rules for granting credit.

# INFORMATION SYSTEMS

## **Semi-structured/semi-programmable decisions**

- The information requirements and the methodology to be applied are often known, but some aspects of the decision still rely on the manager:
- An example is selecting the location to build a new warehouse. Here the information requirements for the decision such as land cost, shipping costs are known, but aspects such as local labour attitudes or natural hazards still have to be judged and evaluated by the manager.



# INFORMATION SYSTEMS

- **Unstructured/non-programmable decisions**
- These decisions tend to be unique e.g. policy formulation for the allocation of resources.
- The information needed for decision-making is unpredictable and no fixed methodology exists.
- Multiple alternatives are involved and the decision variables as well as their relationships are too many and/or too complex to fully specify. Therefore, the manager's experience and intuition play a large part in making the decision.
- In addition there are no pre-established decision procedures either because:
  - The decision is too infrequent to justify organizational preparation cost of procedure
  - The decision process is not understood well enough, or
  - The decision process is too dynamic to allow a stable pre-established decision procedure.
- Example: Selecting a CEO of a company.