INFORMATION SYSTEMS

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Concepts

- **Data**
  - All concrete elements used as a basis for measurement, calculation, discussion or decision.

- **Information**
  - Processed data
  - Something that contributes to change of opinion about the state of the real world
  - Something that contributes to reducing uncertainty of the state of a system
  - Information = Data + Data Model

Concepts

- Knowledge

  - Information embedded in an agent (Human or program)

- System

  - Set of elements

  - Dynamically related

  - Forming an activity

  - To achieve a goal

  - Operating on data/energy/matter

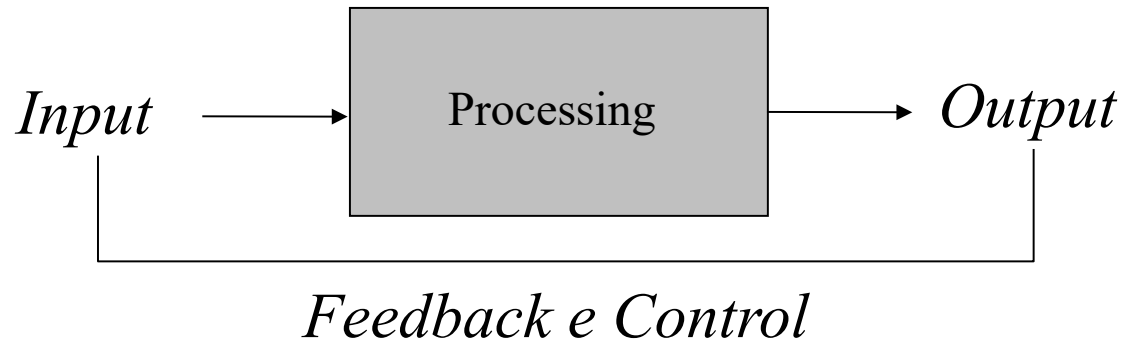 - To provide information/energy/matter

System

Input $\rightarrow$ | Processing | $\rightarrow$ Output
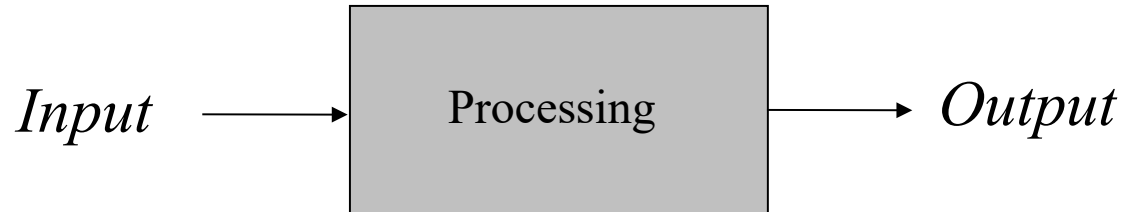
A system has the following basic components or functionalities:

- Input

- Processing

- Output

System

Feedback e Control

A cybernetic system also has the following components or functionalities:

- Feedback (Feedback)

- Control

System

- System hierarchy

- Symbolic system

- Socio-cultural system

- Man

- Animals

- Inferior organisms - e.g. plants

- Open systems - e.g. cell

- Simple cyber systems - e.g. thermostat

- Simple dynamic systems (clockworks) - e.g.watchmaking, levers, pulleys

- Static systems (frameworks) - e.g. solar system

System

- System hierarchy

- Symbolic system

- Socio-cultural system   **Open Systems**

- Man

- Animals

- Inferior organisms - e.g. plants

- Open systems - e.g. cell

- Simple cyber systems - e.g. thermostat   **Closed Systems**

- Simple dynamic systems (clockworks) - e.g.watchmaking, levers, pulleys

- Static systems (frameworks) - e.g. solar system

Information Systems

Field of knowledge

- It concerns the purposes, design, use and impacts of information systems in the organization.

- Inter-disciplinary field

- computer science (from a technical perspective) to management (from an organizational perspective)

- It involves aspects of economics, psychology and sociology, statistics and operational research.

Information Systems

Set of interrelated components that collect, process, store, and distribute information to users in an organization

Information Systems

Computerized Information Systems vs. Non-Computerised Information Systems

The set of software systems that generate the information

Information Systems

It is the set of programs that manage information.
Information Technologies

Types of Systems

- TPS (Tansaction Processing systems)
  - Billing, processing salaries, ...
- MIS (Management Information Systems)
  - Information Systems for Management
  - Standardized reporting systems
- Decision Support Systems (DSS)
  - Non-standard reporting systems
- EIS (Executive Information Systems)

