COMPREHENSIVE ANALYSIS OF INFORMATION SYSTEMS

CRIS LAWRENCE LUCERO
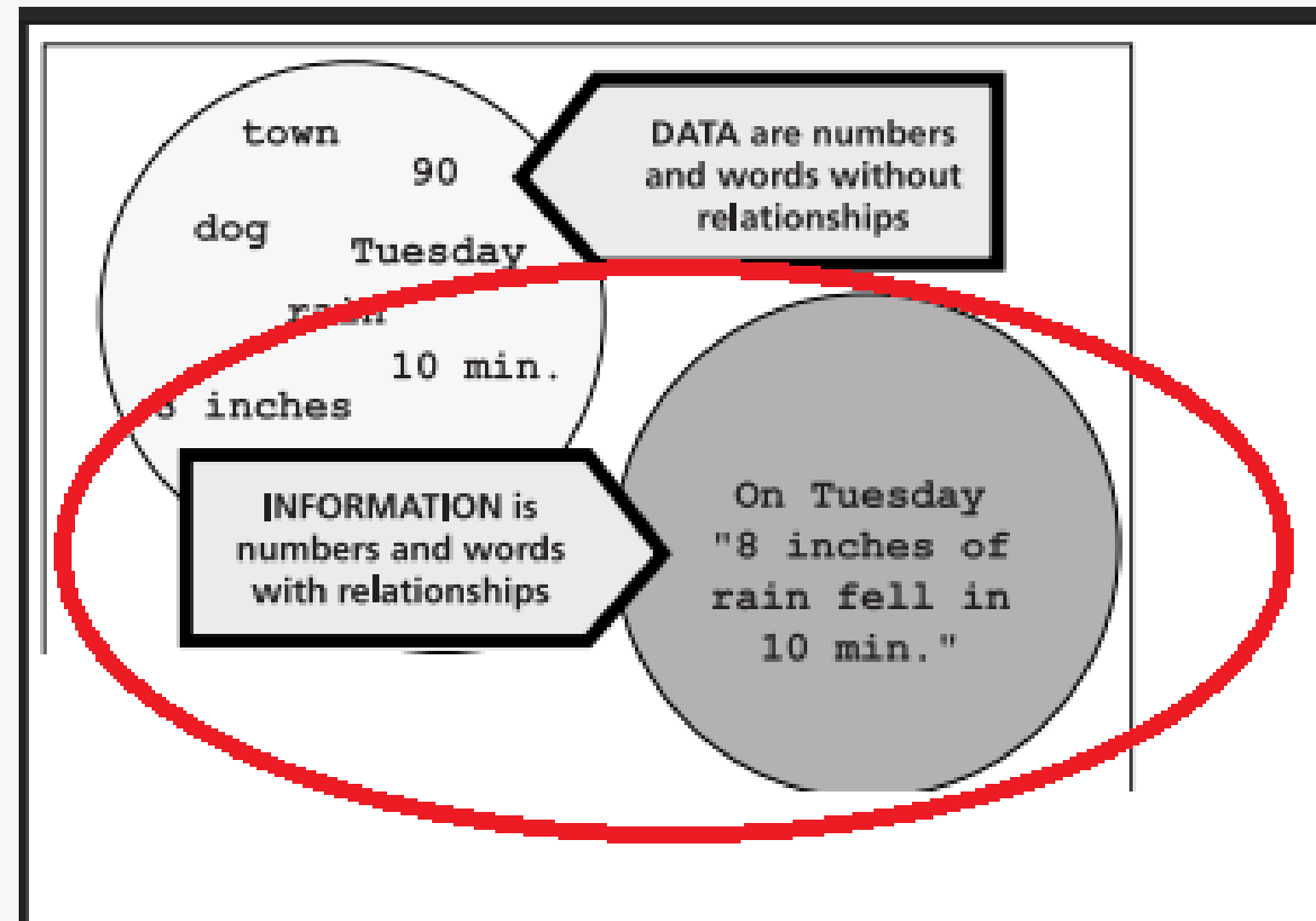
DATA AND INFORMATION

WHAT IS DATA?

- Defined as numbers and words without relationships (Pohl, n.d.).
- "Facts and figures"
- Collection of text, numbers and symbols with no meaning

Data	Represented by
Alphanumeric data	Numbers, letters, and other characters
Image data	Graphic images and pictures
Audio data	Sound, noise, or tones
Video data	Moving images or pictures

Fundamentals of information systems. (n.d.). https://www.cengageasia.com/title/default/detail?isbn=9781337097536

WHAT IS INFORMATION?

- Defined as numbers and words with relationships (Pohl, n.d.).
- result oof processing data, usually by computer

RELATIONSHIP BETWEEN DATA AND INFORMATION

- Data on its own has no meaning. It only takes on meaning and becomes information when it is interpreted. When that data is processed into sets according to context, it provides information (Pohl, n.d.)

Data + Meaning = Information

Example
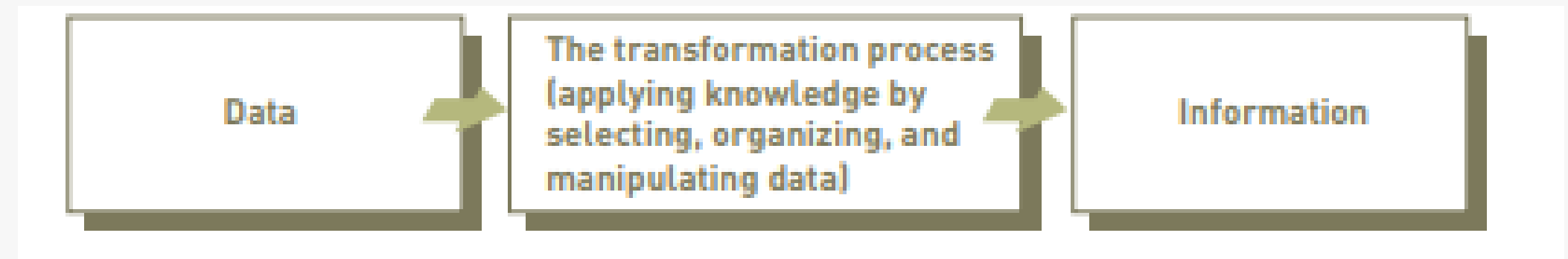
Looking at the examples given for data:

- 3, 6, 9, 12
- cat, dog, gerbil, rabbit, cockatoo
- 161.2, 175.3, 166.4, 164.7, 169.3

Only when we assign a context or meaning does the data become **information**. It all becomes meaningful when we are told:

- 3, 6, 9 and 12 are the first four answers in the 3 x table
- cat, dog, gerbil, rabbit, cockatoo is a list of household pets
- 161.2, 175.3, 166.4, 164.7, 169.3 are the heights of 15-year-old students.

Pohl, J. G. (n.d.). Transition from data to information. DigitalCommons@CalPoly

RELATIONSHIP BETWEEN DATA AND INFORMATION

- Turning data into information is a **process**, or a set of logically related tasks performed to achieve a defined outcome (Fundamentals of Information Systems, n.d.).

Data	The transformation process (applying knowledge by selecting, organizing, and manipulating data)	Information

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IMPORTANCE OF DATA AND INFORMATION IN OORGANIZATIONS

- Innovation
  - Supports adaptability and scalability

- Customer Focus
  - Enables rapid response to customer needs

- Efficiency
  - Streamlines operations and reduces costs

- Informed Decisions
  - Data drives quick and accurate decision-making

Laudon, K. C., & Laudon, J. P. (2020). Management Information Systems: Managing the Digital Firm (16th ed.). Pearson.
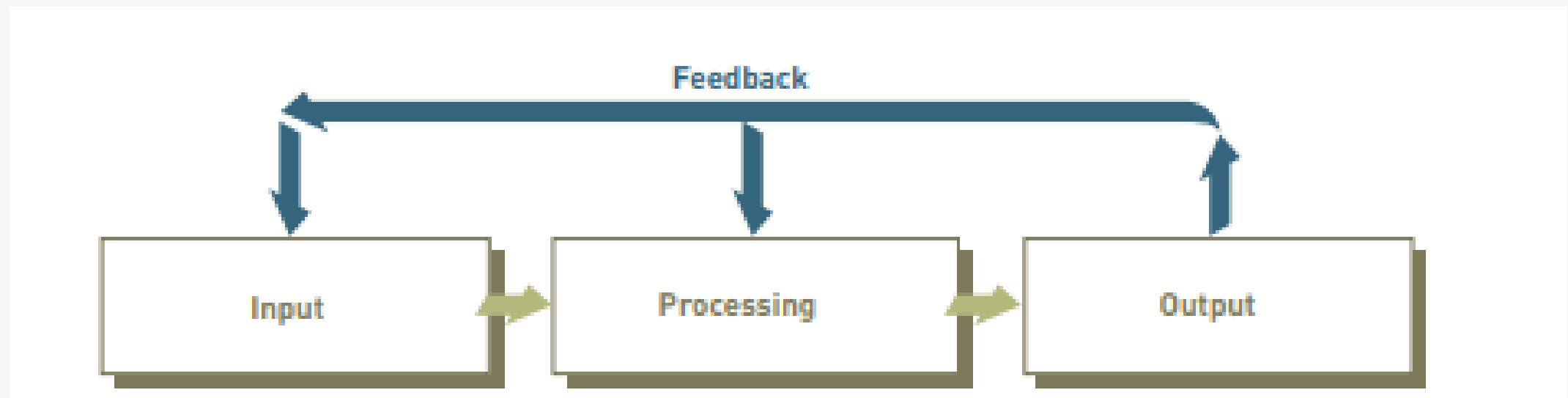
INFORMATION SYSTEM

WHAT IS INFORMATION SYSTEM?

