

Informatics – Class 3

IT Infrastructure and Support Systems

Outline

2.1 Data and Software Application Concepts

2.2 Types of Information Systems and Support

2.3 Supply Chain and Logistics Support

2.4 IT Infrastructures, Cloud Computing, and Services

Learning Objectives

- **Understand the types of information systems and how they process data.**
- **Understand the types of information systems used to support business operations and decision makers.**
- **Describe how IT supports supply chains and business processes.**
- **Understand the attributes, benefits, and risks of service-based and cloud computing infrastructures.**

2.1 Data and Software Application Concepts

Organizations have different types of information systems that collect and process data, distribute reports, and support decision making and business processes.

- Starting with transactions that take place at an interface (e.g., withdrawing cash from an ATM), a **transaction processing system** (TPS) processes the data as follows:
 - verifies available funds
 - subtracts withdrawn amount updating the data in the database (or adds deposit amount)
- Data are extracted from the database and organized into reports using **management information systems** (MIS).
- Decision making procedure is supported by **decision support systems** (DSS).

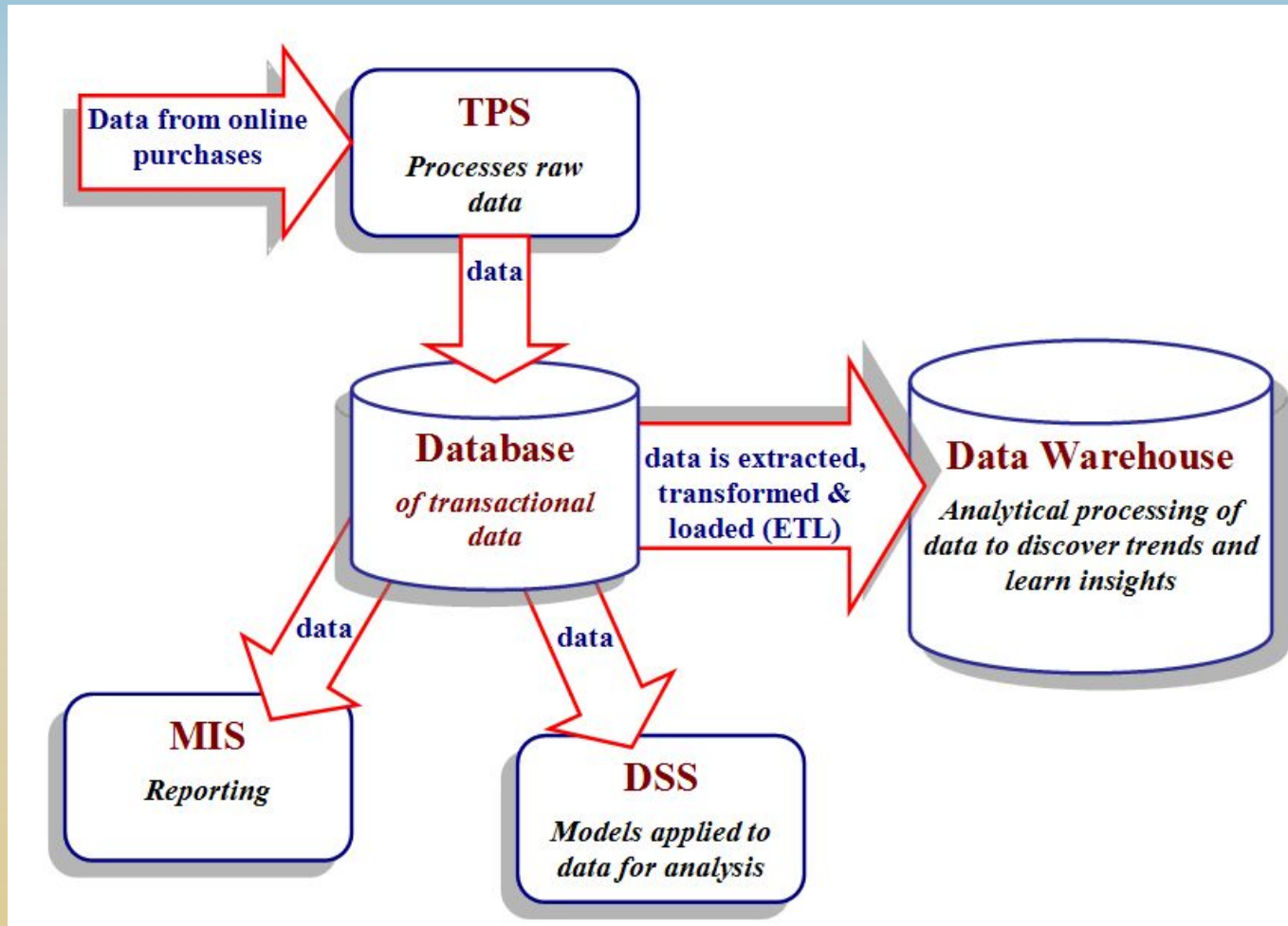


Figure 2.1 Diagram showing the relationships among information systems.