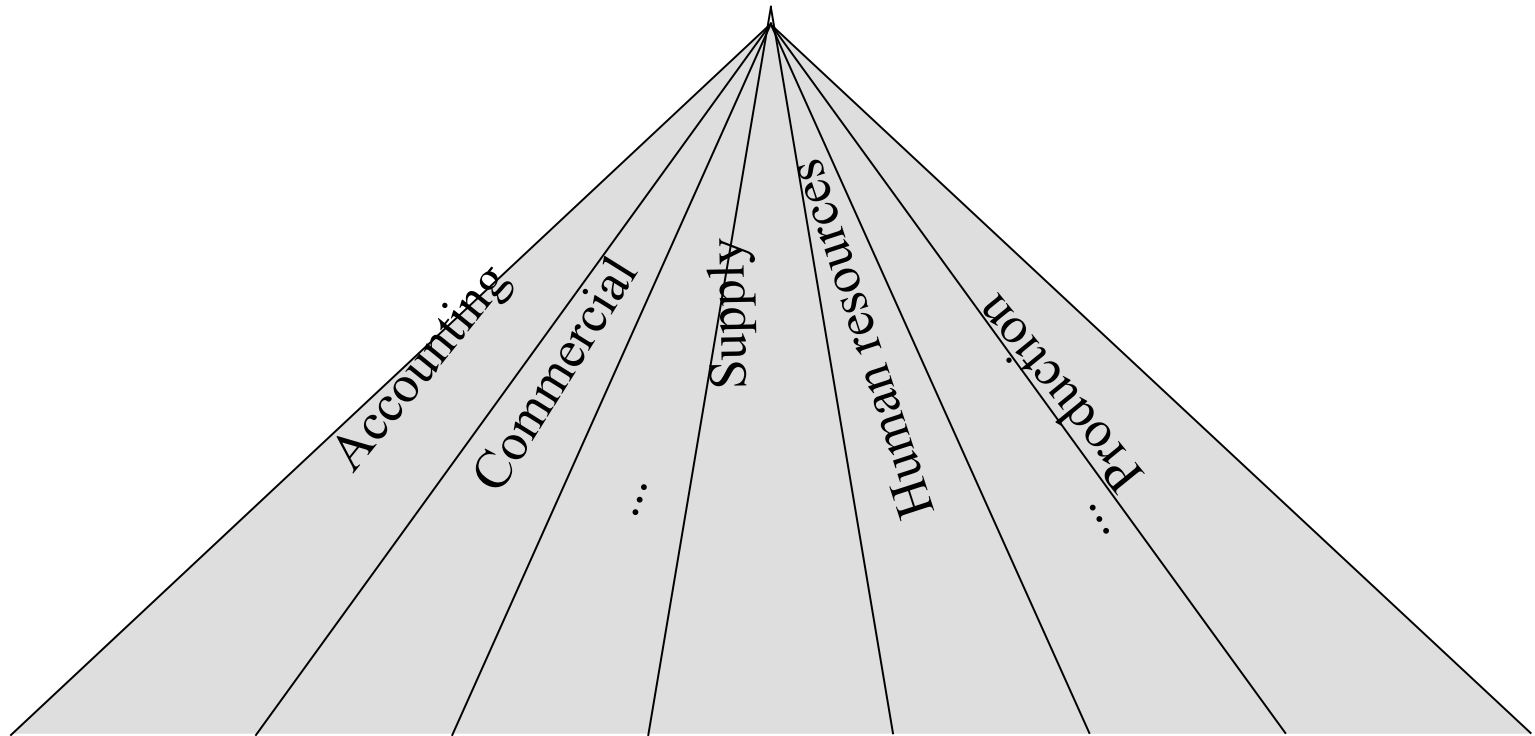# Information Systems and Organizational Decision Levels
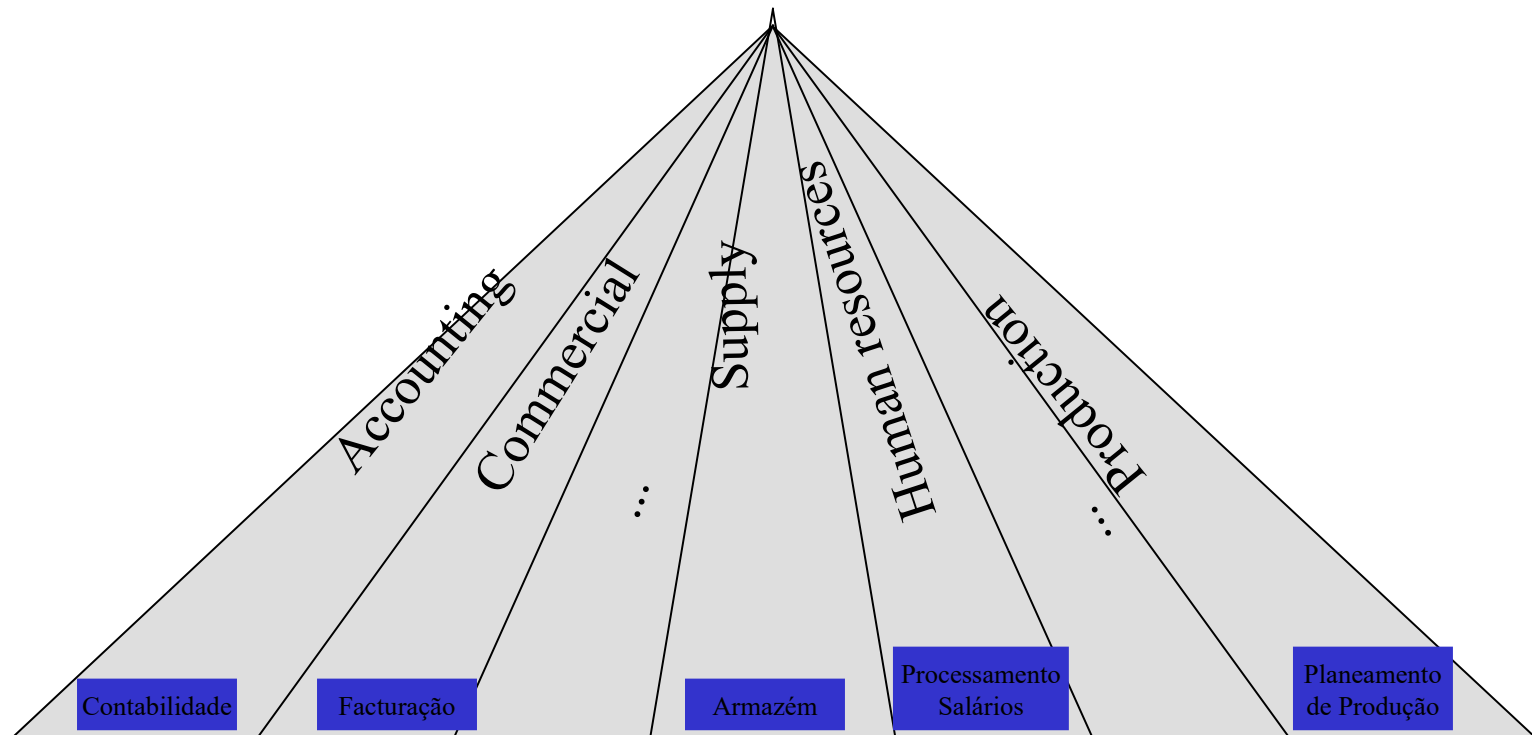
Strategic - EIS

