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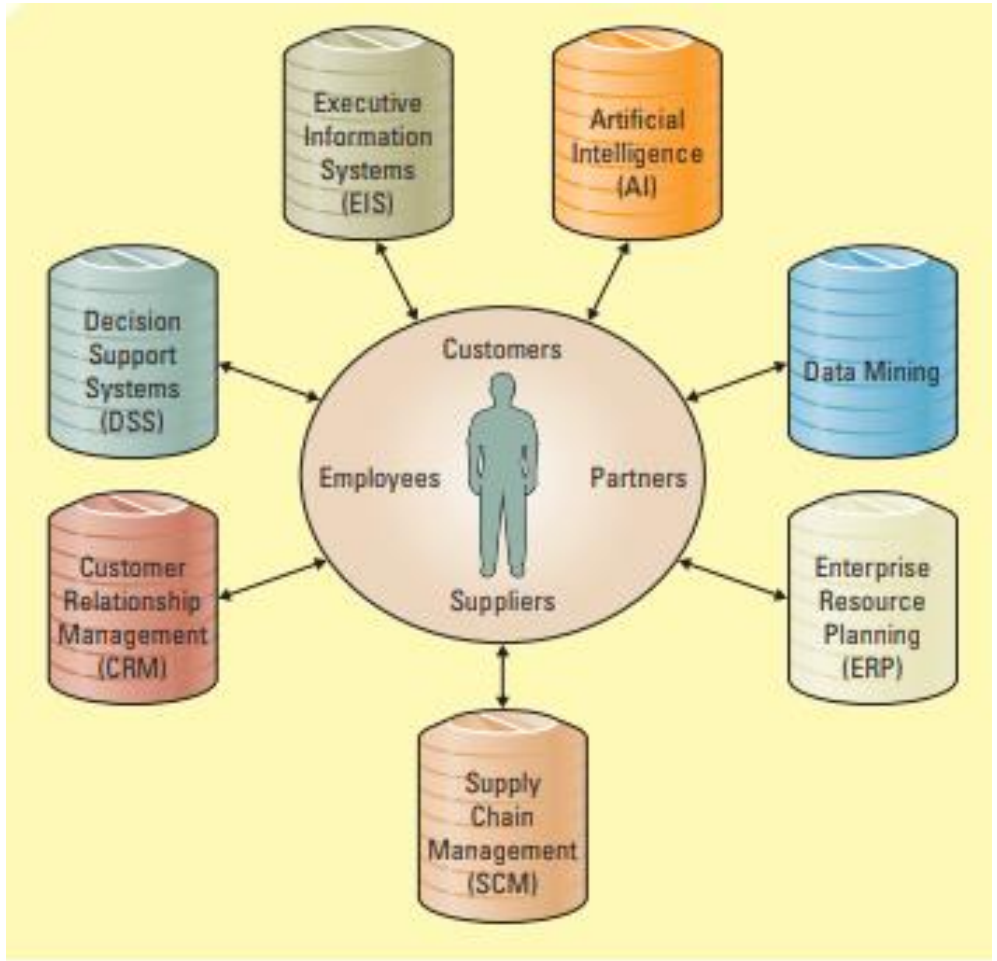

EPITA Bachelor of Science

Principles and Architecture of Information Systems

Chapter #7

Major Information Systems

Olivier BERTHET

Principles & Architecture

Structure

- **Chapter 1 : Introduction and Organisations**
- **Chapter 2 : Hardware**
- **Chapter 3 : Software**
- **Chapter 4 : Database Systems**
- **Chapter 5 : Network**
- **Chapter 6 : Internet and E-Commerce**
- **Chapter 7 : Major Information Systems**
- **Chapter 8 : Systems Development**
- **Chapter 9 : Security, Privacy and Ethical issues**

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Introduction

- **An organization must have information systems that support routine, day-to-day activities and that help a company add value to its products and services**
- **A company that implements an enterprise resource planning system is creating a highly integrated set of systems, which can lead to many business benefits**

Why Learn About the Major Information Systems ?

- **Effective use of enterprise systems will be essential to raise the productivity of your firm, improve customer service, and enable better decision making**

An Overview of Transaction Processing Systems

- **Transaction processing systems (TPSs):**
  - **Capture and process detailed data necessary to update records about fundamental business operations**
  - **Include order entry, inventory control, payroll, accounts payable, accounts receivable, general ledger, etc.**
  - **Provide valuable input to Management information systems, decision support systems, and knowledge management systems**

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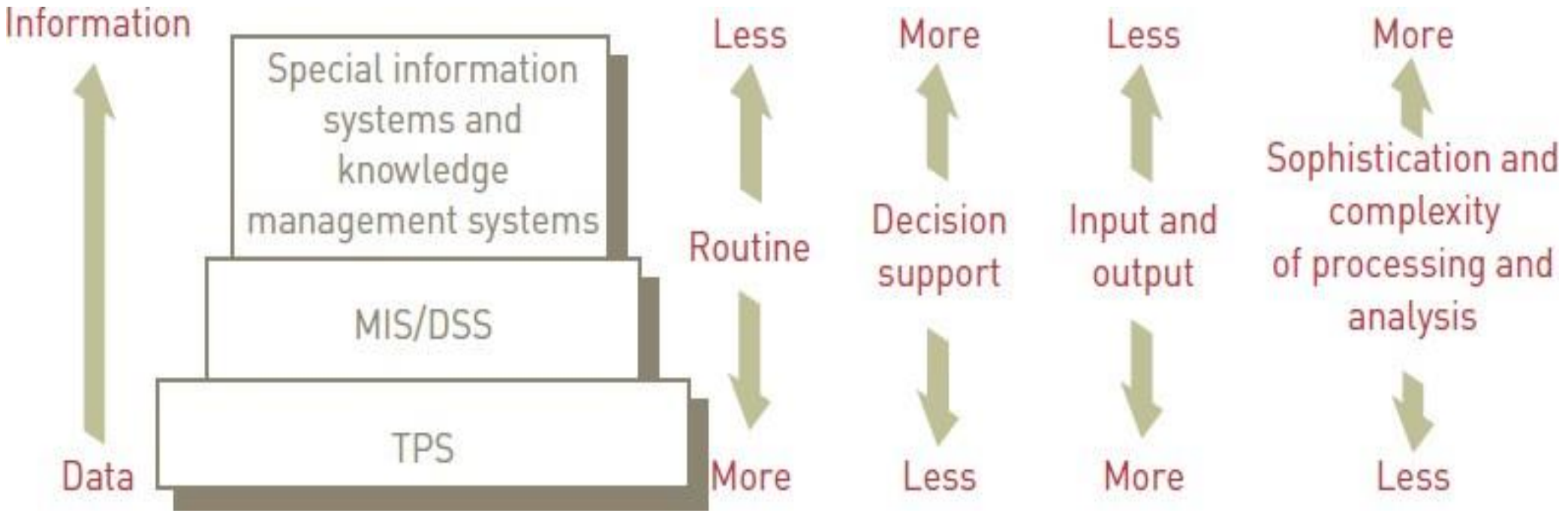
An Overview of Transaction Processing Systems



