Information Technologies: Concepts and Management

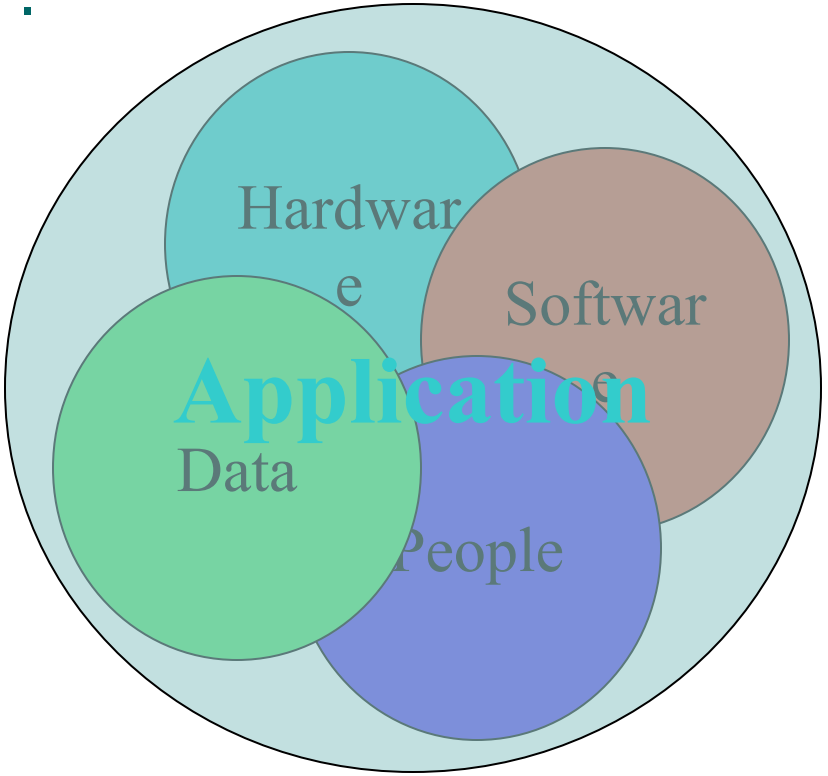
Objectives

- Describe various information technologies and systems and their evolution, and categorize specific systems
- Describe and compare transaction processing systems and functional information systems
- Identify the major internal support systems and relate them to managerial procedures.
- Describe the support IT provides along the supply chain, including CRM and SCM.
- Describe the major types of Web-based information systems and understand their functionalities.
- Describe new computing environments.
- Describe how well information resources in a company are managed and what are the roles of the IT Department and end users

Information System - Elements

An Information system (IS) collects, processes, stores, analyzes, and disseminates information for a specific purpose - "Application".

- Hardware
- Software
- Data
- Network
- Procedures
- People



Information System – Primary Purpose

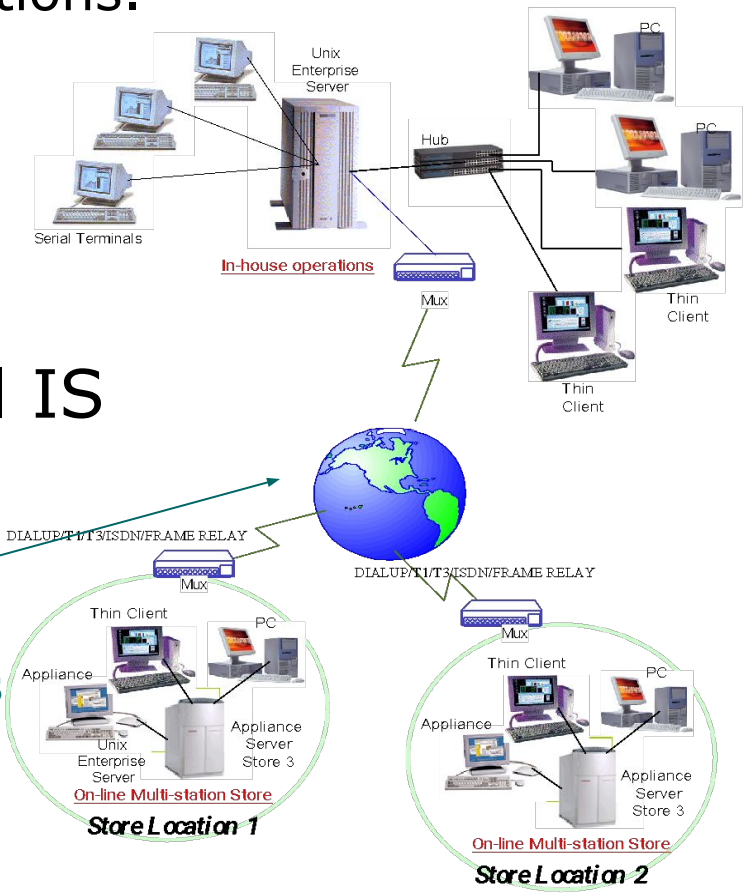
Collects data, processes it into information then converts information into knowledge for a specific purpose.