A set of interrelated elements or components that collect (input), manipulate (process), store and disseminate (output) data and information, and provide a corrective reaction (feedback mechanism) to meet an objective (Fundamentals of Information Systems, n.d.).

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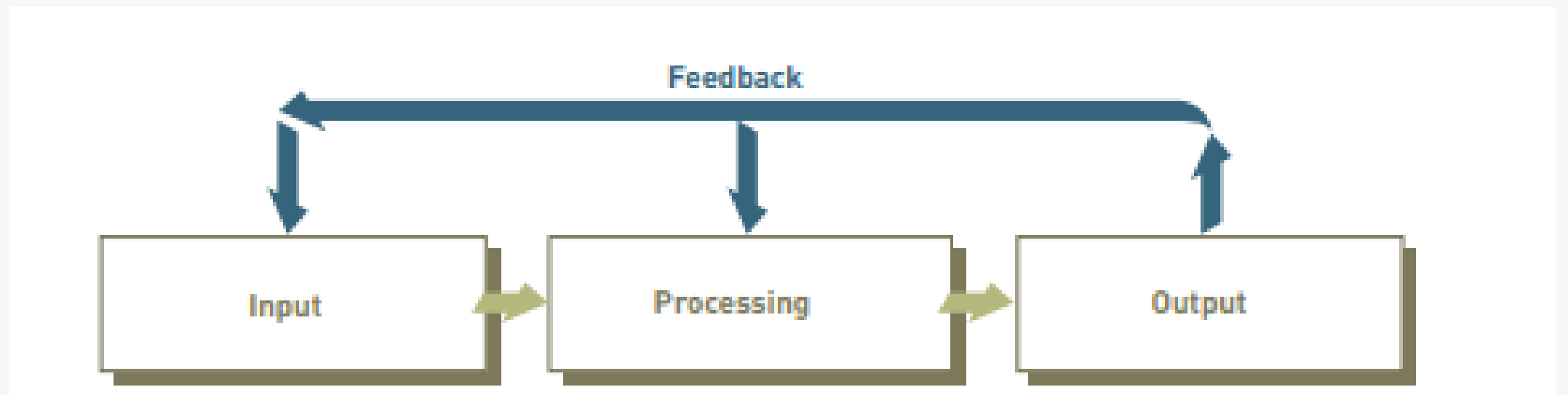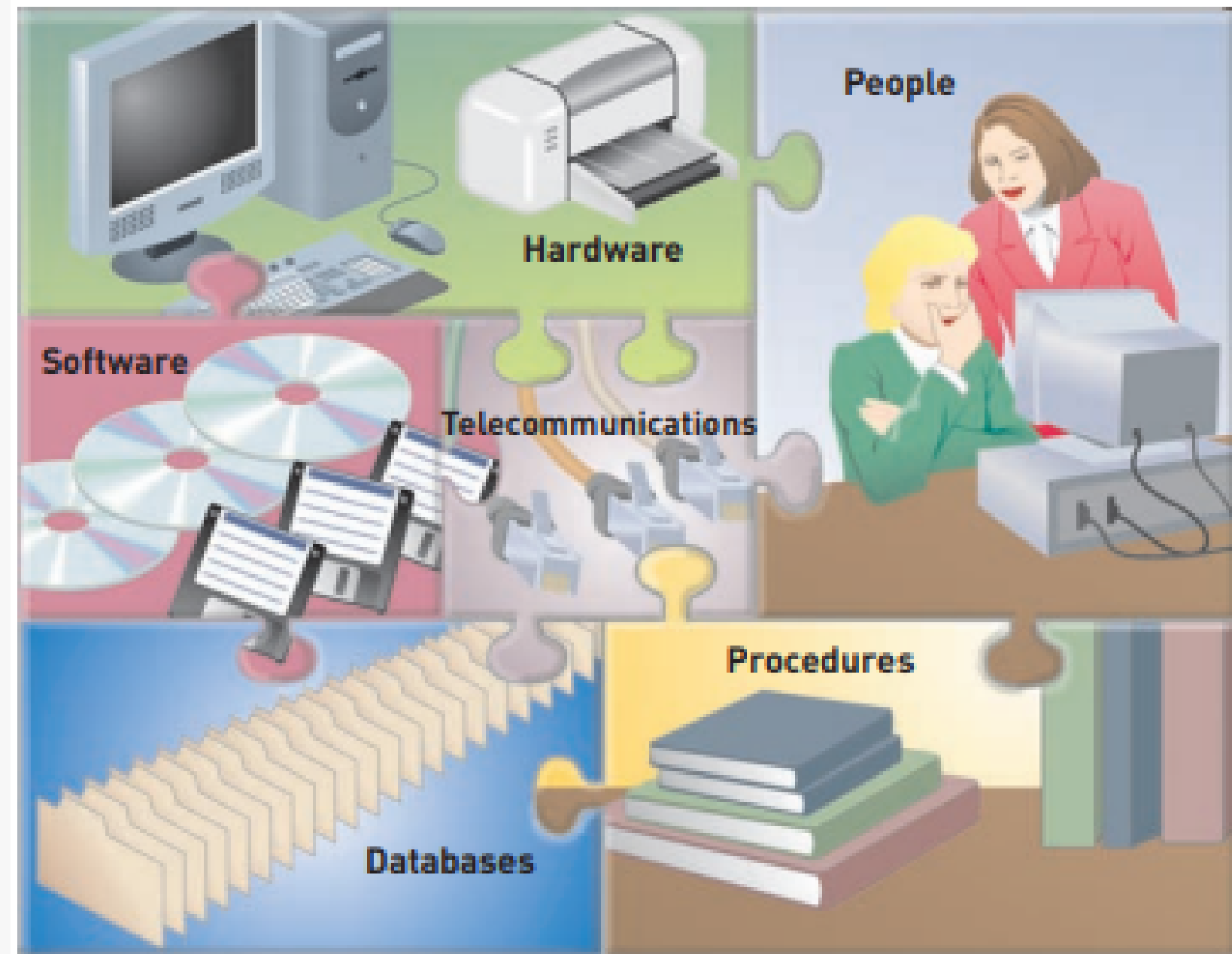
INPUT, PROCESSING, OUTPUT, FEEDBACK

- Input
  - Collect and capture raw data (e.g., work hours, grades).
- Processing
  - Convert data into useful outputs (e.g., calculating net pay).
  - Involves calculations, comparisons, and storing data.
- Output
  - Produce useful information (e.g., paychecks, reports).
  - Output from one system can be input for another.
- Feedback
  - Information used to correct or adjust inputs or processes
  - Example: Correcting error like entering wrong data (e.g., 400 hours instead of 40).