Tactical - MIS, DSS

Operational - TPS
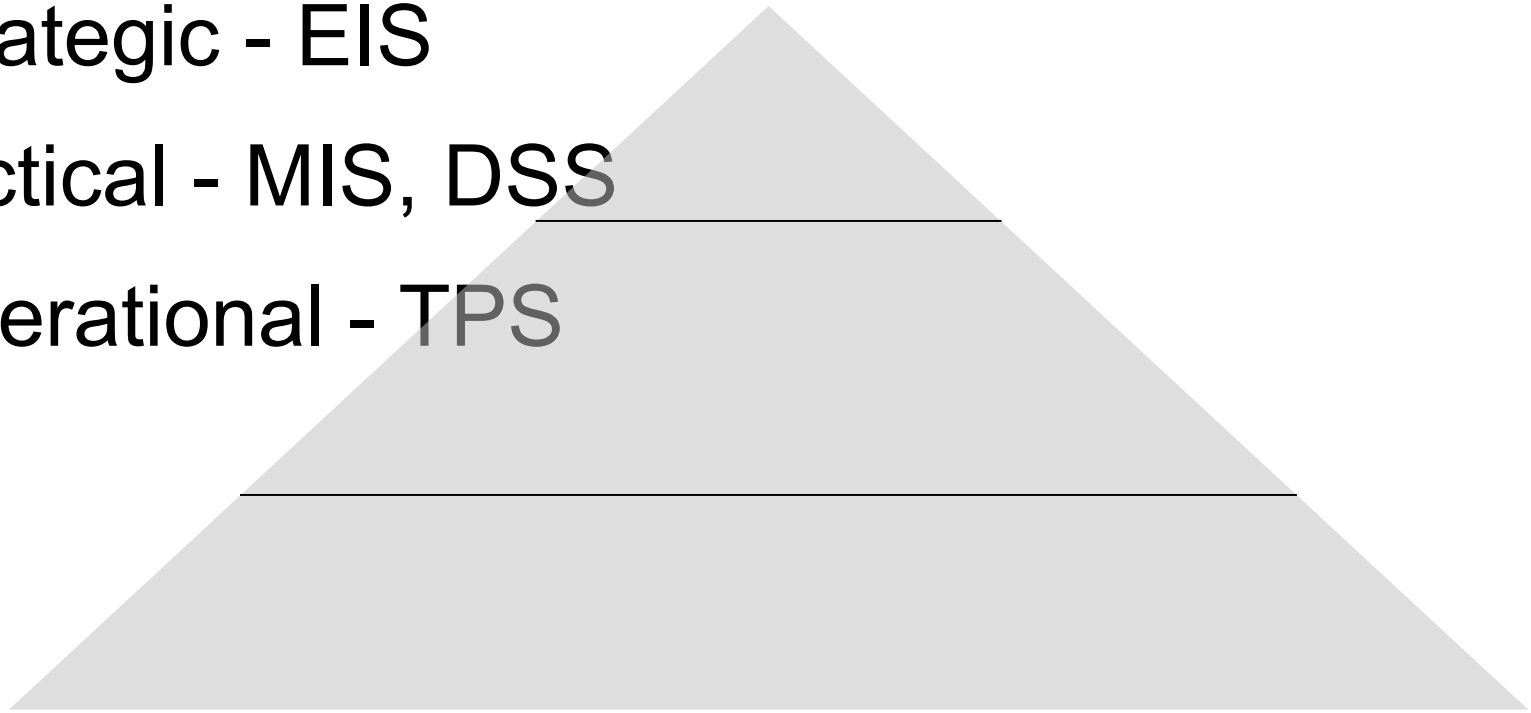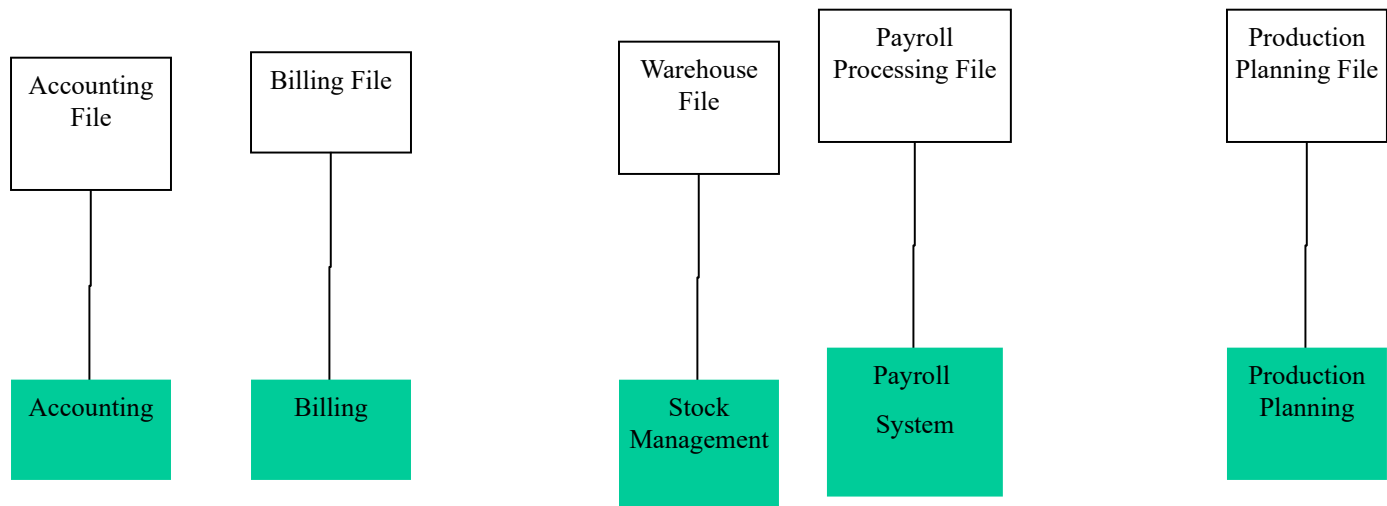