- Data
  - Elementary description of things, events, activities, and transactions that are recorded, classified, and stored, but not organized to convey any specific problem
- Information
  - Data that has been organized so that they have meaning and value to the spescific organizational task
- Knowledge
  - Information that has been organized and processed to convey understanding, experience and expertise as they apply to a current problem or activity

Information System – Classification By Organizational Structure

An information system (IS) can span departments, business units and corporations.

- Departmental IS
- Enterprise-Wide IS
- Inter-Organizational IS



Information systems are usually connected by means of electronic networks

Information System - Classification By Function (Department)

An information system (IS) support each department in a corporation.

- Planning
- Accounting
- Finance
- Marketing
- Human resources

Point-of-Sale (POS)

Transaction Processing Systems (TPS): Automates routine and repetitive tasks that are critical to the operation of the organization

Information System - Classification By Function (Department)

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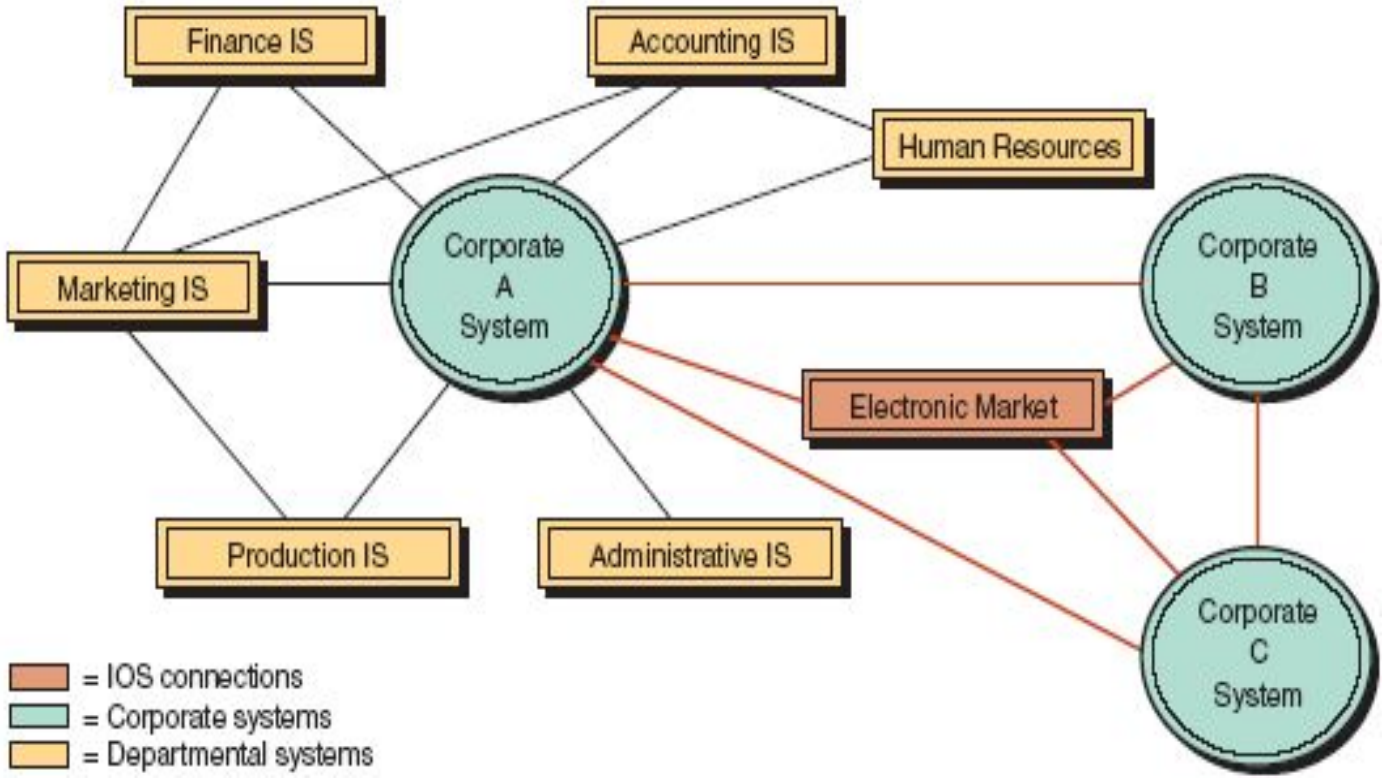
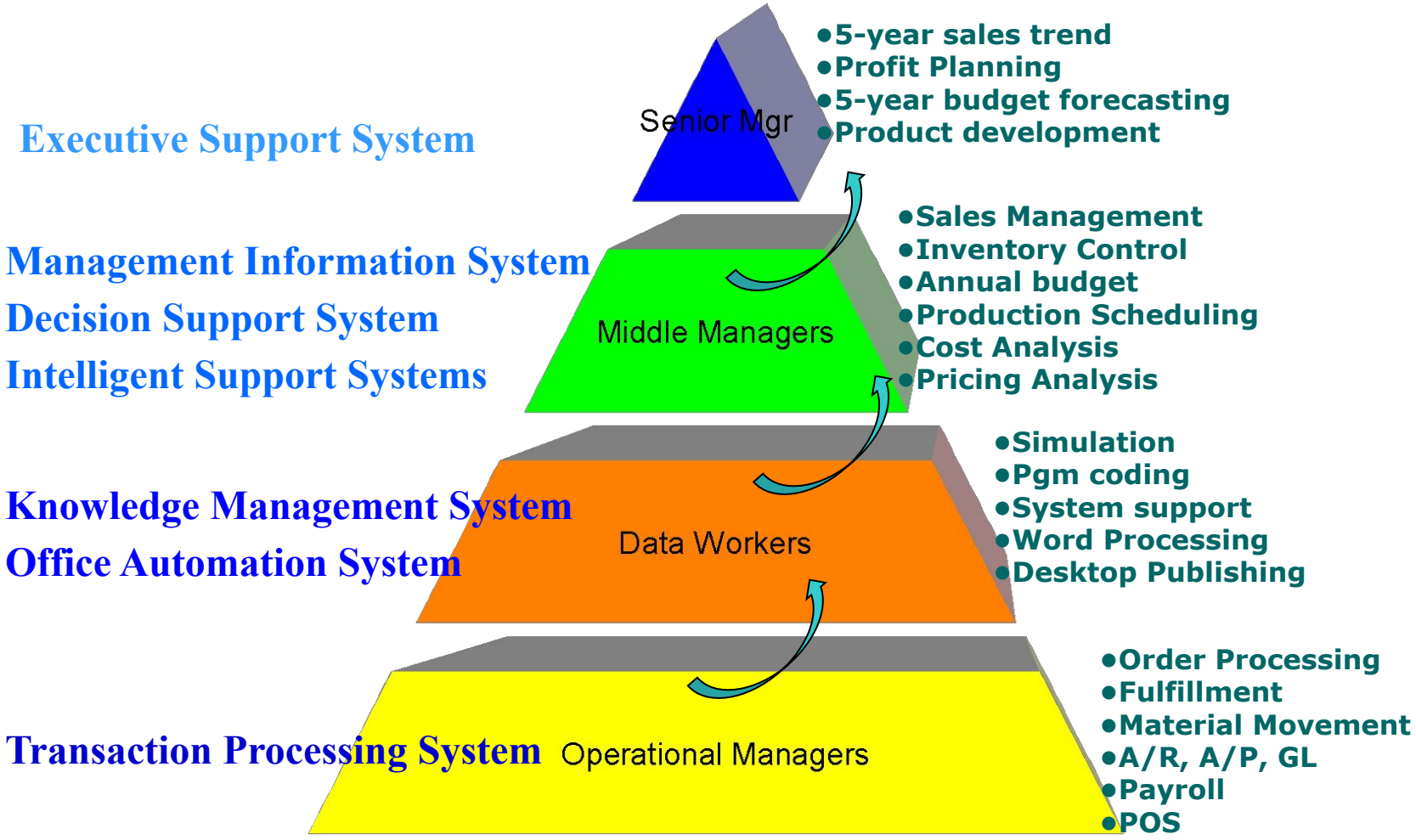