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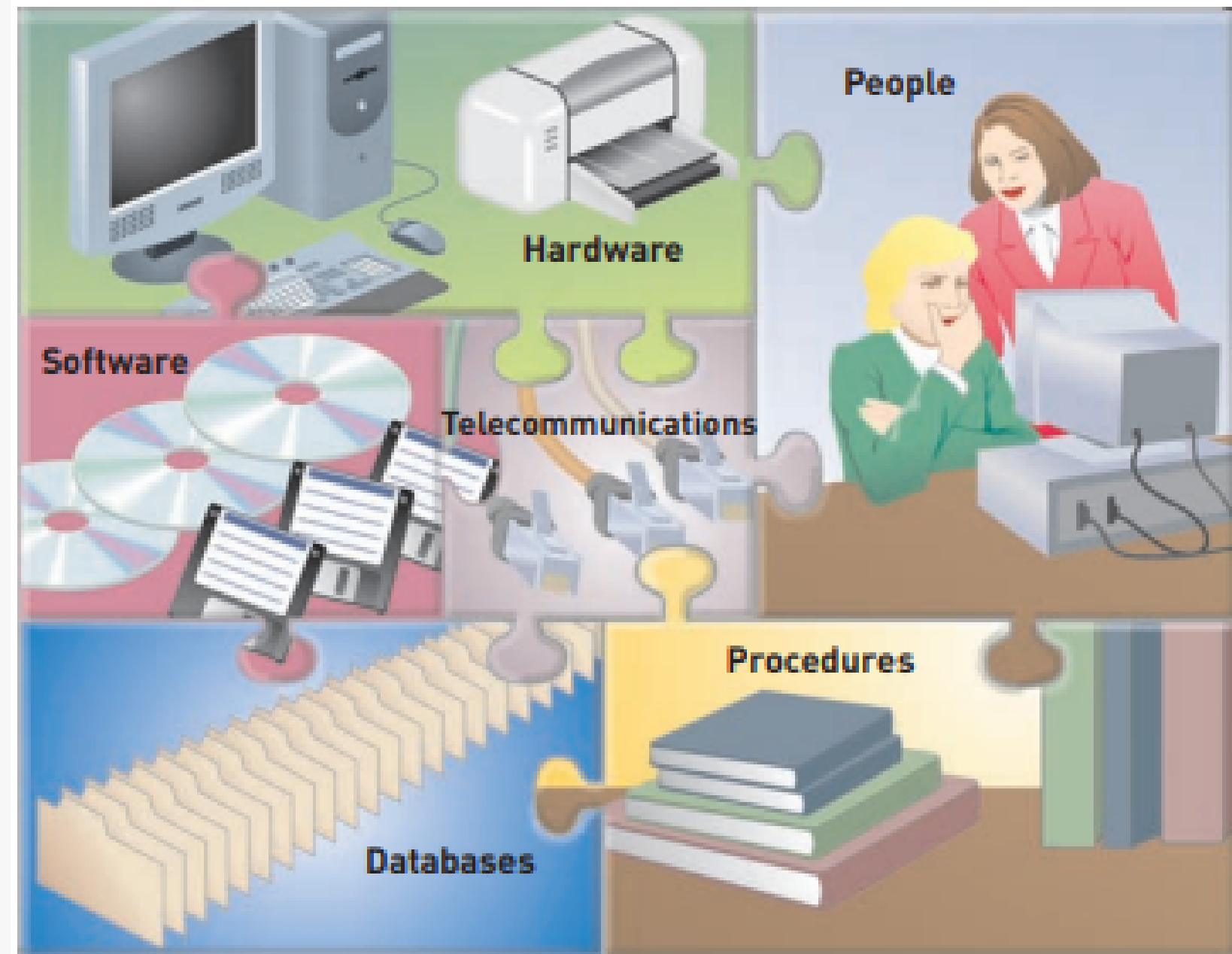
COMPONENTS OF A COMPUTER-BASED INFORMATION SYSTEMS

- **Hardware**
  - Physical equipment for input, processing, and output
  - Examples: Keyboards, CPUs, printers, special devices like even data recorders (EDRs).
- **Software**
  - Programs that control computer operations
  - Types: System software (e.g., Windows) and application software (e.g., Microsoft Office).
- **Databases**
  - Organized collection of data

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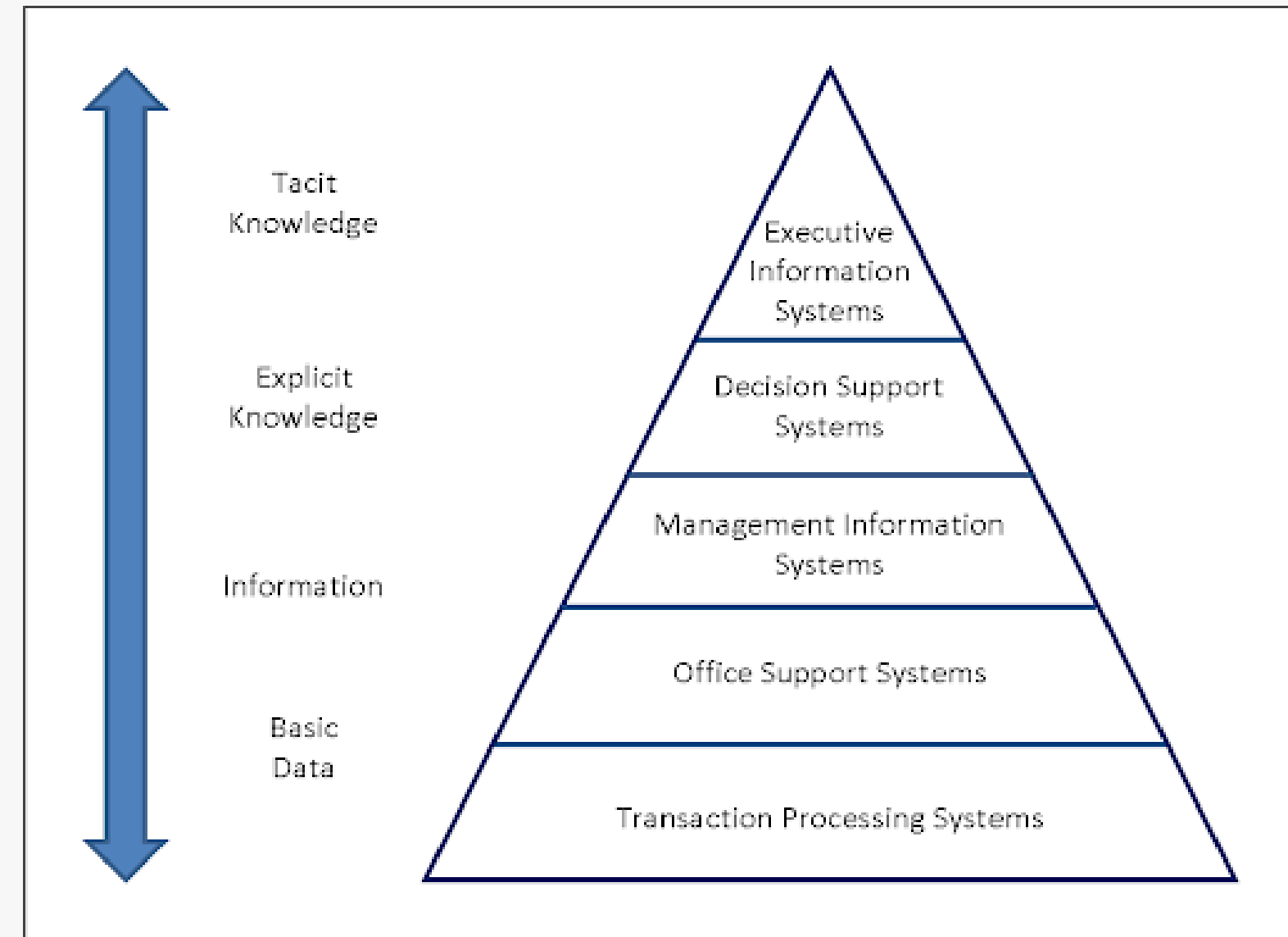
COMPONENTS OF A COMPUTER-BASED INFORMATION SYSTEMS