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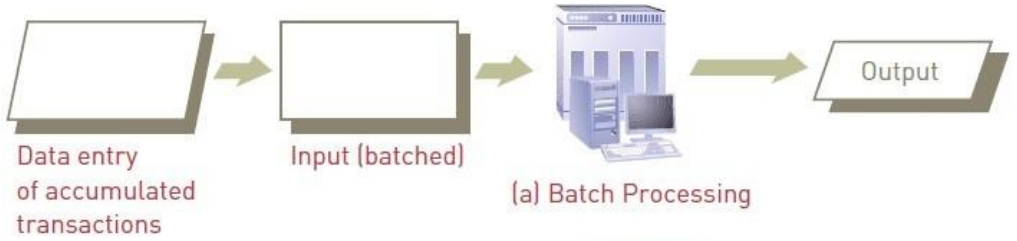
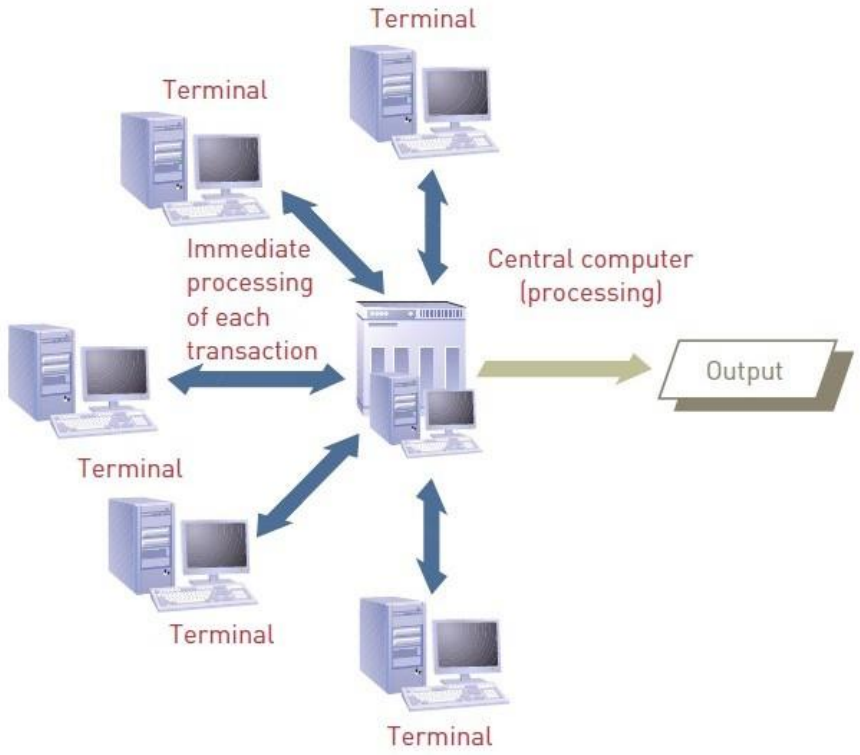
Batch versus Online Transaction processing





(b) Online Transaction Processing

Traditional Transaction Processing Methods and Objectives

- **Batch processing system:**
  - Data processing in which business transactions are:
  - Accumulated over a period of time
  - Prepared for processing as a single unit or batch
- **Online transaction processing (OLTP):**
  - Data processing in which each transaction is processed immediately

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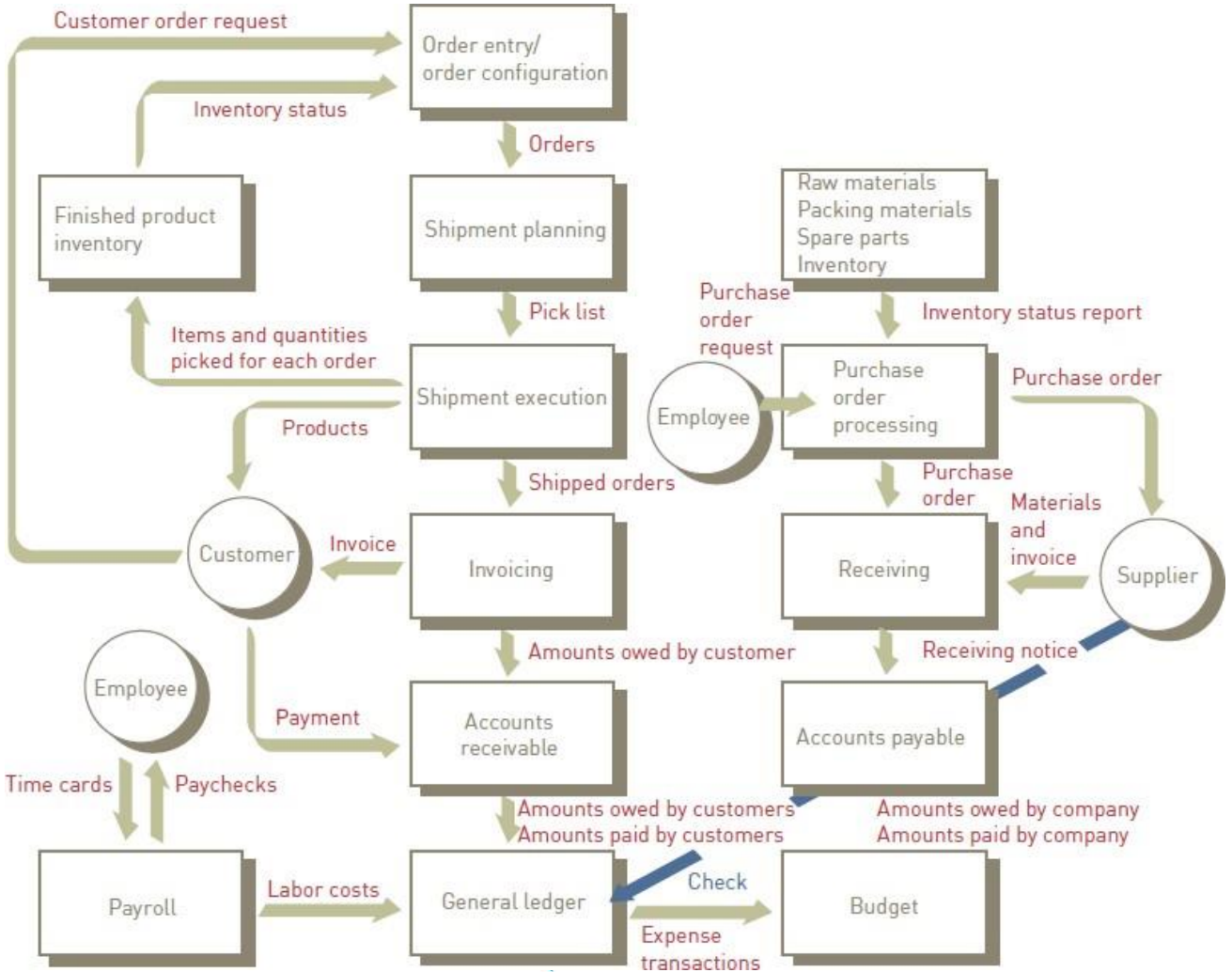
Batch versus Online Transaction processing



Traditional Transaction Processing Methods and Objectives

- **Organizations expect their TPSs to:**
  - Capture, process, and update databases of business data
  - Ensure that the data is processed accurately and completely
  - Avoid processing fraudulent transactions
  - Produce timely user responses and reports
  - Reduce clerical and other labor requirements
  - Help improve customer service
- **A TPS typically includes the following types of systems:**
  - Order processing systems
  - Accounting systems
  - Purchasing systems