Information System - Classification By Support Function



Transaction Processing System (TPS) does the following :

- automates routine and repetitive tasks that are critical to the operation of the organization, such as preparing a payroll, billing customers, Point-of-Sale and Warehouse operations.
- data collected from this operation supports the MIS and DSS systems employed by Middle Management
- computerizes the primary and most of the secondary activities on the Value Chain.
- Primary purpose - to perform transactions and collect data.

Management Information Systems (MIS)

- These systems access, organize, summarize, and displayed information for supporting *current decision making* in the functional areas. Geared toward middle managers, MIS are characterized mainly by their ability to produce periodic reports such as a daily list of employees and the hours they work, or a monthly report of expenses as compared to a budget limits
- Typical uses would be in Completion , Pricing Analysis (Markdowns) and Sales Management
- Decisions supported are more structured.
- Primary purpose - to convert data into information

Decision Support Systems (DSS)

- These systems support complex non-routine decisions.
- Primary purpose to convert data into information and knowledge
- DSS systems are typically employed by tactical level management whose decisions and *"what-if" analysis* are less structured.
- This information system not only presents the results but also expands the information with alternatives.
- Some DSS methodologies :
  - Mathematical Modeling
  - Simulation Modelling
  - Queries
  - What-If (OLAP-Cubes)
  - Data mining
  - Fuzzy logic

Intelligent Support Systems (ISS)