Information Systems and Functional Areas
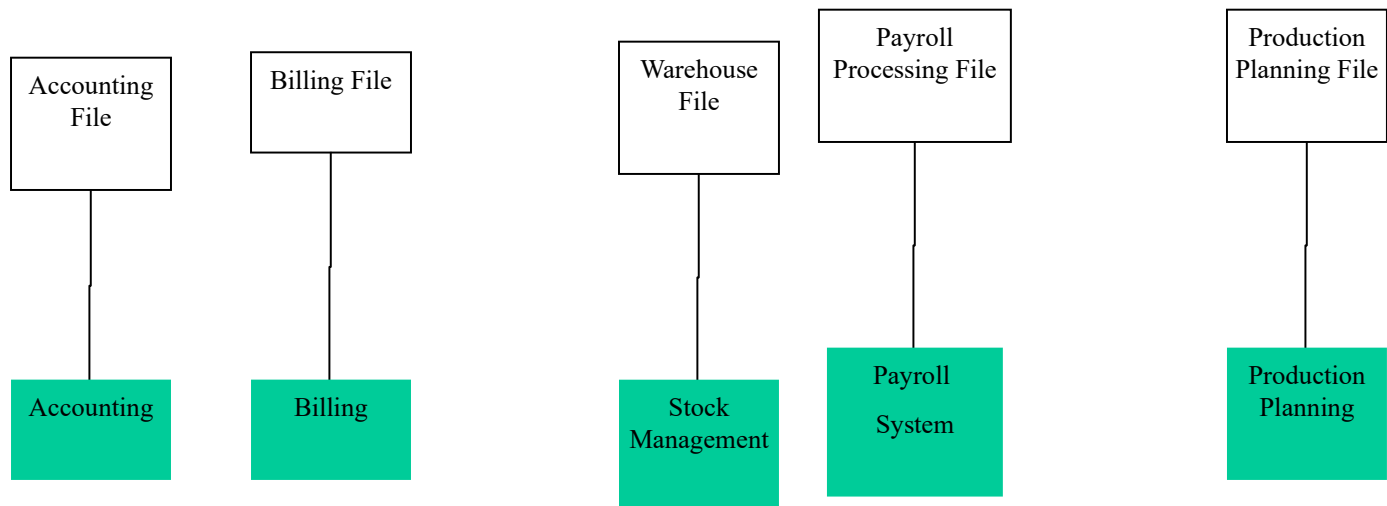
Information Systems and Functional Areas