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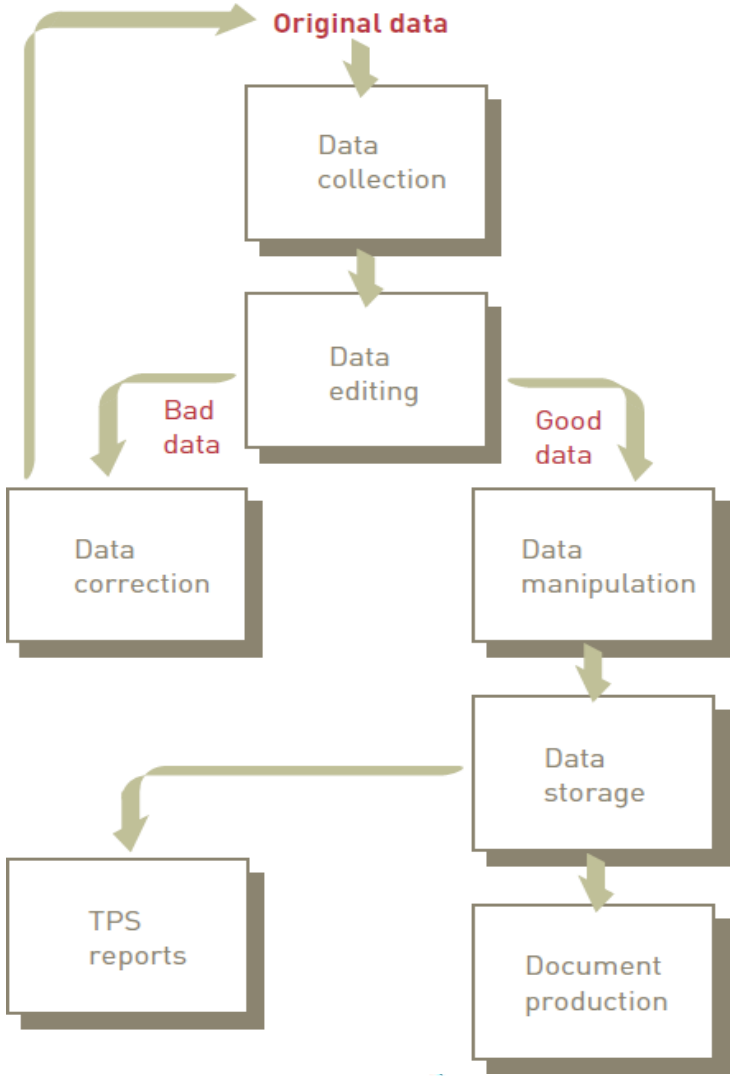
Data processing activities



Data Collection

- **Capturing and gathering all data necessary to complete the processing of transactions**
- **Data collection can be:**
  - **Manual**
  - **Automated via special input devices**
- **Data should be:**
  - **Collected at source**
  - **Recorded accurately, in a timely fashion**

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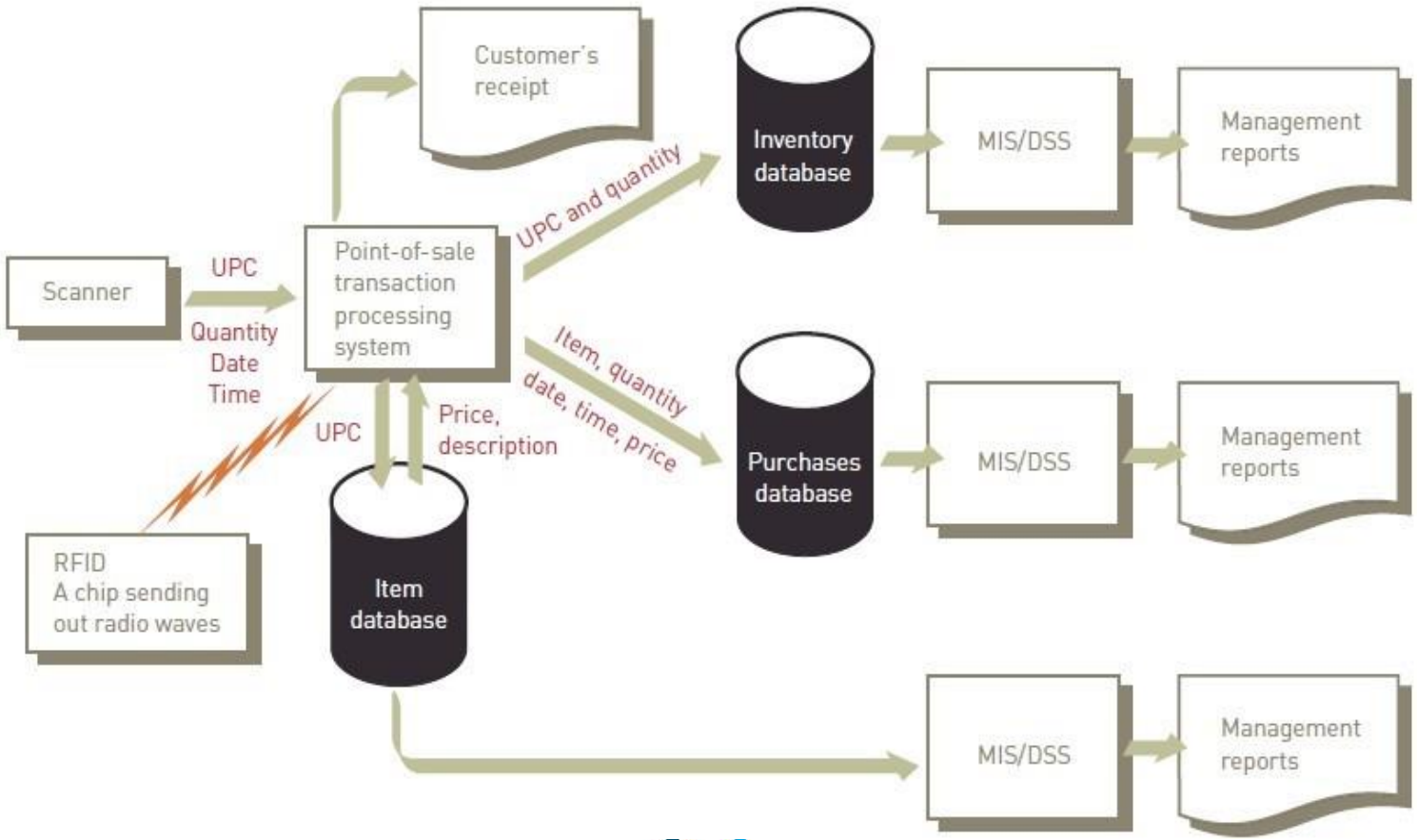
Point-of-Sale Transaction processing systems



Data Editing

- **Checking data for validity and completeness to detect any problems**
- **Examples:**
  - **Quantity and cost data must be numeric**
  - **Names must be alphabetic**

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Data Correction

- **Reentering data that was not typed or scanned properly**
- **Error messages must specify the problem so proper corrections can be made**

Data Manipulation

- **Performing calculations and other data transformations related to business transactions**
- **Can include:**
  - **Classifying data**
  - **Sorting data into categories**
  - **Performing calculations**
  - **Summarizing results**
  - **Storing data in the organization's database for further processing**

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Data Storage

- **Updating one or more databases with new transactions**
- **After being updated, this data can be further processed and manipulated by other systems**

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Major Information Systems

- **MES : Manufacturing Execution System**
- **ERP : Enterprise Resource Planning**
- **SCM : Supply Chain Management**
- **CRM : Customer relationship Management**
- **HRM : Human Resources Management**
- **DSS : Decision Support System**
- **BI : Business Intelligence**
- **KM : Knowledge Management**