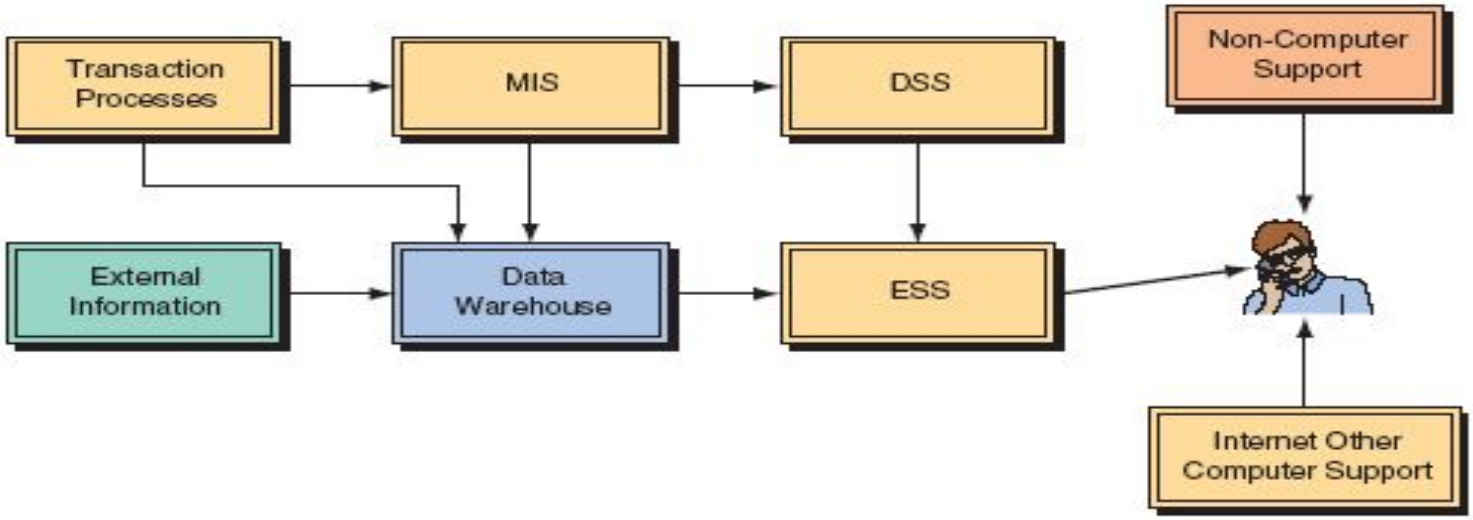
- Essentially, artificial intelligence (AI) these systems perform intelligent problem solving.
- One application of AI is expert systems. *Expert systems* (ES) provide the stored knowledge of experts to managers, so the latter can solve difficult or time-consuming problems. These advisory systems differ from TPS, which centered on data, and from MIS and DSS, which concentrated on processing information. With DSS, *users* make their decisions according to the information generated from the other systems. With ES, the *system* makes recommended decisions for the users based on the built-in expertise and knowledge.

Office Automation Systems (OAS)

- Electronic communication is only one aspect of what is now known as an *office automation system* (OAS). Other aspects include *word processing systems*, *document management systems* and *desktop publishing systems*.
- OAS systems are predominantly used by *clerical workers* who support managers at all levels. Among clerical workers, those who use, manipulate, or disseminate information are referred to as **data workers**.

Executive Support Systems (ESS)