- **Telecommunications**
  - Electronic transmission of data via networks (e.g., Internet, intranets, extranets).
  - Enables communication and information sharing
- **People**
  - Users and IT personnel who manage, operate, and use information systems
- **Procedures**
  - Policies and methods for using and maintaining the system, including security and disaster recovery.
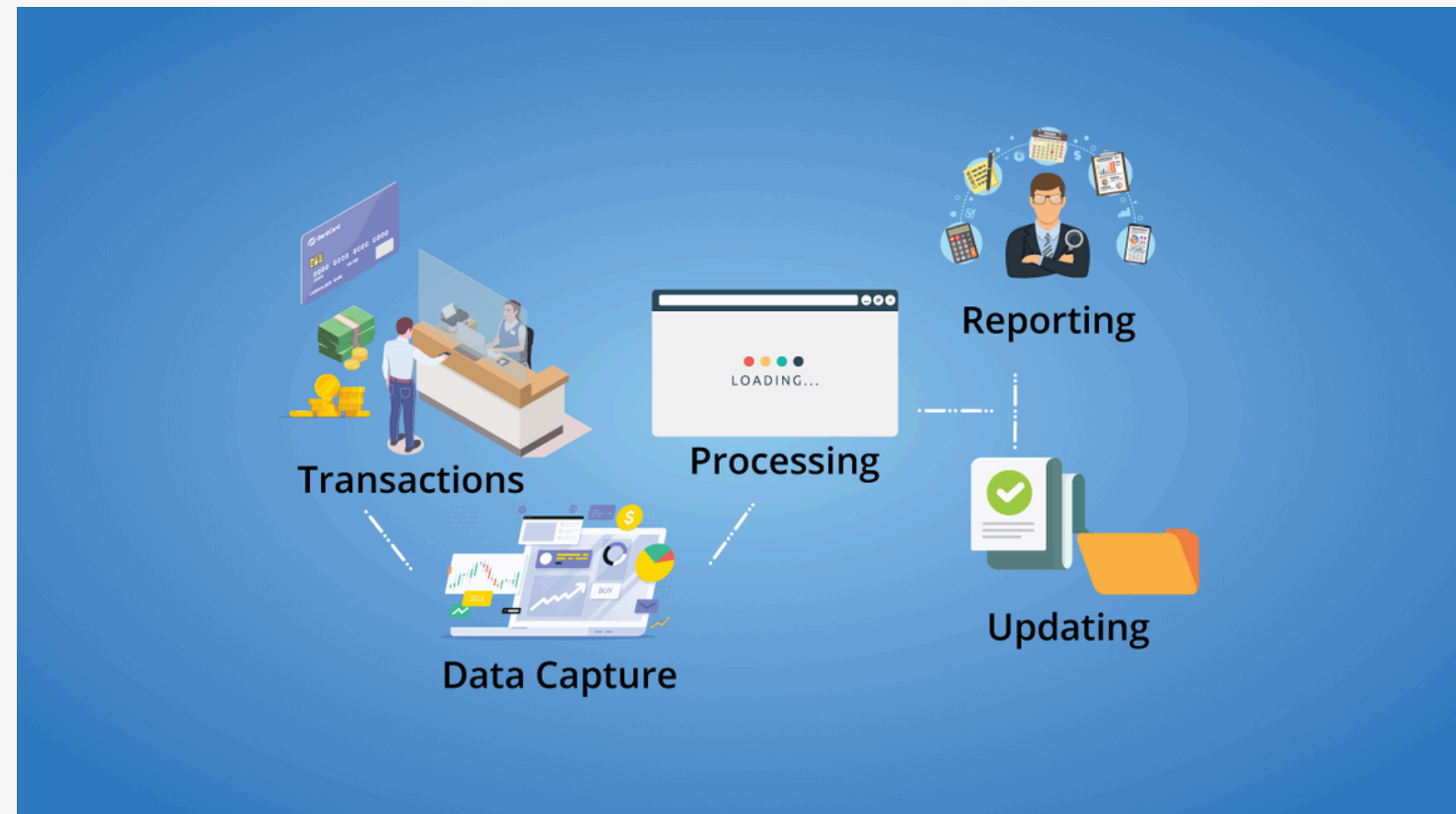

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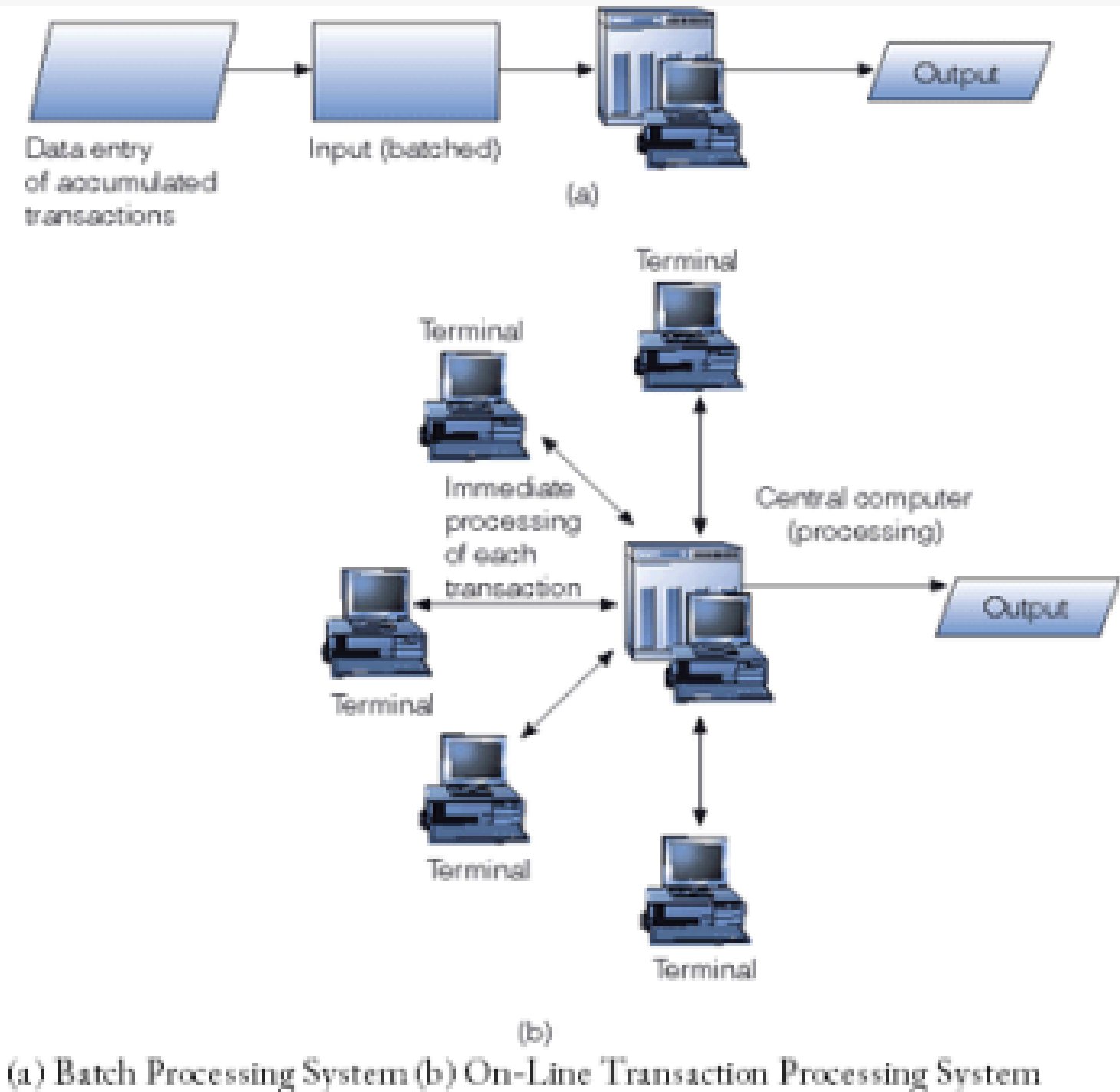
TRANSACTION PROCESSING SYSTEMS

- A transaction processing system collects and stores data about (of business) transactions and sometimes controls decisions made as part of a transaction.

CTTO: mindmajix.com

Amin MB, Alauddin M, Azad MM. Business transaction processing system. International Journal of Computer Information Systems. 2012; 4(5): 11-60.

TYPES OF TPS

- **Batch transaction processing**
  - information that is gathered and stored but not processed immediately i.e the processing of an invoice in a banking system
- **Real time transaction**
  - this is a transaction which is processed immediately and the operator has access to online database i.e. withdrawal from a bank account, Library loans

Data entry of accumulated transactions — Input (batched) — Output
(a)

Terminal — Immediate processing of each transaction — Central computer (processing) — Output
(b)

(a) Batch Processing System (b) On-Line Transaction Processing System

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MANAGEMENT INFORMATION SYSTEMS