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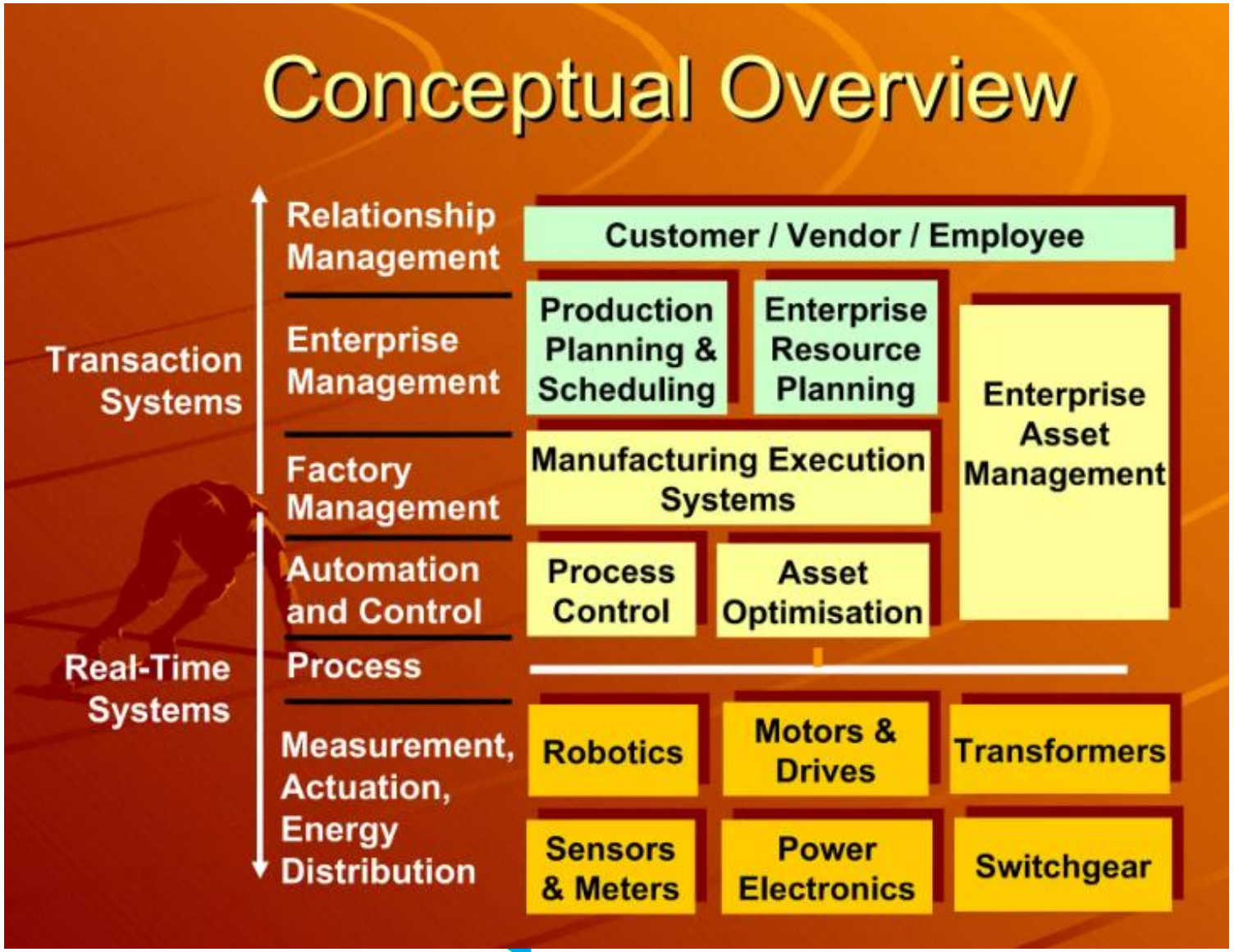

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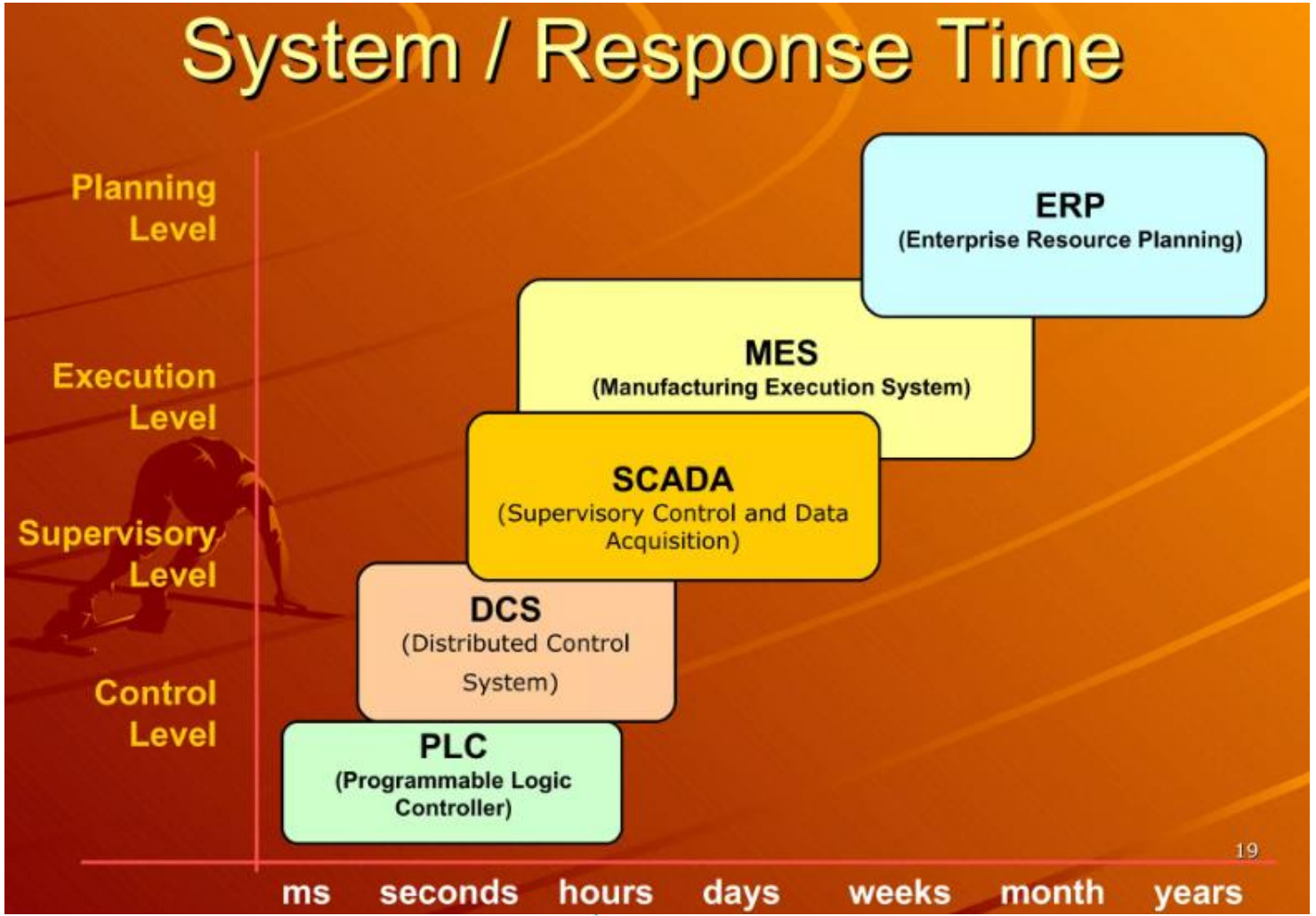
PLC, DCS, MES and ERP