Various types of ISs and applications support managers, workers, work flows, business processes, and transactions with supply chain partners.

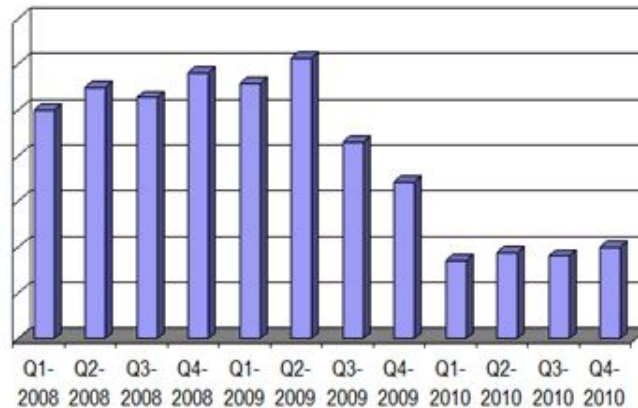
Data, Information, and Knowledge



- **Data:** raw data (details of subjects and processes)
 - *Database:* stores data in such a way that it can be accessed, searched, retrieved, and/or updated
- **Information:** data that's been processed, organized, or put into context with the event.
- **Knowledge:** data or information that have been processed to convey understanding, experience, accumulated learning, and expertise as they apply to a current problem or activity.

**Number of new vehicles sold in the
1st quarter of 2010 (Q1-2012)**

Data



Information

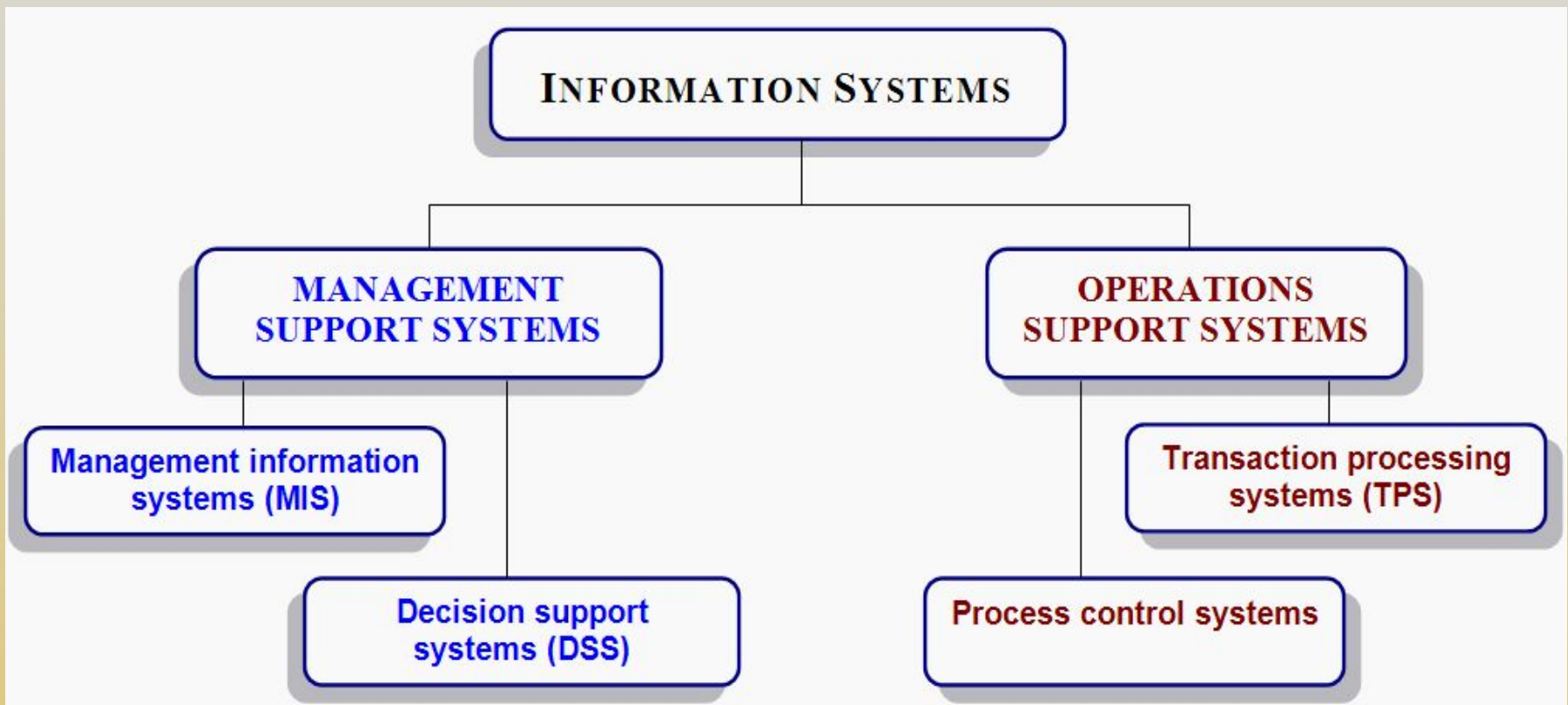
**Managing a vehicle recall in a way
that minimizes negative impacts on
new vehicle sales and net income**