Information Systems and Functional Areas
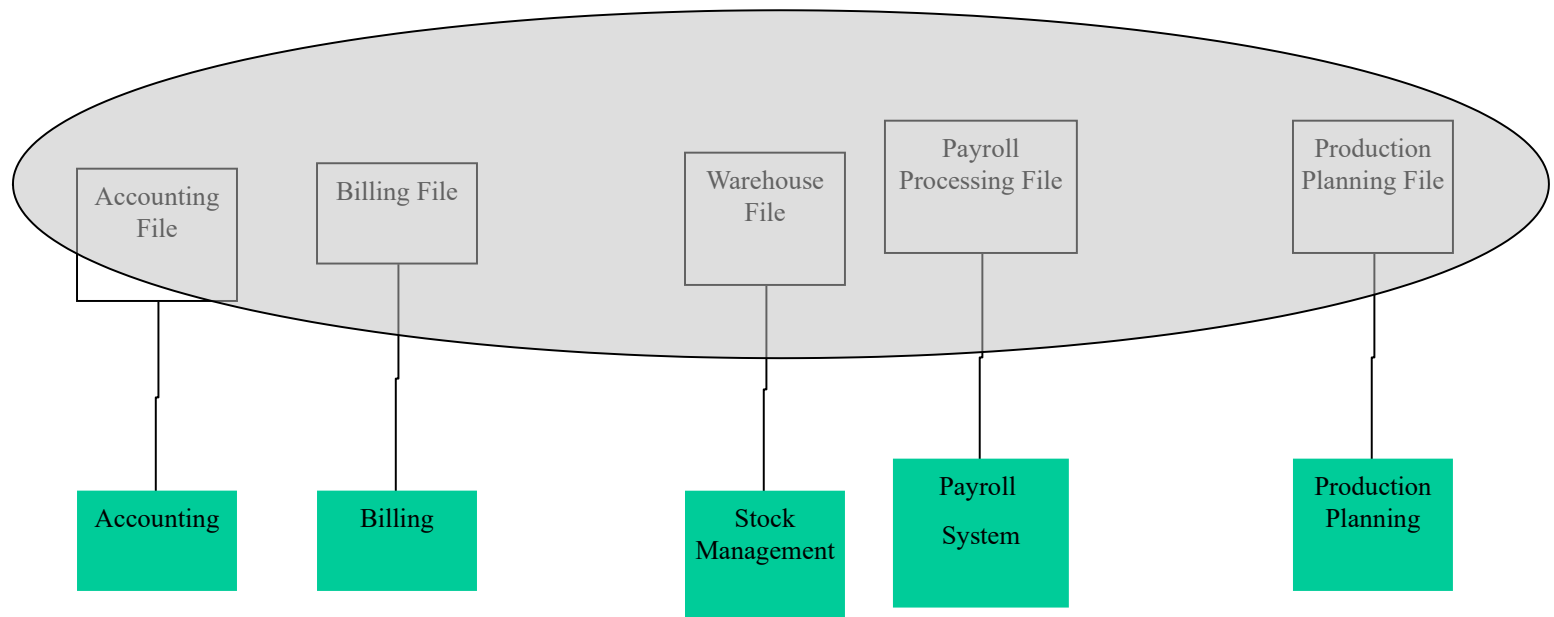
Portfolio of independent SW applications

| Accounting File | Billing File | | Warehouse File | Payroll Processing File | | Production Planning File |

| Accounting | Billing | | Stock Management | Payroll System | | Production Planning |

Information Systems and Functional Areas

Portfolio of linked SW applications

Accounting File	Billing File		Warehouse File	Payroll Processing File		Production Planning File

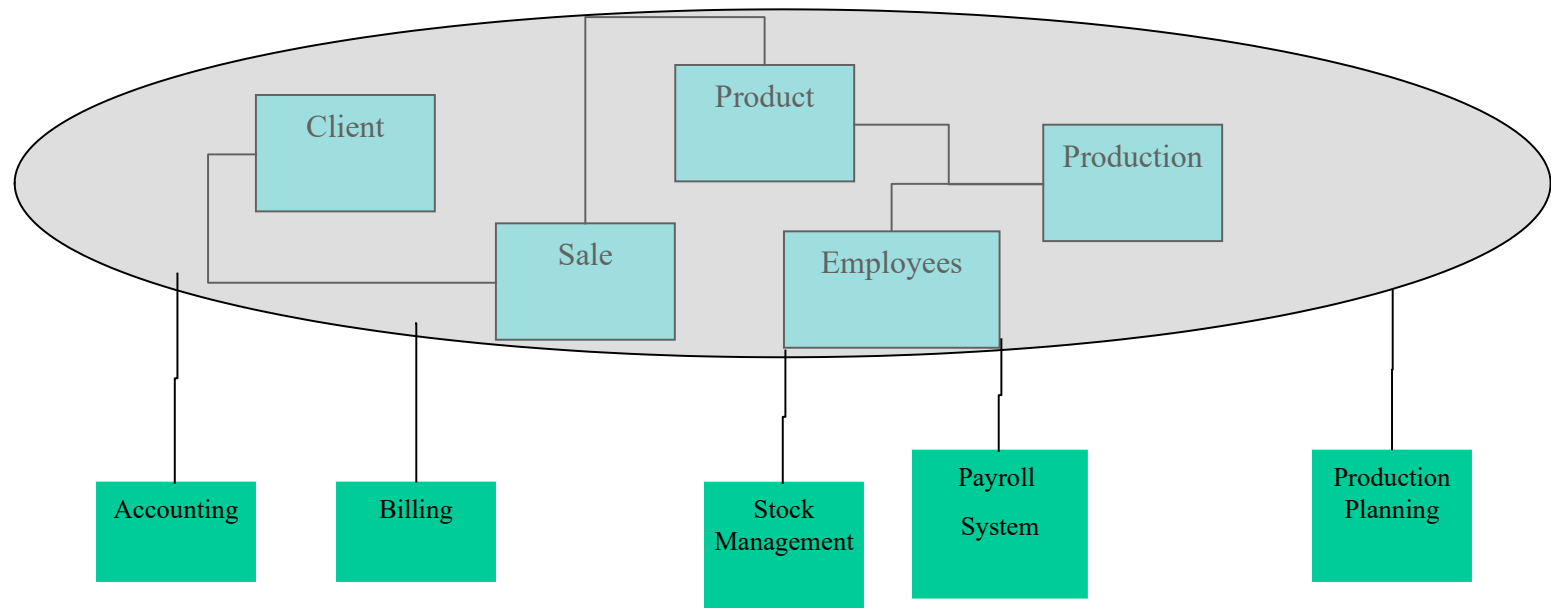| Accounting	Billing		Stock Management	Payroll System		Production Planning