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MES

Principles & Architecture

MES

- **MES have evolved to fill the communication gap between the manufacturing planning system (MRP,ERP) and the control systems to run equipment on the plant floor**
- **Coordinate functions on the shop floor to optimize the plant activities**
- **Provide visibility and flexibility to effectively manage supply chain**

MES and ERP

- **ERP systems handle financial functions, customer orders and send production requests to the factory floor (shop-floor)**
- **MES provide overall control and management to the factory floor and provide updated information to the ERP systems**
- **The simplest model of CIM has MES as the middle ground between ERP systems and individual machine and automation controls**

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ERP

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ERP

- **An ERP is a software solution which includes integration and automation of various business processes in a company to achieve operational efficiencies, improve business processes and facilitate effective decision making.**
- **ERP system when implemented effectively in an organization can have huge benefits in integration of the different business processes and also automating the repetitive and cumbersome processes.**
- **An ERP system in a company can integrate the areas such as HR, sales, purchase, marketing, delivery, engineering etc. It can also enable these different departments to share data and communicate easily.**

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ERP

- **ERP is now not only limited to the applications running on desktops and workstations. Instead there are mobile ERP devices like the radar guns in the warehouses which are very popular.**
- **There is also the added advantage of customization which is available with the ERP systems. Most or all activities in an organization can now be integrated and automated through an ERP system**

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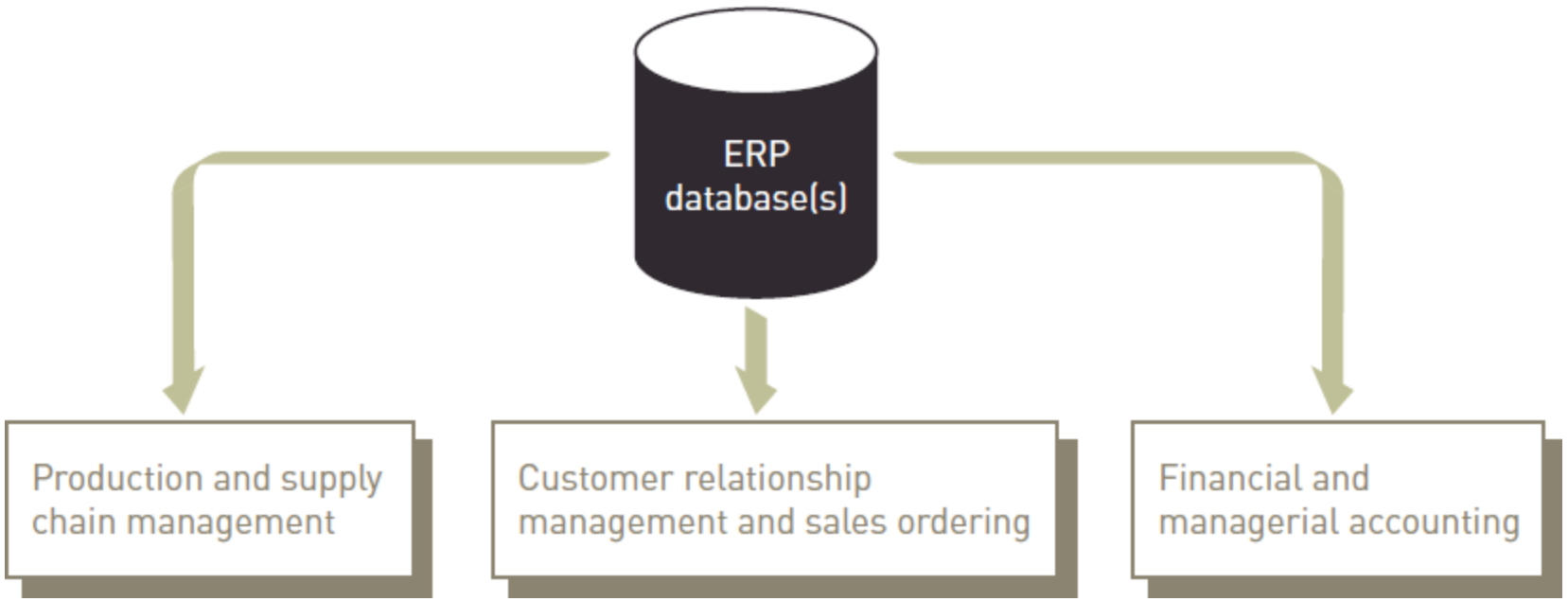
Integration between Systems



Pros and Cons of an ERP

- **Advantages**
  - Improved access to data for operational decision making
  - Elimination of costly, inflexible legacy systems Improvement of work processes
  - Upgrade of technology infrastructure
- **Disadvantages**
  - Expense and time in implementation
  - Difficulty implementing change
  - Difficulty integrating with other systems
  - Difficulty in loading data into new ERP system
  - Risks in using one vendor
  - Risk of implementation failure

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Leading ERP Systems

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Business Intelligence and ERP

- **Business intelligence (BI):**
  - Gathering enough of the right information to shine a spotlight on the organization's performance
  - Essential component of an organization's ERP system
- **BI tools are used to:**
  - Access all the operational data captured in the ERP database, analyze performance on a daily basis
  - Highlight areas for improvement, and monitor the results of business strategies

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SCM

Supply Chain Management (SCM)

- **A system that includes:**
  - **Planning, executing, and controlling all activities involved in raw material sourcing and procurement**
  - **Converting raw materials to finished products, and warehousing and delivering finished product to customers**

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Process for developing a production plan

- **Sales forecasting**
- **Sales and operations plan (S&OP)**
- **Demand management**
- **Detailed scheduling**
- **Materials requirement planning (MRP)**
- **Purchasing**
- **Production**
- **Sales ordering**

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CRM

CRM Customer Relationship Management

- **Goal is to understand and anticipate the needs of current and potential customers**
- **Used primarily by people in:**
  - **The sales, marketing, and service organizations to capture and view data about customers and to improve communications**
- **CRM software:**
  - **Automates and integrates the functions of sales, marketing, and service in an organization**