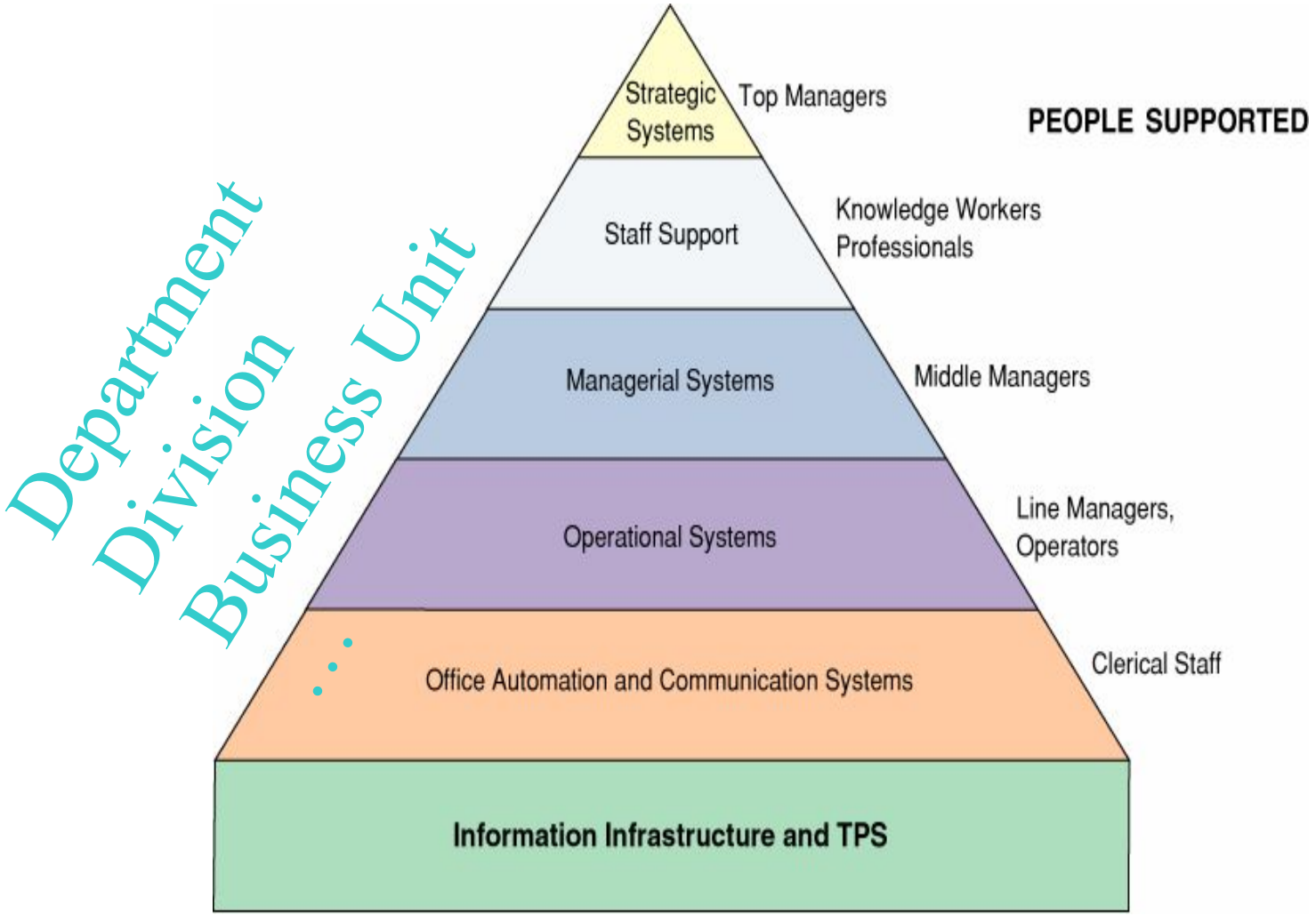
- ESS systems or Enterprise Information Systems (EIS) originally were implemented to support Senior management. These systems have been expanded to support other managers within the enterprise.
- At the senior management level they support *Strategic decisions* which deal with situations that significantly may change the manner in which business is done



Knowledge Management Systems (KMS)

- An *additional level of staff support* now exists between top and middle management. These are professional people, such as financial and marketing analysts that act as advisors and assistants to both top and middle management. They are responsible for finding or developing new knowledge (External Content) for the organization and integrating it with existing knowledge (Internal Content).
- KMS that support these **knowledge workers** range from Internet search engines and expert systems, to Web-based computer-aided design and sophisticated data management systems

People in organizations



Expanded Scope with External Environments

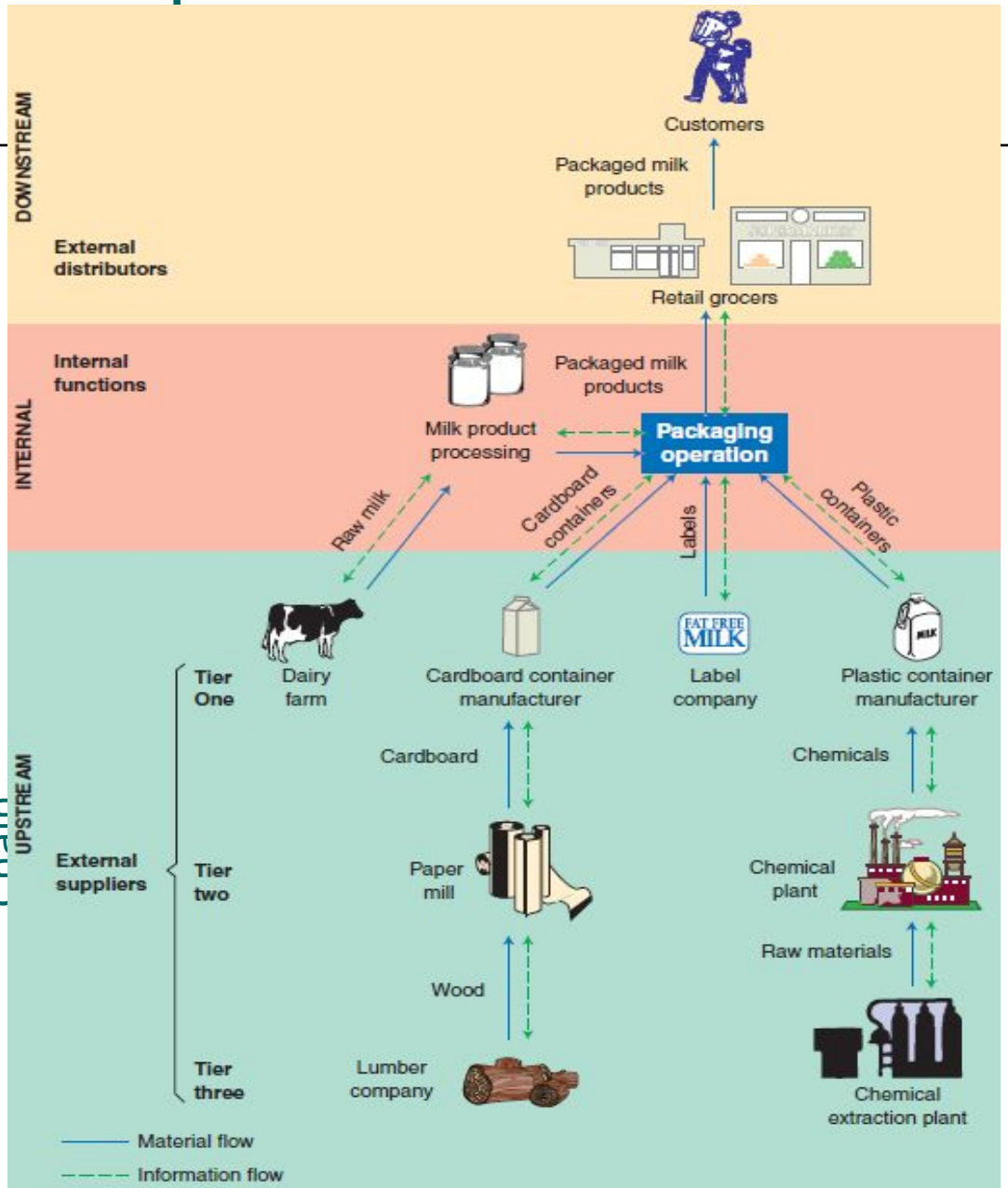
A **supply chain** is a concept describing the flow of materials, information, money, and services from raw material suppliers through factories and warehouses to the end customers.