- **MIS Definition**
  - Organized collection of people, procedures, software, databases, and devices
  - Provides routine information to managers and decision-makers
- **Focus**
  - Aims at improving operational efficiency in functional areas (e.g., manufacturing, marketing, finance).
- **Common Database**
  - Links different functional areas and draws data from Transaction Processing Systems (TPS) or Enterprise Resource Planning systems
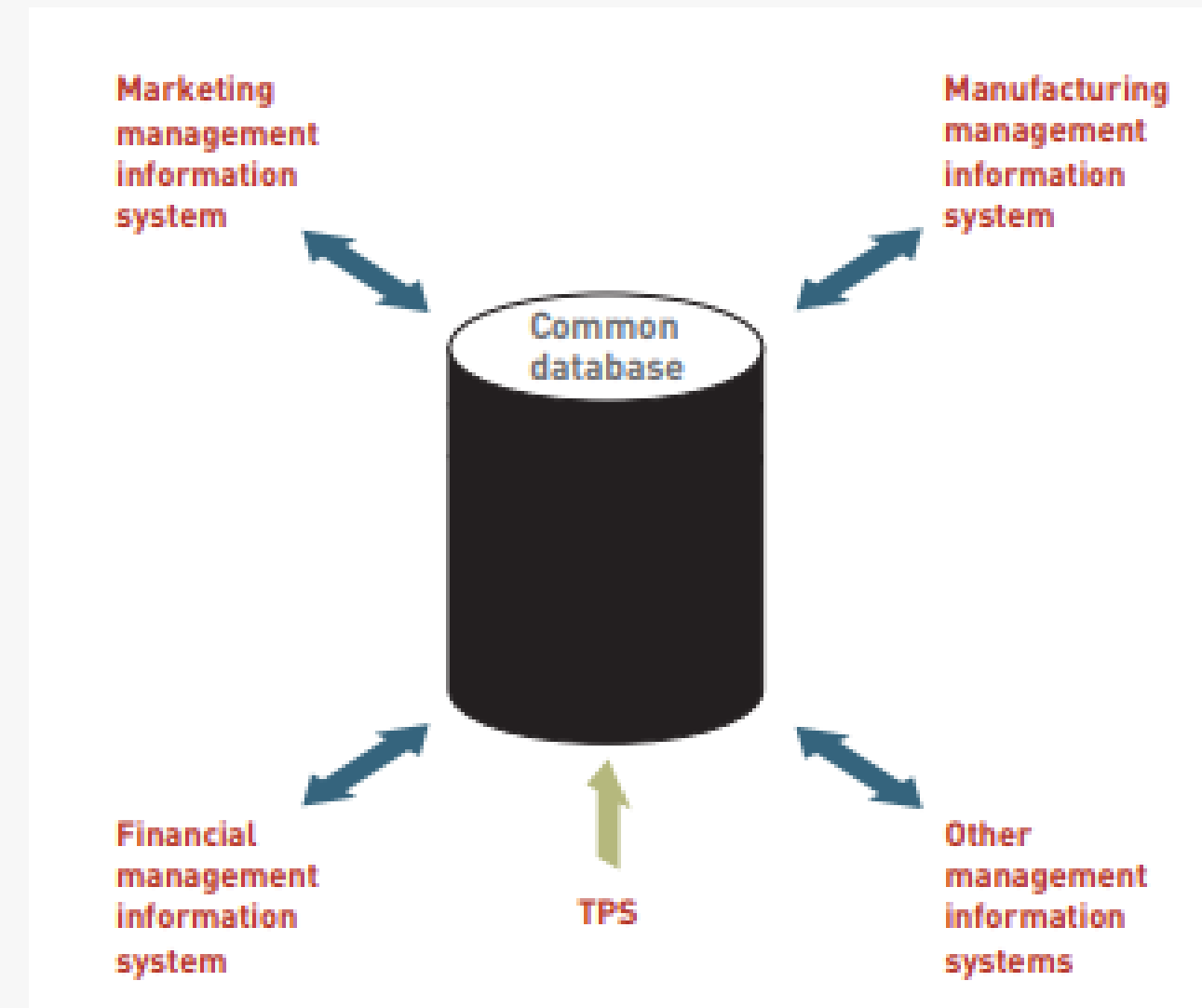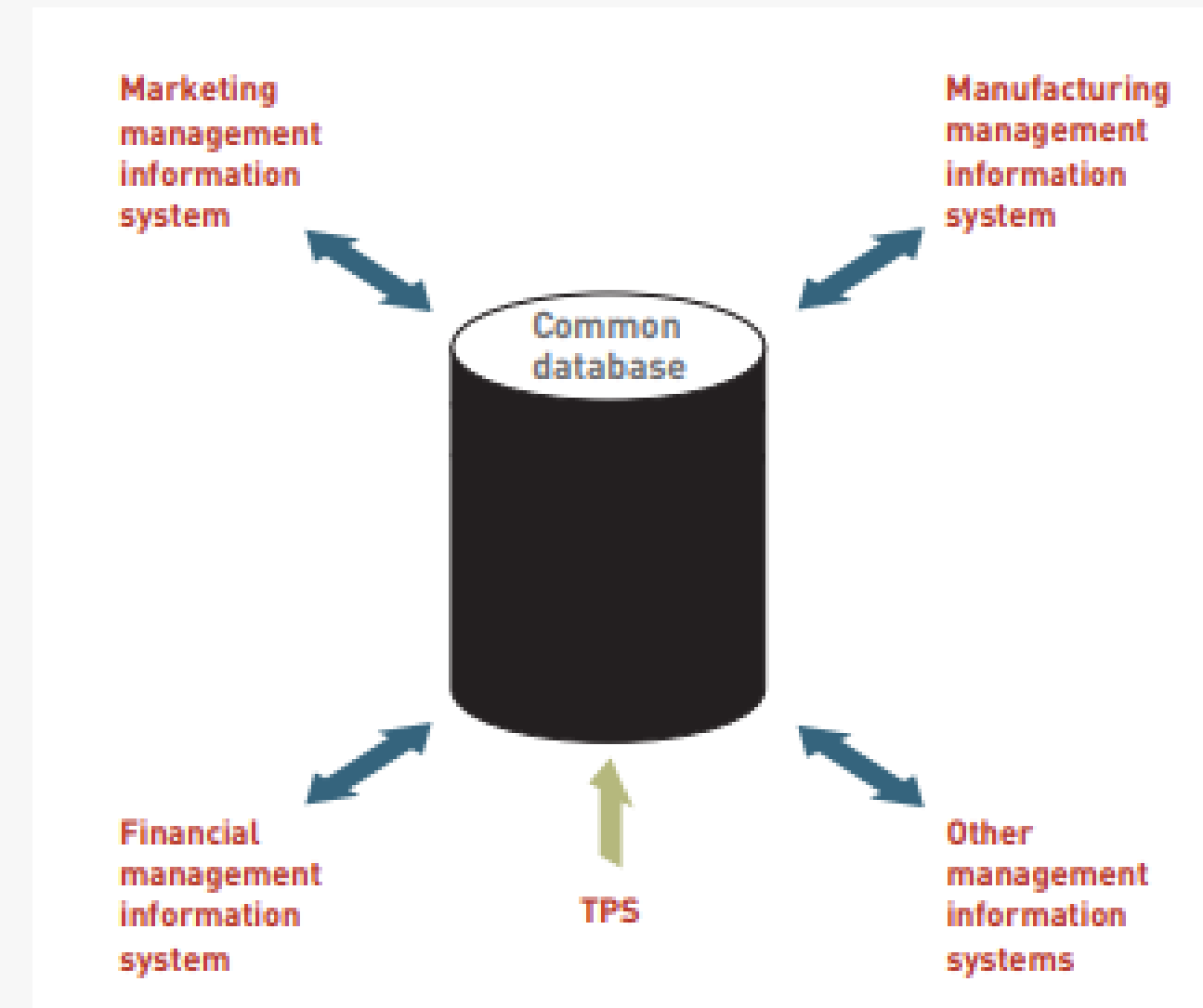

Marketing management information system

Manufacturing management information system

Common database

Financial management information system

TPS

Other management information systems

Management Information System

Functional management information systems draw data from the organization's transaction processing system.

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MANAGEMENT INFORMATION SYSTEMS

- **Reports**
  - Provides standard reports based on data from TPS or ERP, often produced periodically (daily, weekly monthly).
- **Example**
  - Dell used MIS for manufacturing reports, saving S1 million annually while increasing product variety.
- **History**
  - Developed in the 1960s, MIS has since expanded throughout management ranks.