Information Systems and Functional Areas

Portfolio of linked SW applications

Information Systems and Functional Areas

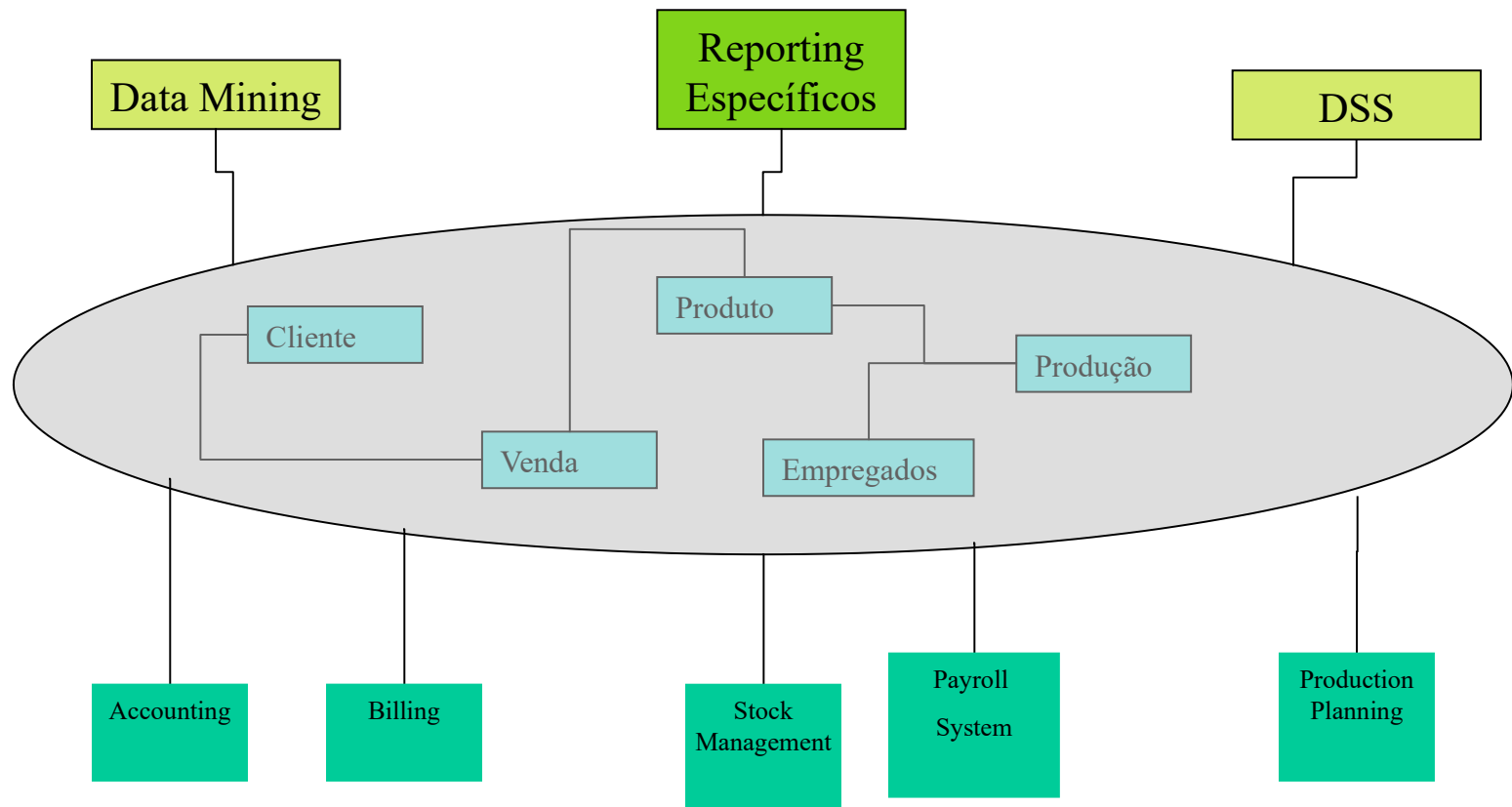Data as core

Information Systems and Databases

Database?

Organized set of data (according to a data model) existing in a computer system

Available to all users or processing in the organization.