Components of the Supply Chain

- **Upstream supply chain**
  - includes the organization's first-tier suppliers and their suppliers
- **Internal supply chain**
  - includes all the processes used by an organization in transforming the inputs of the suppliers to outputs
- **Downstream supply chain**
  - includes all the processes involved in delivering the products to final customers

Expanded Scope with External Environments

Components of the Supply Chain



Inter-Organizational Systems (IOS)

- IOS are systems that connect two or more organizations. These systems are common among business partners and play a major role in e-commerce, as well as in supply chain management support.
- The first type of IT system that was developed in the 1980s to improve communications with business partners was electronic data interchange (EDI), which involved computer-to-computer direct communication of standard business documents (such as purchase orders and order confirmations) between business partners. These systems became the basis for *electronic markets*, that later developed to *electronic commerce systems*.
- *Web-based systems* (*many using XML*) deliver business applications via the Internet. Using browsers and the Internet, people in different organizations communicate, collaborate, access vast amounts of information, and run most of the organization's tasks and processes.

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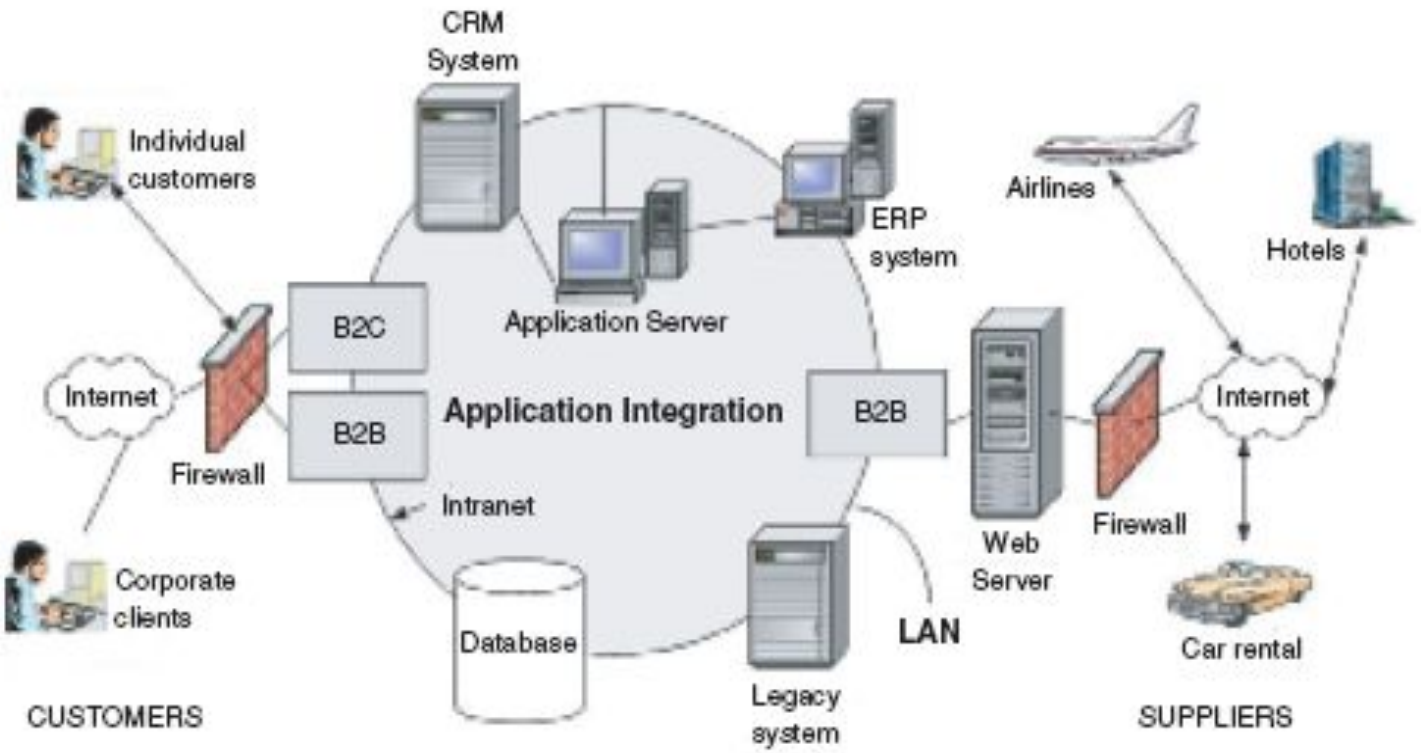