Marketing management information system

Manufacturing management information system

Common database

Financial management information system

TPS

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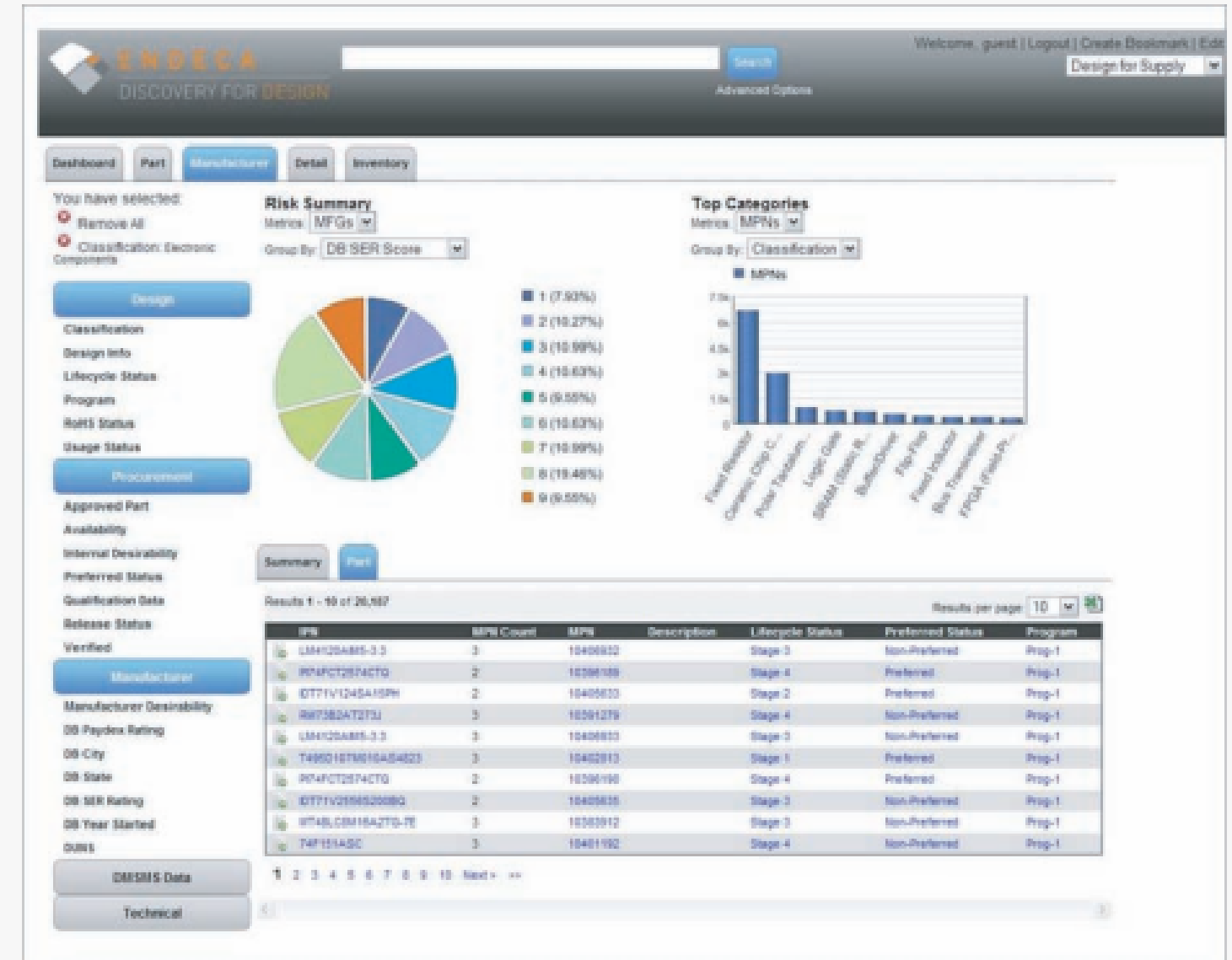# DECISION SUPPORT SYSTEMS

- **DSS Definition**
  - Computer-based system that helps in decision-making by analyzing data
- **Purpose**
  - Supports complex problem-solving and decision-making activities

- **Features**
  - Interactive, flexible, and adaptable
  - Provides simulations, models, and analytical tools for decision support

Endeca provides Discovery for Design, decision support software that helps businesspeople assess risk and analyze performance. The data shown here is for electronic component development.

(Source: Courtesy of Endeca Technologies, Inc.)