Access and updating is done through specific software (DBMS).
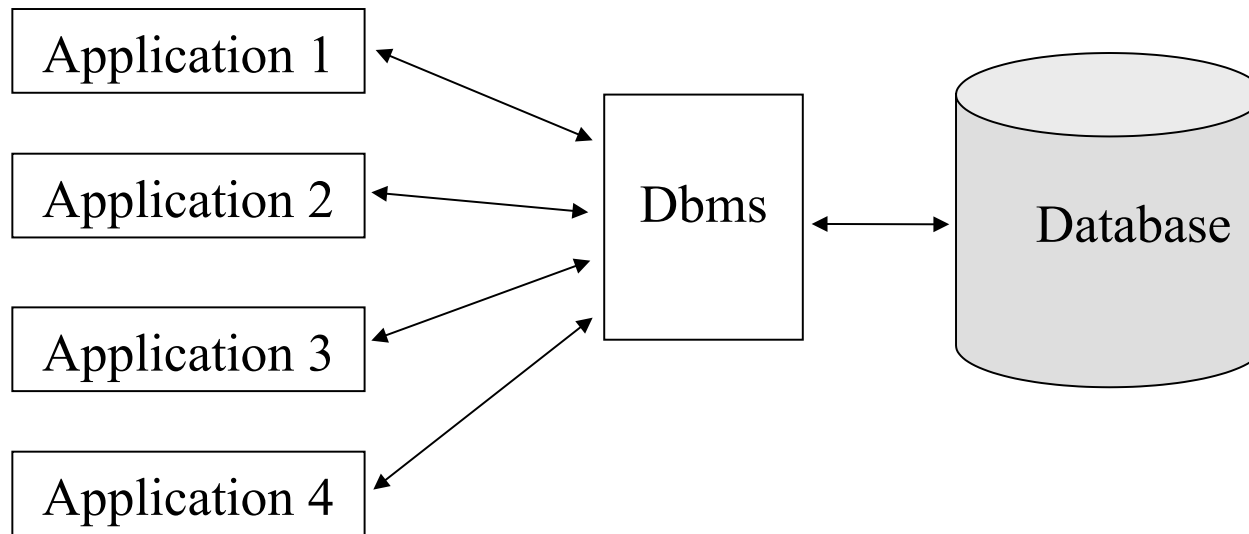
Information Systems and Databases

DBMS

Database Management System (DBMS):

- Software used to manage Databases

- Create database;

- Modify Database;

- Delete databases

- Enter data into the Database

- Delete data from the database

DBMS and Applications

DBMS as interface between applications and databases

DBMS

- Functional requirements

- Security

- Integrity (only includes valid data regarding reality)

- Control of Concurrence

- Locking

- Labelling

- Optimistic

- Failure Recovery and Tolerance

- Backup

- Transaction logging

DBMS and IS

An Information System (IS) is a computer-supported system that provides information to users of an organization. Includes:

Software (applications)

DBMS

Databases

Development of Information Systems

- Data planning

- Requirements specification

- Conceptual Design

- Logical Design

- Physical Design and Implementation

Management of Organizational Information Systems

Lifecycle of organizational information systems:

Proposal - revolutionary

Running - conqueror

System maturity - wise

System decline - liquidator

IS Development

Development Life Cycle - set of phases through which the development of a system passes.

According to a traditional approach (Waterfall or Waterfall) involves several phases (Enger, 1981):
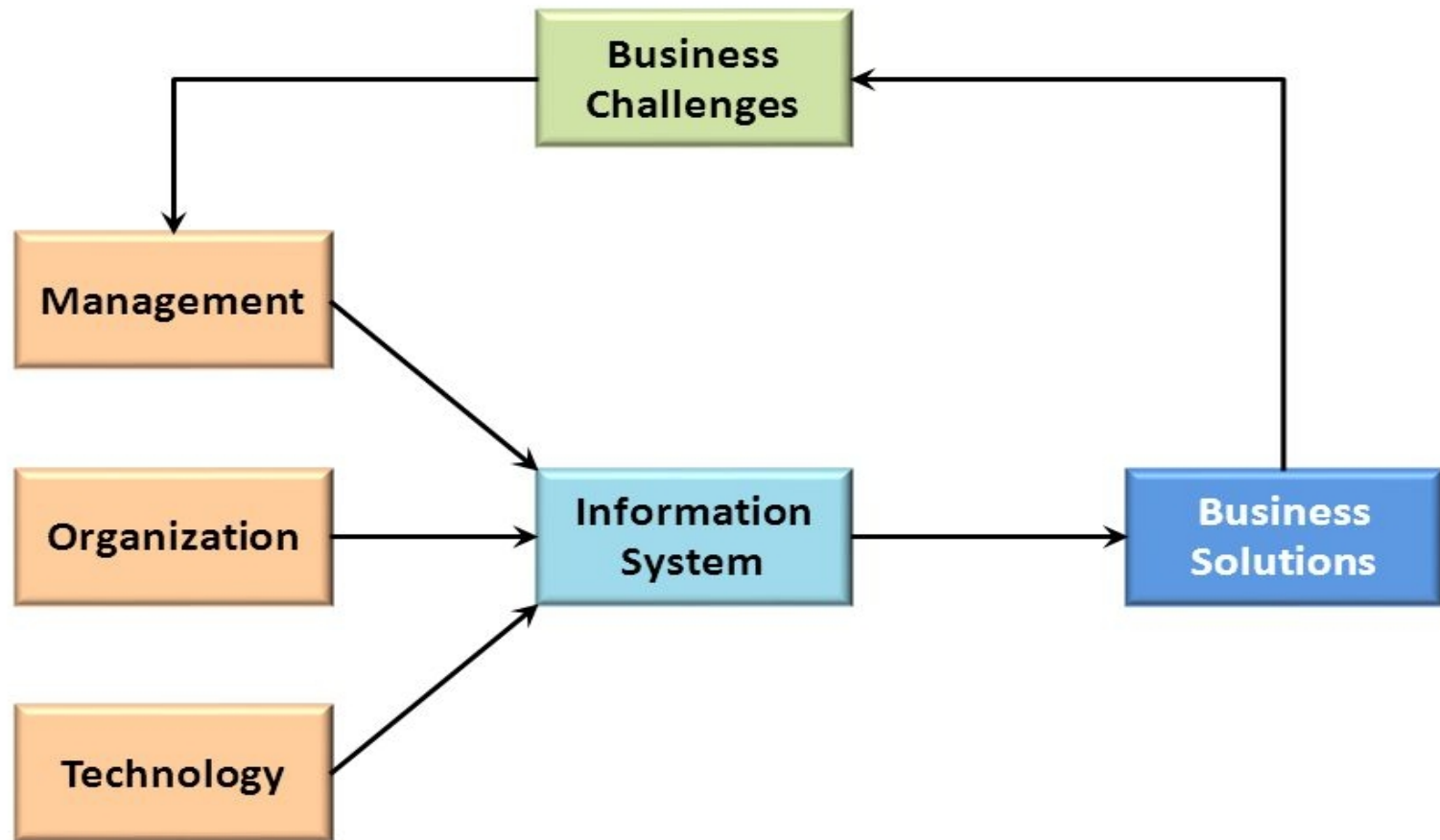
- Requirements analysis;
- Logical Design;
- Physical Drawing;
- Design of programs;
- Implementation of the System;
- Operating System.