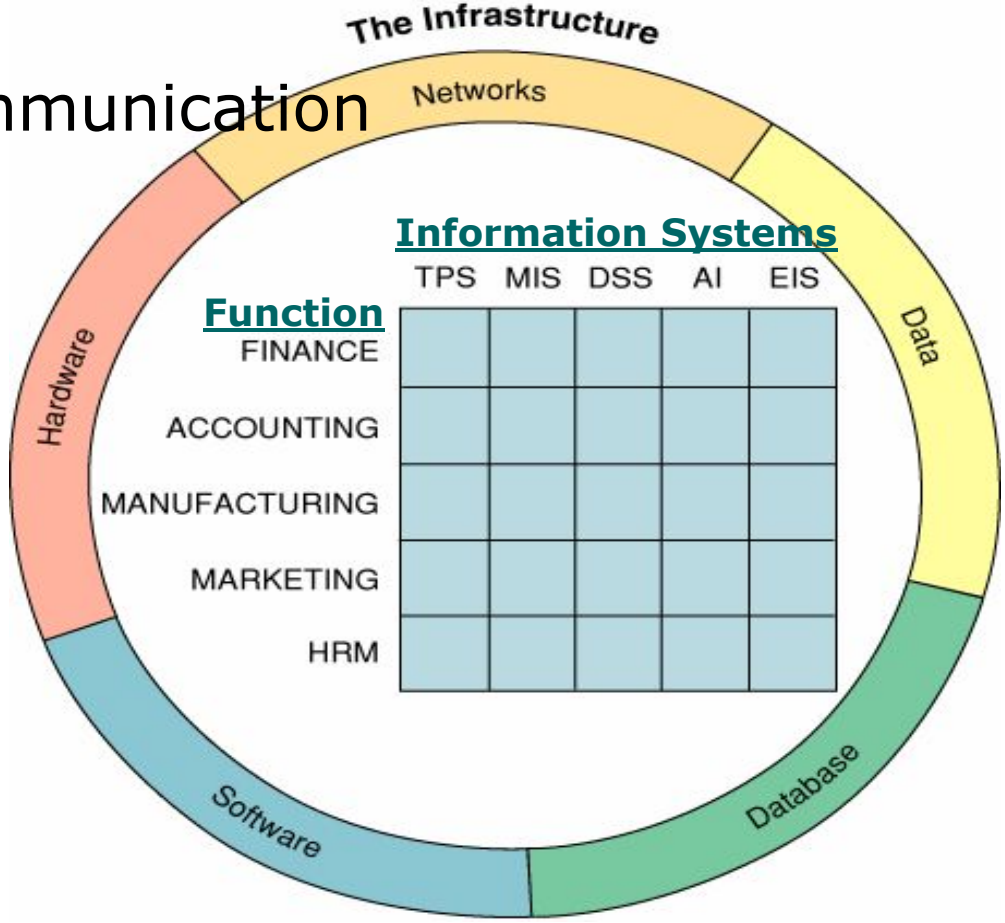


Two or more organizations

Information Infrastructure

- Hardware
- Software
- Networks & communication facilities
- Databases
- IS personnel



Information Architecture – Classified by Hardware

A common way to classify information architecture is by computing paradigms, which are the core of the architecture.

- Mainframe Environment
- PC Environment
- PC-LAN Environment
- Distributed Computing Environment
- Client/server Environment
- Enterprise-wide Computing Environment
- Legacy systems

The Web Based IT Architectures

Web-based systems refer to those applications or services that are resident on a server that is accessible using a Web browser. The only client-side software needed to access and execute these applications is a Web browser environment.

- The Internet
- Intranets
- Extranets
- Corporate Portals
- E-commerce Systems
- Electronic Storefronts
- Electronic Markets
- Electronic Exchanges
- M-Commerce
- Enterprise Web

The Internet

- Sometimes called simply “the Net,” the *Internet* is a worldwide system of computer networks—a network of networks hence Internet, in which users at any one computer can get information from any other computer
- The Internet uses a portion of the total resources of the currently existing public telecommunication networks. Technically, what distinguishes the Internet is its use of a set of protocols called TCP/IP (Transmission Control Protocol/Internet Protocol).