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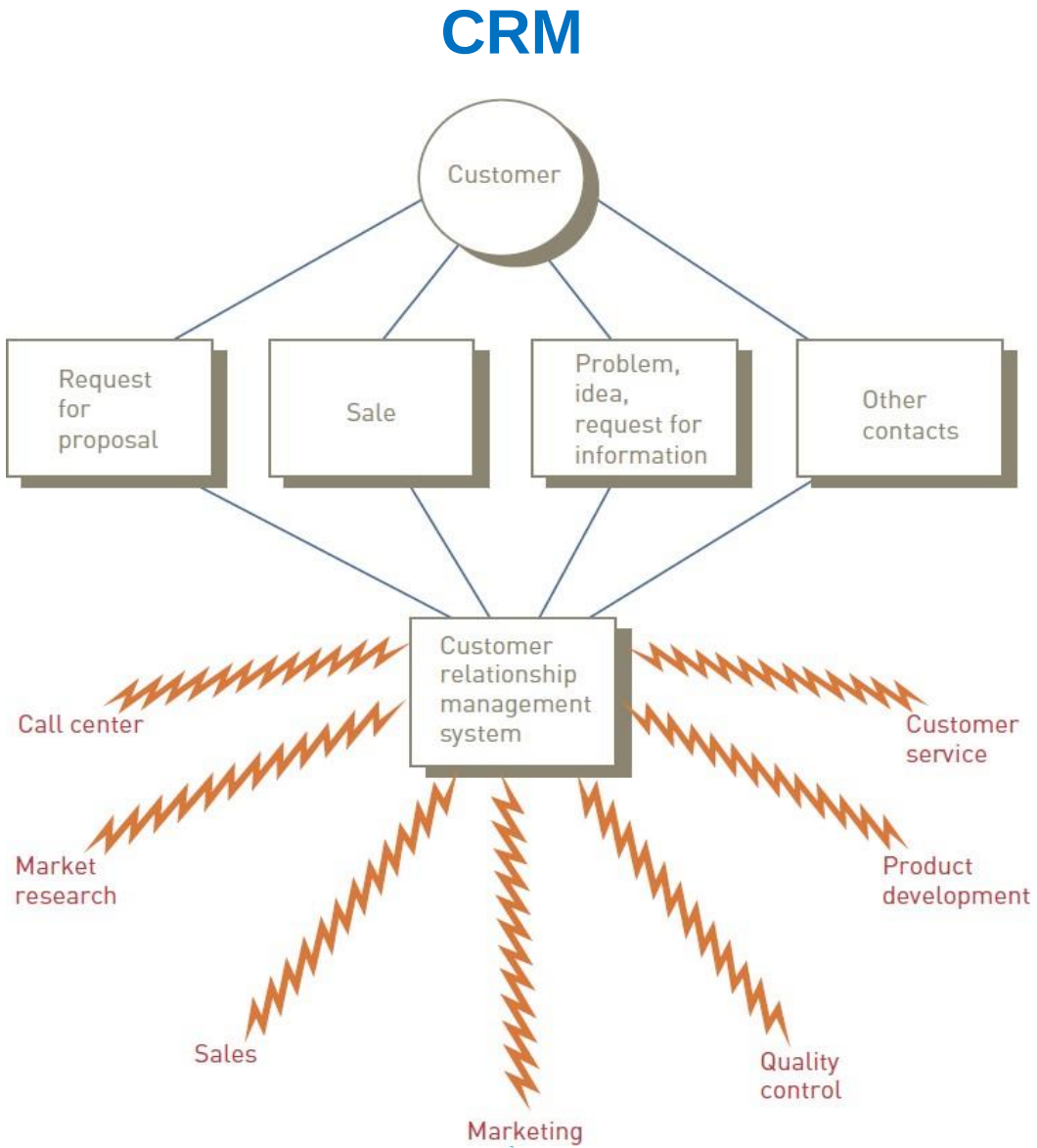

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Key features of a CRM system

- **Contact management**
- **Sales management**
- **Customer support**
- **Marketing automation**
- **Analysis**
- **Social networking**
- **Access by smartphones**
- **Import contact data**

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Leading CRM Systems

Hosted Software Model for Enterprise Software

Advantages	Disadvantages
Decreased total cost of ownership	Potential availability and reliability issues
Faster system startup	Potential data security issues
Lower implementation risk	Potential problems integrating the hosted products of different vendors
Management of systems outsourced to experts	Savings anticipated from outsourcing may be offset by increased effort to manage vendor

International Issues Associated with Enterprise Systems

- **Challenges that must be met by an enterprise system of a multinational company include:**
  - **Different languages and cultures**
  - **Disparities in IS infrastructure**
  - **Varying laws and customs rules**
  - **Multiple currencies**
  - **Lack of a robust or a common information infrastructure can create problems**
  - **Many countries' telecommunications services are controlled by a central government or operated as a monopoly**

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DSS

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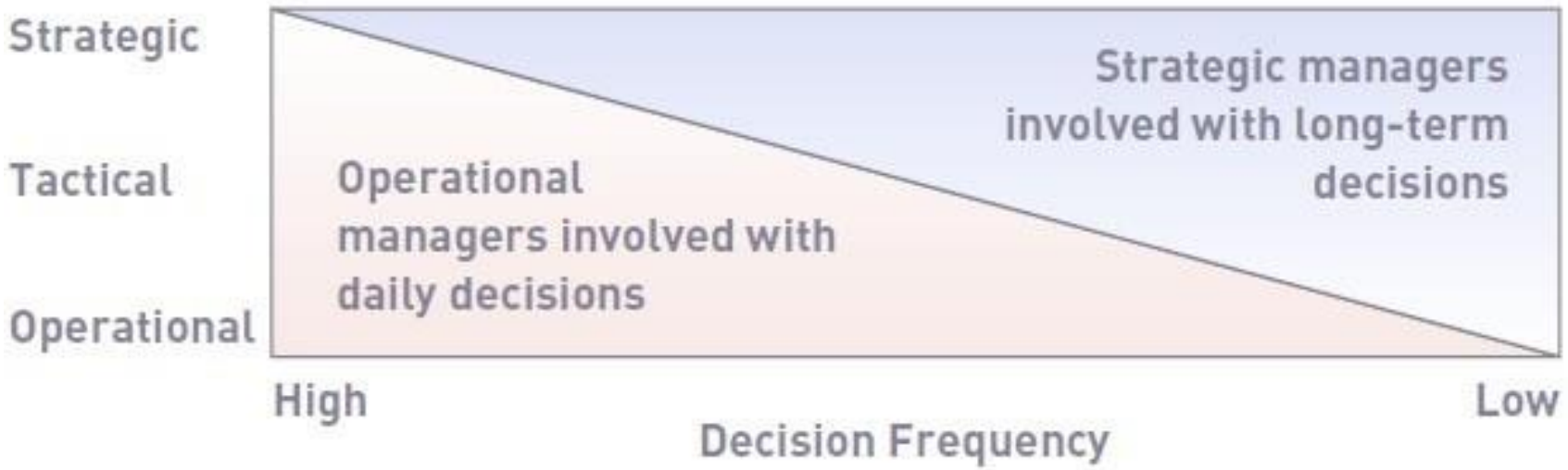
Characteristics of a Decision Support System

- **Provide rapid access to information**
- **Handle large amounts of data from different sources**
- **Provide report and presentation flexibility**
- **Offer both textual and graphical orientation**
- **Support drill-down analysis**