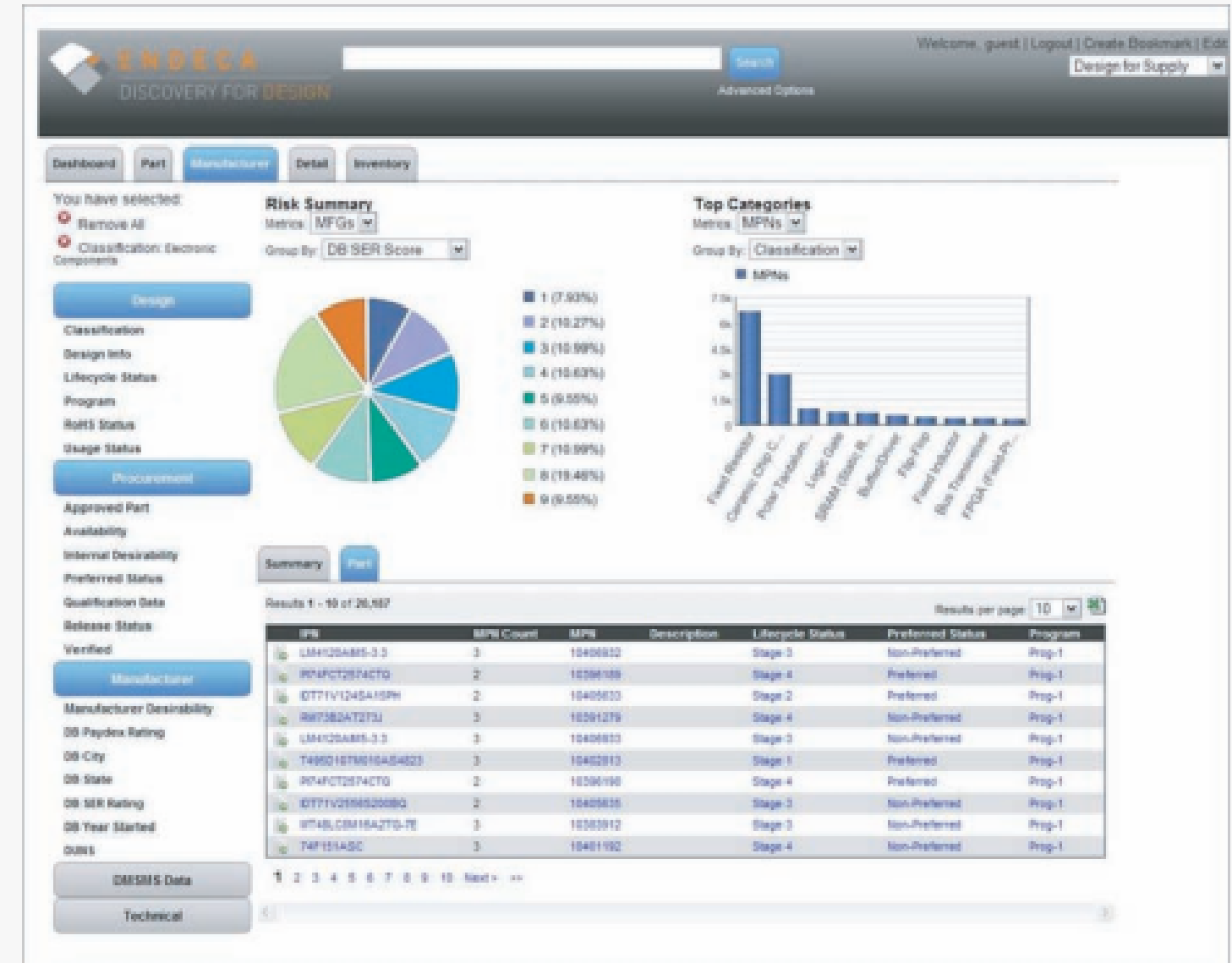# DECISION SUPPORT SYSTEMS

- **Data sources**
  - Uses data from internal systems (e.g., databases) and external sources (e.g., market data)
- **Examples**
  - Used for financial planning, forecasting, and resource allocation
- **Users**
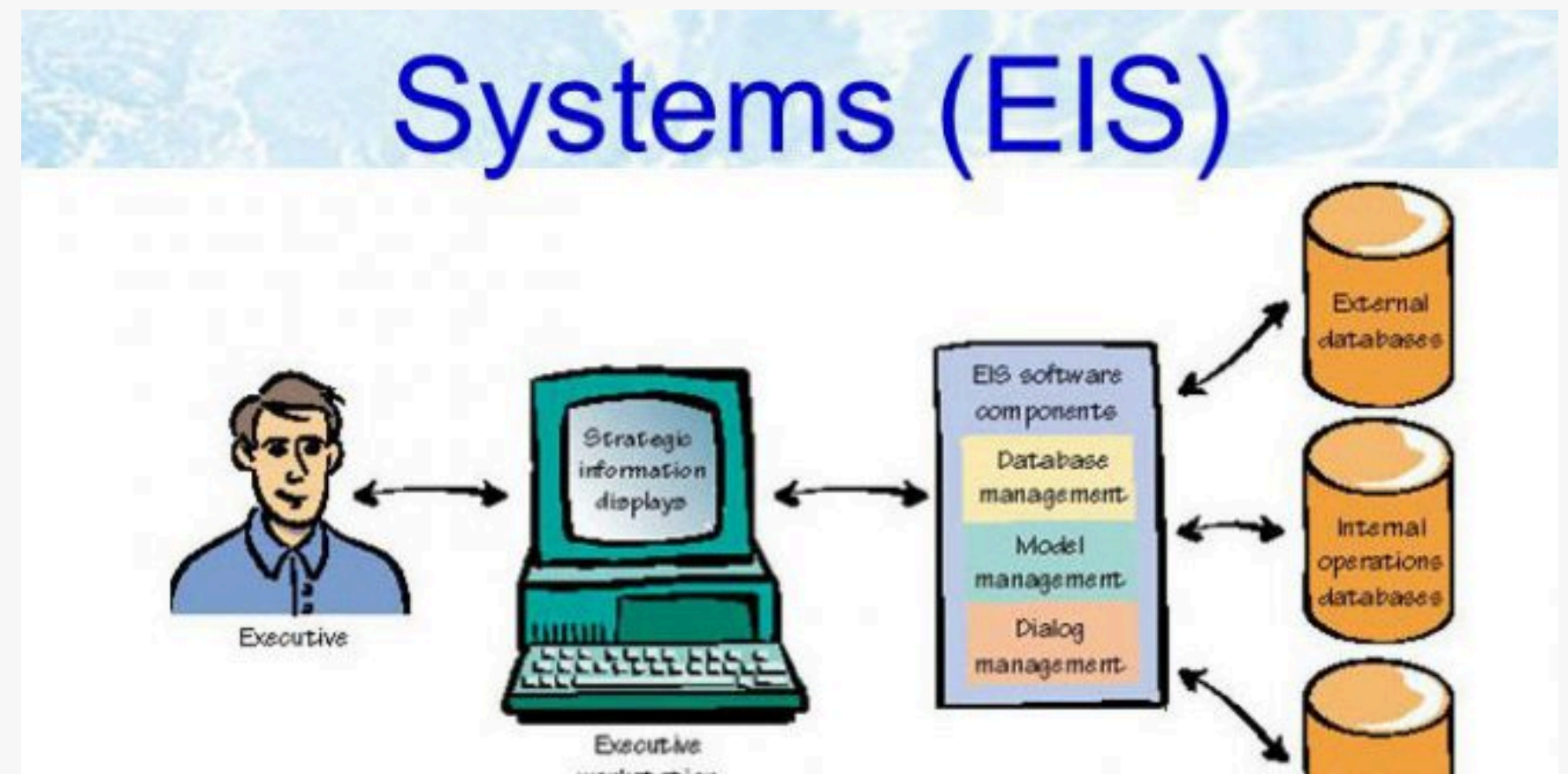 - Typically used by managers and business analyst for non-routine decisions

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EXECUTIVE INFORMATION SYSTEMS

- **Definition:**
  - EIS is a specialized type of MIS designed to meet the information needs of senior executives.
- **Purpose:**
  - Provides easy access to internal and external information for strategic decision-making.
- **Features:**
  - Graphical displays, user-friendly interfaces, and strong reporting capabilities.
  - Helps analyze trends, monitor performance, and identify opportunities.

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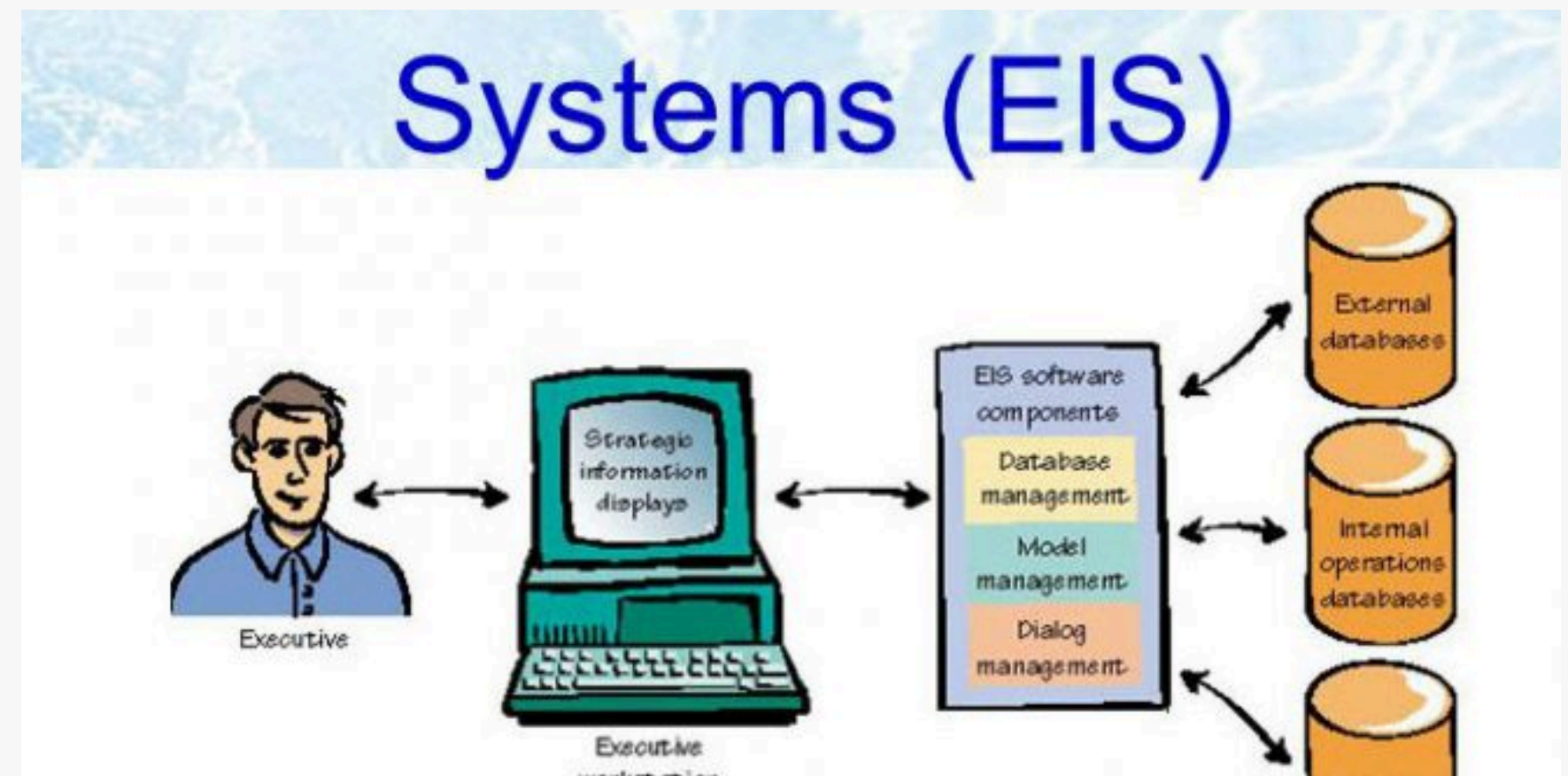
EXECUTIVE INFORMATION SYSTEMS