Knowledge

Figure 2.2. Example of data, information, and knowledge.

2.2 Types of Information Systems and Support

ISs classified into 2 categories based on type of support:
management or operations



Operations support system

Transaction Processing Systems (TPS)

Data is processed by a TPS—e.g., sales orders, payroll, accounting, financial, marketing, purchasing, inventory control

Transactions are either:

- **Internal transactions:** occur or originate from within the organization; e.g., payroll, purchases, budget transfers & payments.
- **External transactions:** originate from outside the organization; e.g., from customers, suppliers, regulators, distributors, and financing institutions.

TABLE 2.1 Business Transactions in a Manufacturing Company

Payroll and personnel

- Employee time cards
- Employee pay and deductions

Finance and accounting

- Financial statements
- Accounts receivable / Accounts payable

Sales

- Invoices and billings
- Sales returns

Production

- Production reports
- Quality control reports

Inventory management

- Material usage
- Inventory levels

Operations support system

Batch vs. Online Real-Time Processing

Processing of transactions is done in one of two modes:

1. **Batch processing:** The TPS collects all transactions for a day or other time period; and later processes the “batch” of transactions at once.
2. **Online transaction processing (OLTP) or real-time processing:** The TPS processes each transaction as it occurs, which is *real-time processing*.
 - OLTP requires that a network link the input device or Web site to the TPS.

Management support system

Management Information Systems (MIS)

General purpose **reporting systems** are referred to as management information systems (MIS).



3 types of reports

1. **Periodic:** created or run according to a pre-set schedule.
2. **Exception:** generated only when something is outside the norm.
3. **Ad hoc:** generated on an *as needed* basis.

Decision Support Systems (DSS)

Support unstructured and semi-structured decisions, such as whether to make or buy products or what new products to develop & introduce into existing markets.

3 characteristics of DSSs:

1. easy-to-use interactive interface
2. models that enable sensitivity analysis, *what if* analysis, goal seeking, and risk analysis
3. Data are extracted from internal databases, external sources, and added by the decision maker who may have insights relevant to the decision situation