IS Development

This process can be much more complex, involving:

- Design of prototypes;
- Agile
- Iterative development;
- Use of CASE (Computer Aided Software Engineering).
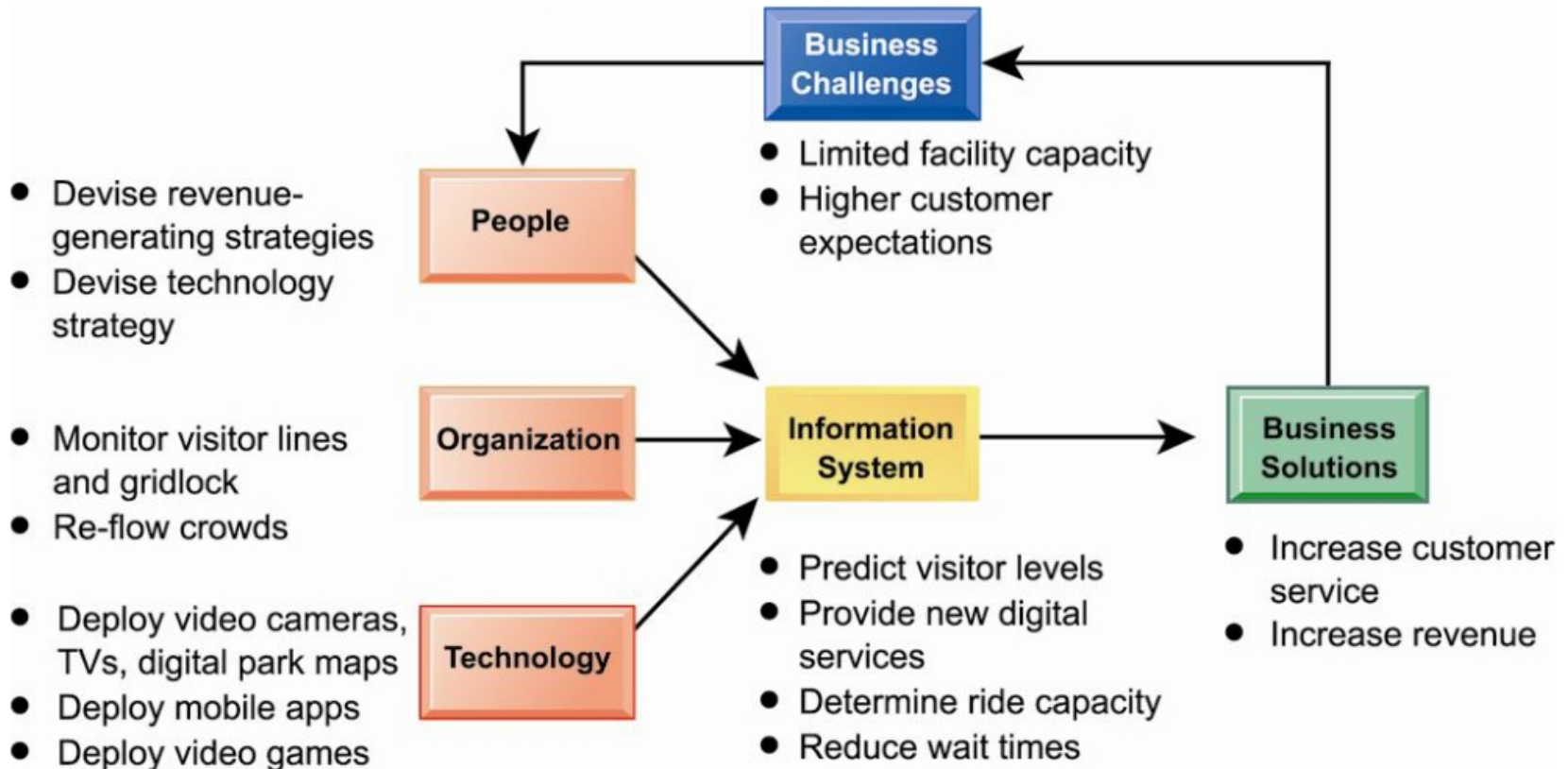- User engagement
- Emphasis on maintenance

MIS

Source: Kenneth C. Laudon & Jane P. Laudon (2014), Management Information Systems: Managing the Digital Firm, Thirteenth Edition, Pearson.

8

MIS

Bibliography

- Ludon, K. & Laudon, J. *Management Information Systems* 16th Edition, 2020.

- Sprague, R. & McNurlin, B, *Information Systems Management in Practice*, Third Edition, Prentice-Hall, 1993.

- *Oxford Dictionary of Computing*, Oxford University Press.