- **Components:**
  - Hardware: Input devices, CPU, data storage, output devices.
  - Software: Text base, databases, graphics, models.
  - User Interface: Interaction between executives and system for decision-making.
  - Telecommunications: Critical for networked data access.
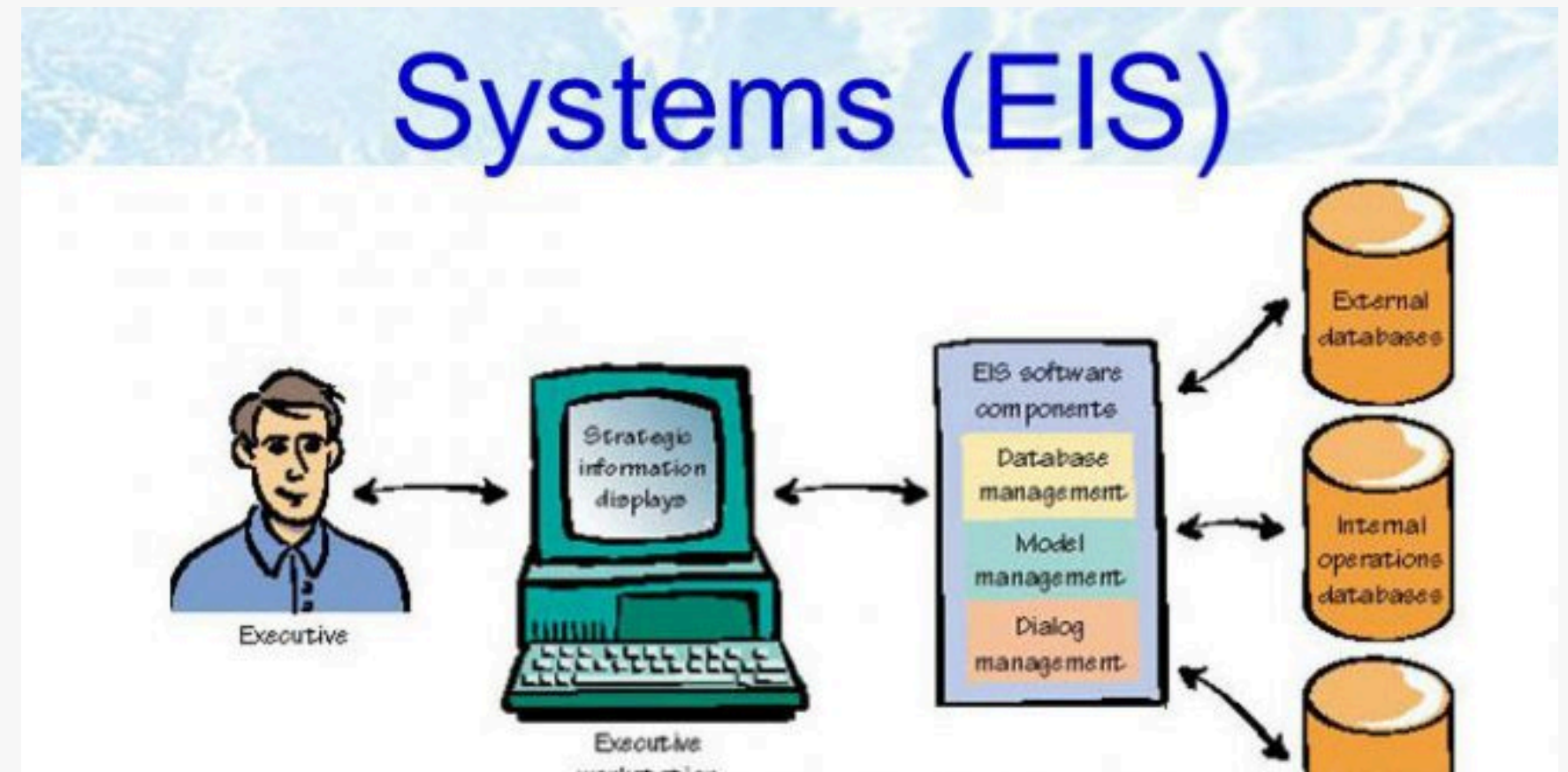- **Applications:**
  - Widely used in manufacturing, marketing, and financial decision-making.
  -

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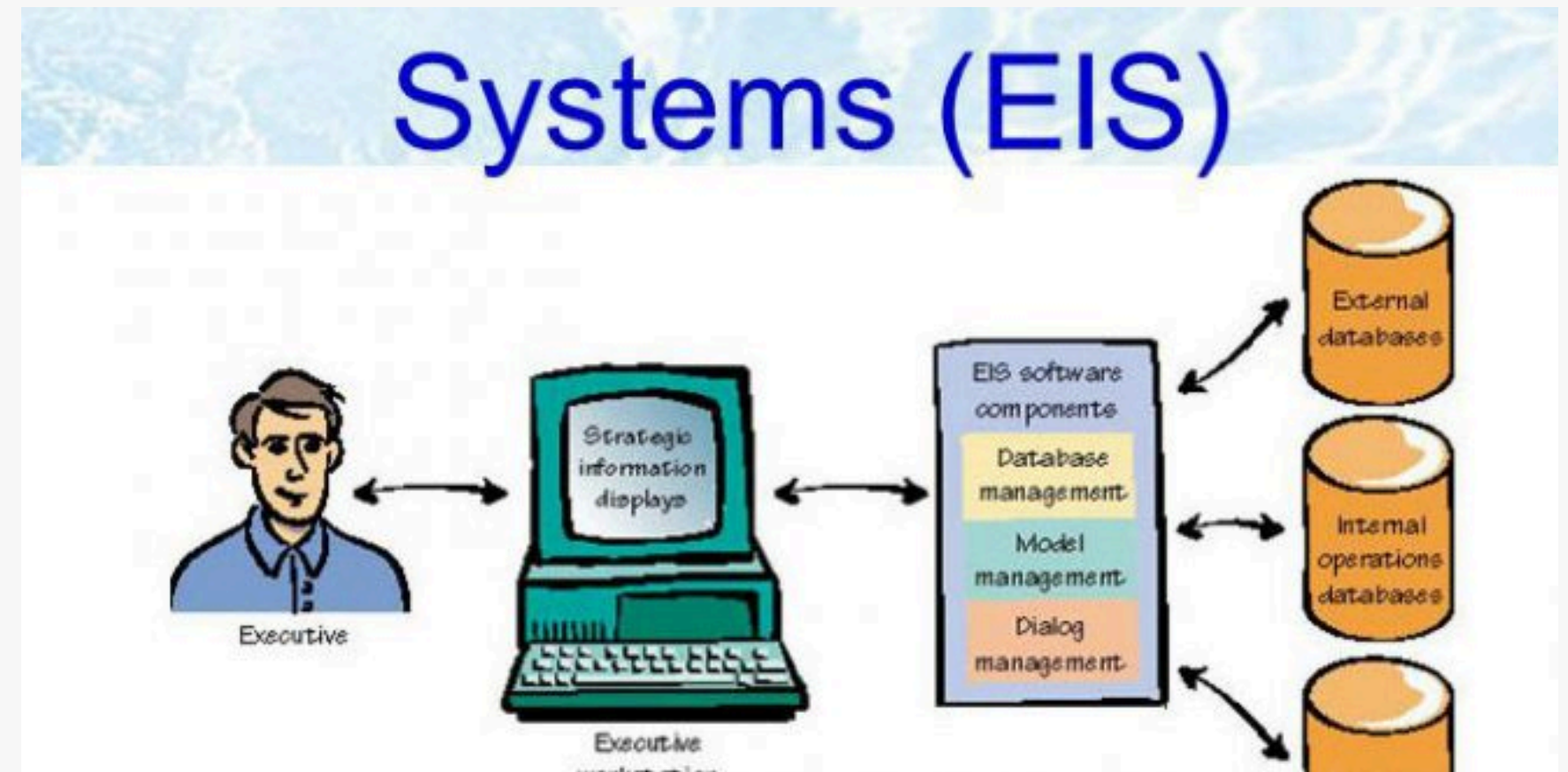
EXECUTIVE INFORMATION SYSTEMS

- **Advantages:**
  - Easy to use, improves information tracking, and filters data for management.
- **Disadvantages:**
  - High implementation costs, information overload, and system dependency.
- **Trends:**
  - Moving away from mainframes to more accessible software platforms.

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Systems (EIS)

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ANALYSIS

As I research on the topic Information System (IS), I learned that such systems are pretty important to mordern business. Information systems are the backbone of efficient and effective operations, wheter in small businesssess or multinational corporation. By understanding the different types of systems and their roles, I realized how much they contribute to an organization's success and long-term growth.

One of the key takeaways from my study is the distinction between data and information. Data consists merely of raw facts, number, symbols, or texts without contexts, but once processed into useful insight, the resulting product is information. The distinction, therefore, underpins the importance of information systems for further processing of raw data into useful knowledge to enable business innovation, operational efficiency, and intelligent decision-making. Data on its own holds little value, but when processed and interpreted by an IS, it becomes crucial for operational decisions, financial forecasting and customer management.

Business information systems consist of hardware, software, databases, people, and procedure components that are integrated for data management. TPS works on a routine, daily operation; DSS and EIS help in solving a complex decision. IS is the organizational nervous system to assist in smoothing out its operations, working out efficiency in resources, and improving customer satisfaction through quick responses to market demands. Analysis of MIS indicates that these systems help to improve operational efficiency. For example, Dell puts MIS manufacturing reports to use to better costs and offer a wide range of products. This then implies that the use of MIS is of great help in coming up with good and informed management decisions. DSS and EIS provide analytical tools and graphics that aid managers and executives in making strategic decisions.

In conclusion, A contemporary firm cannot thrive without information systems. They give efficiency of operation and competitiveness in the ever-changing environment. Basically, information systems enable the firm to conduct its functions through transactional ways and strategic plans by utilizing data for informed decisions, as well as adapting to changes in the market. In this regard, I understand that my pursuit in studying IS equips me with the necessary skills to adapt to a data-driven business future. Leveraging IS is a critical success factor in today's digital economy.

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Azad MM, Amin MB, Alauddin M. Executive information system. International Journal of Computer Science and Network Security. 2012; 12(5): 106-110.

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