2.3 Supply Chain and Logistics Support

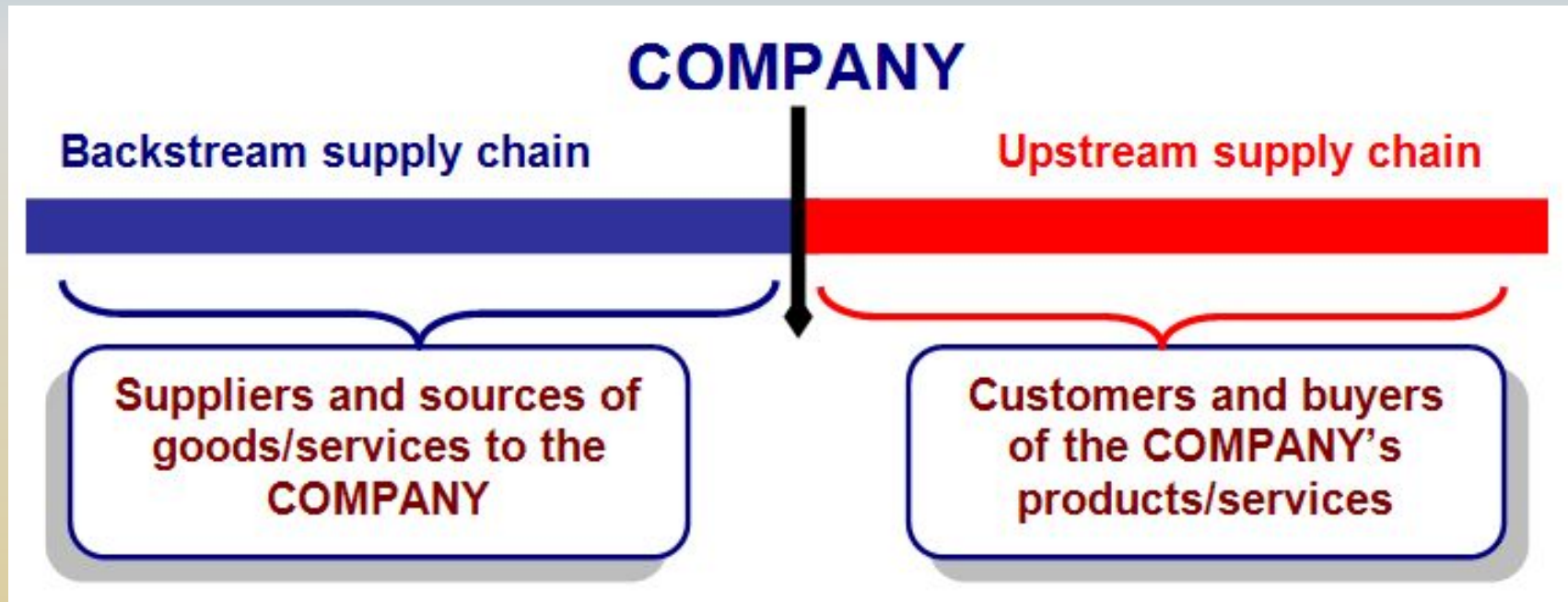


Figure 2.8 Backstream and upstream components of a supply chain.

A company's competitive advantage—*low cost, reliability, quality, or speed to market*—depends on how well the supply chain is managed.

Logistics & RFID



- Managing material and information flows to optimize supply chain operations.
- Logistics has been described as *having the right thing, at the right place, at the right time*.
- RFID (radio frequency identification) tags can be attached to or embedded in packages or physical objects.
- RFID readers scan and input identifying information from the tags via radio waves.

Wal-Mart's Global Sourcing Strategy for its Backstream Supply Chain

- Because Wal-Mart has thousands of suppliers and constantly looks for new ones worldwide, they invested in a new *global sourcing strategy*.
- Benefits:
 - reduced cost of goods to keep prices down
 - increased speed to market
 - improved product quality



Sourcing: identifying sellers (sources) that can provide Wal-Mart with products or services to sell in stores and online.

Global sourcing: purchase of goods or services from sellers located anywhere in the world.

2.4 IT Infrastructures, Cloud Computing, & Services

- A company's **IT infrastructure** determines the workload that its ISs, apps, and mobile devices can handle and their speed.
 - **IT infrastructure**: collection of hardware, software, processes, networks, and users.
- **IT infrastructure** allows (*and limits*) the ability to store, protect, and manage data so that it can be made accessible, searchable, retrievable, shareable, and actionable.

Cloud Computing

- To improve performance at lower up-front costs, companies are turning to **cloud computing**.
 - **Cloud:** term used to refer to the Internet.
- Cloud computing has greatly expanded the options for enterprise IT infrastructures.



Figure 2.10 Evolution to Cloud Computing



IT at Work

U.S. government spent about \$68.1 billion in 2012 on IT, with 1/3 spent on IT infrastructure. Using cloud computing can significantly reduce costs and energy consumption.

U.S. Department of Defense (DoD):

- implemented a **private cloud** to service many military agencies at reduced cost.
- did not adopt (public) **cloud computing** because of the sensitive nature of their data.
- U.S. Navy has drafted guidelines for ordering cloud services, but standards and policies for cloud computing have not yet been established.

What *Services* are Available in the Cloud?

- **Software-as-a-Service (SaaS):** popular IT model in which software is available to users *as needed*.
- Other terms for SaaS:
 - on-demand computing
 - utility computing
 - hosted services
- Basic idea: instead of buying and installing expensive packaged enterprise applications, users access software apps over a network



Moving to the Cloud raises questions

- Which workloads should be exported to the cloud?
- Which set of standards to follow for cloud computing?
- How to resolve issues of privacy and security as things move out to the cloud?
- How will departments or business units get new IT resources? *Should they help themselves, or should IT remain a gatekeeper?*

Cloud computing limitations & trade-offs

- Cloud computing runs on a *shared infrastructure* so the arrangement is less customized to a specific company's requirements.
- It's more difficult to get to the root of performance problems, like the unplanned outages that occurred with Google's Gmail & Workday's human resources apps.
- The tradeoff is cost vs. control

Link Library

- Blog on cloud computing <http://infoworld.com/blogs/david-linthicum>
- Planners Lab, for building a DSS <http://plannerslab.com>
- Supply Chain and Logistics Institute <http://SCL.gatech.edu/>
- Salesforce.com cloud demos <http://salesforce.com>
- U.S. Defense Information Systems Agency <http://disa.mil>
- Supply Chain, Europe's strategic supply chain management resource.
<http://supplychainstandard.com>

Thank you !
Questions ?