Capabilities of a Decision Support System



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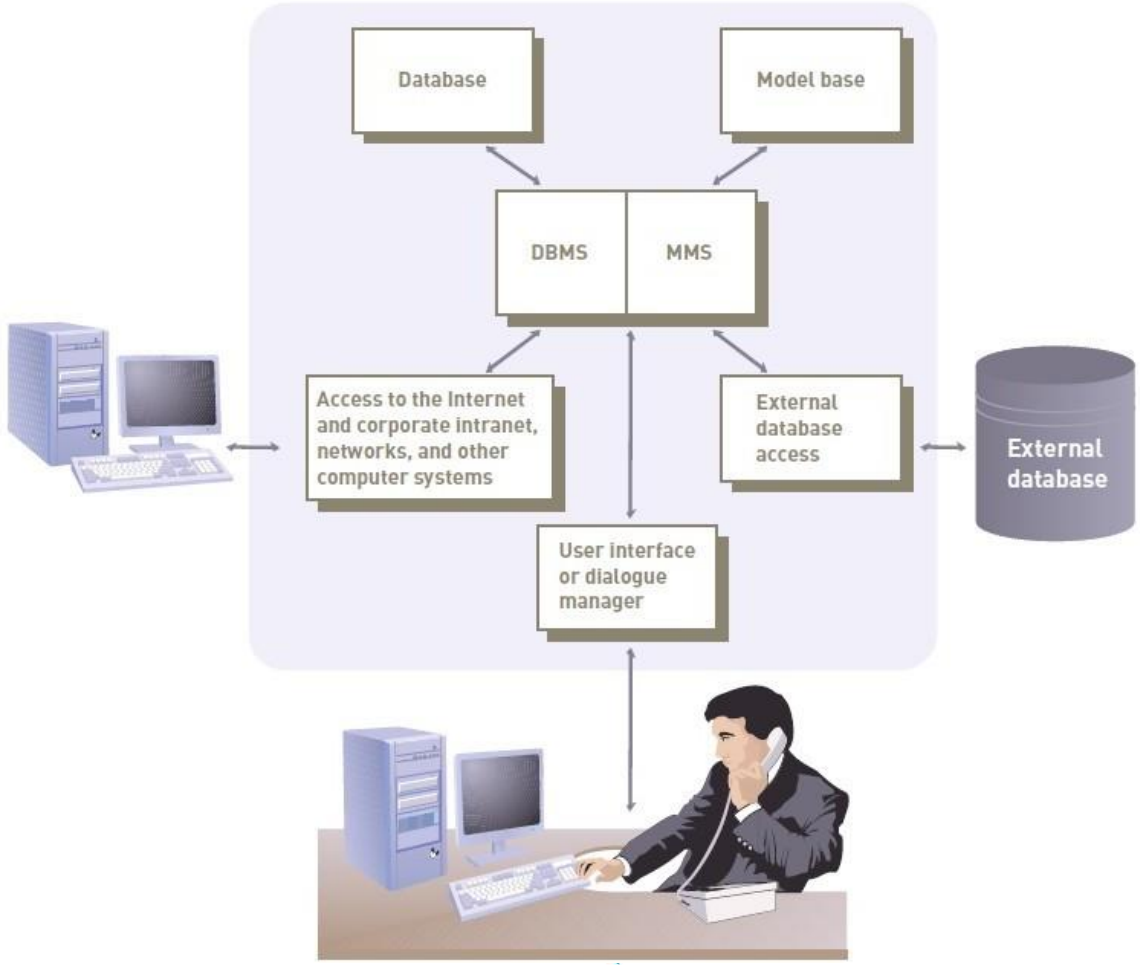
Capabilities of a Decision Support System



MMS
Model
Management
System

Principles & Architecture

Characteristics of a Decision Support System

- **Simulation model – calculates the simulated outcome of tentative decisions and assumptions**
- **Optimization model – determine optimal decisions based on criteria supplied by the user, mathematical search techniques, and constraints**
- **Online analytical processing (OLAP) : the use of data analysis tools to explore large databases of transaction data - Cubes**
- **Data mining : the use of analysis tools to find patterns in large transaction databases**

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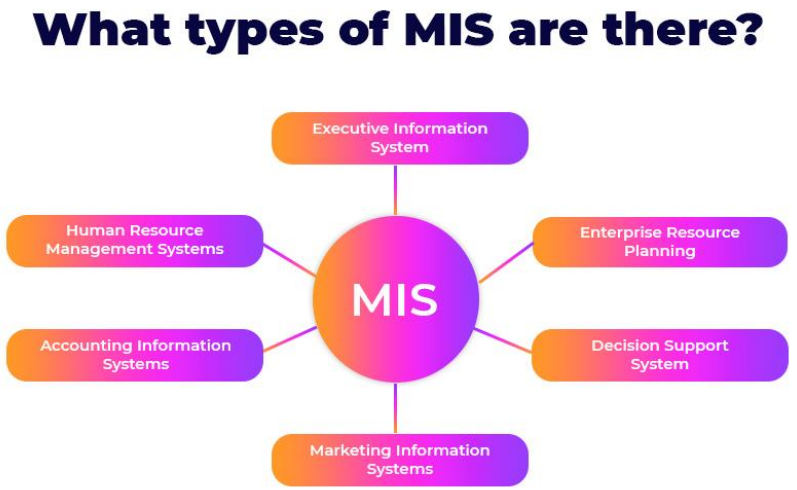
MIS

Management Information Systems

- **Integrated collection of people, procedures, databases, and devices**
- **Can give the organization a competitive advantage**
- **To help an organization achieve its goals and give it a competitive advantage**
- **Provide the right information to the right person in the right format at the right time**
- **Can enter the organization through traditional methods, or via an extranet**



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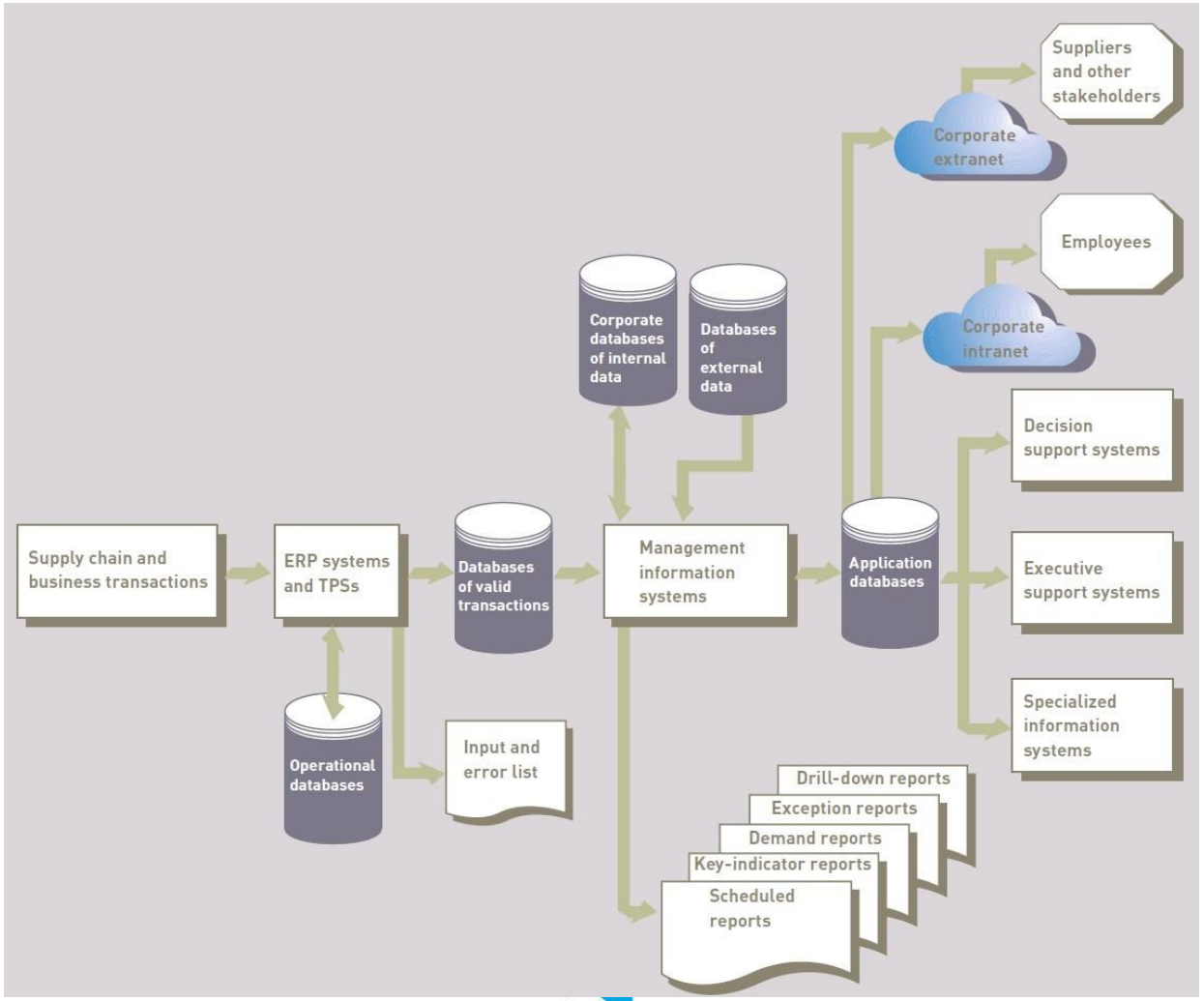
Management Information Systems in Perspective



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KMS

Knowledge Management Systems

- **Data consists of raw facts**
- **Information: Collection of facts organized so that they have additional value beyond the value of the facts themselves**
- **Knowledge: Awareness and understanding of a set of information and the ways that information can be made useful to support a specific task or reach a decision**
- **Knowledge management system (KMS):**
  - **Organized collection of people, procedures, software, databases, and devices**
  - **Used to create, store, share, and use the organization's knowledge and experience**

The difference between Data , Information and Knowledge

Data	There are 20 PCs in stock at the retail store.
Information	The store will run out of inventory in a week unless more is ordered today.
Knowledge	Call 800-555-2222 to order more inventory.

Data and Knowledge Management Workers

- **Data workers:**
  - **Secretaries, administrative assistants, bookkeepers, etc.**
- **Knowledge workers:**
  - **Create, use, and disseminate knowledge**
  - **Professionals in science, engineering, or business; writers; researchers; educators; corporate designers; etc.**

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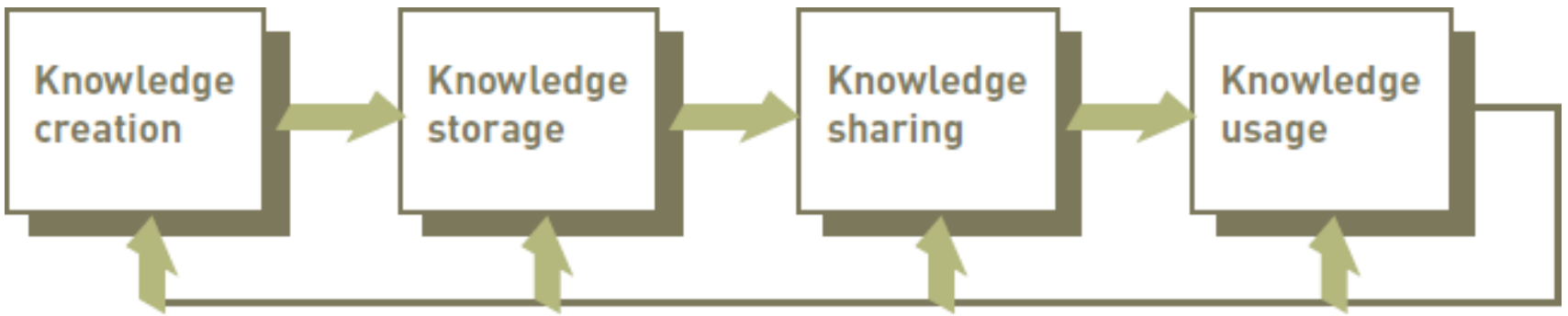
Knowledge Management Systems



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AI

AI

- **Artificial intelligence (AI):**
  - **Computers with the ability to mimic or duplicate the functions of the human brain**
- **Computer systems that use the notion of AI:**
  - **Help to make medical diagnoses**
  - **Explore for natural resources**
  - **Determine what is wrong with mechanical devices**
  - **Assist in designing and developing other computer systems**

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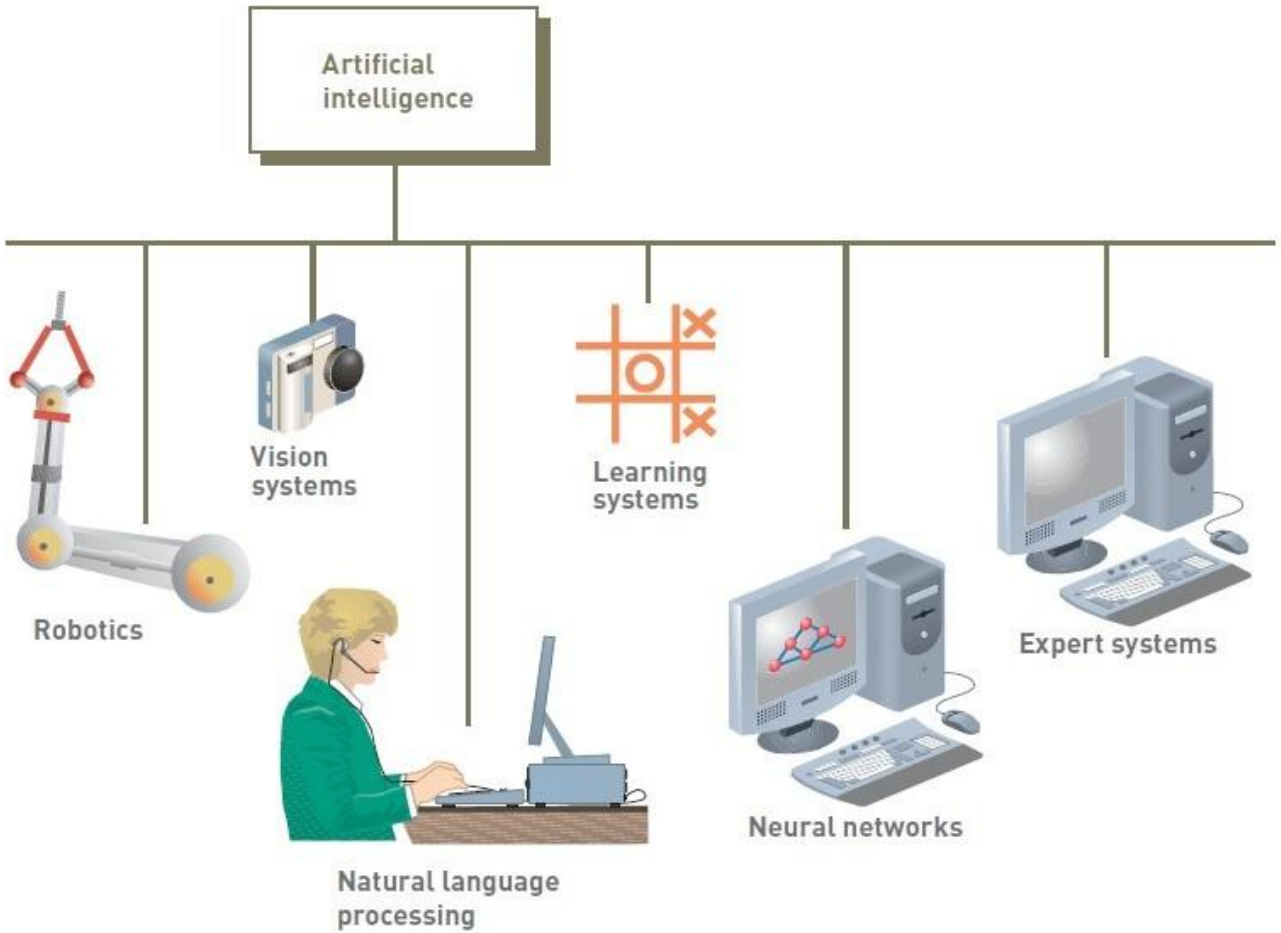
The Major Branches of Artificial Intelligence



Neural Networks

- **Computer system that simulates functioning of a human brain**
- **Can process many pieces of data at the same time and learn to recognize patterns**
- **Neural network software simulates a neural network using standard computers**