Intranets

- An **Intranet** is the use of Web technologies to create a private network, usually within one enterprise.
- It is typically a complete LAN, or several intra-connected LANs
- Intranets are used for:
  - work-group activities
  - the distributed sharing of projects within the company
  - Controlled access to company financial documents
  - use of knowledge management, research materials, online training, and other information that requires distribution within the company.

Extranets

- Connect several intranets via the Internet, by adding a security mechanism and some additional functionalities
- They form a larger virtual network that allows remote users (*such as business partners or mobile employees*) to securely connect over the Internet to the enterprise's main intranet.
- Extranets are also employed by two or more enterprises (*suppliers & buyers*) to share information in a controlled fashion, and therefore they play a major role in the development of business-to-business electronic commerce and Supply Chain systems.

Corporate Portals

- Web sites that provide the gateway to corporate information from a remote access. They aggregate information and content from many files and present it to the user.
- Corporate portals also are used to personalize information for individual customers and for employees.
- Intranets and Extranets are usually combined with and accessed via a corporate portal

E-commerce Systems

- Web-based systems that enable business transactions to be conducted seamlessly twenty-four hours a day, seven days a week
- Some classifications of E-commerce systems are:
  - B2C (Business to Consumer)
  - B2B (Business to Business)
  - B2E (Business to Employee)
- The major components of Web-based EC are:
  - Electronic storefronts
  - Electronic markets
  - Mobile commerce

Electronic Storefronts

- These are Web-equivalents of a physical store. Through the electronic storefront, an e-business can display and/or sell its products.
- The storefront may include electronic catalogs that contain descriptions, graphics, and possibly product reviews.
- They have following common features and functions:
  - an E-catalog
  - a shopping cart
  - a checkout mechanism
  - a payment processing feature
  - a back office order fulfillment system

Electronic Markets

- Is a web-based network of interactions and relationships over which information, products, services, and payments are exchanged. It is equivalent to a physical marketplace except is Web-based.
- The principal participants in marketplaces are: transaction handlers, buyers, brokers, and sellers.
- The means of interconnection vary among parties and can change from event to event, even between the same parties. Electronic markets can reside in one company, where there is either one seller and many buyers, or one buyer and many sellers. These are referred to as *private marketplaces*.

Electronic Exchanges

- A special form of electronic markets **electronic exchanges,** are Web-based public marketplaces where many buyers and many sellers interact dynamically.
- Originally set as trading places for commodities, **electronic exchanges** have emerged for all kinds of products and services

M-Commerce – Mobile Computing

- M-commerce or **Mobile commerce** is commerce (buying and selling of goods and services) in a wireless environment, such as through wireless devices like cellular telephones and tablets.
- M-commerce enables users to access the Internet without needing to find a place to "plug" in their device.
- As this wireless environment expands, a pervasive computing environment will develop, employed by mobile employees and others, will change the way business is transacted.

Enterprise Web

- Is an open environment for managing and delivering Web applications. It combines services from different vendors in a technology layer that spans rival platforms and business systems, creating a foundation for building applications at a lower cost.
- Applications, including business integration, collaboration, content management, identity management, and search, which work together via integrating technologies.
- The result is an environment that spans the entire enterprise.

Emerging Computing Environments

- **Utility Computing** is computing that is as available, reliable, and secure as electricity, water services, and telephony. The vision behind utility computing is to have computing resources flow like electricity on demand from *virtual utilities* around the globe—always on and highly available, secure, efficiently metered, priced on a pay-as-you-use basis, dynamically scaled, self-healing, and easy to manage.
- **Subscription Computing** is a form of utility computing that puts the pieces of a computing platform together as services, rather than as a collection of separately purchased components.
- **Grid Computing** employs networked systems to harness the unused processing cycles of all computers in that given network thus creating powerful computing capabilities. Grid computing is already in limited use, for example the well-known grid-computing project SETI (Search for Extraterrestrial Intelligence) @Home project. In this project, PC users worldwide donate unused processor cycles to help the search for signs of extraterrestrial life by analyzing signals coming from outer space.
- **Pervasive Computing**, a future in which computation becomes part of the environment. Computation will be embedded in *things*, not in computers. (Internet of Things)
- **Web services** are self-contained, self-describing business and consumer modular applications, delivered via the Internet, that users can select and combine through almost any device, ranging from PC to mobile phones.

Managing Information Systems

- Information Systems (IS) have enormous strategic value so when they are not working even for a short time, an organization cannot function. Furthermore, the Life Cycle Costs (*acquisition, operation, security, and maintenance*) of these systems is considerable. Therefore, it is *essential to manage them properly*. The planning, organizing, implementing, operating, and controlling of the infrastructures and the organization's portfolio of applications must be done with great skill.
- The responsibility for the management of information resources is divided between two organizational entities:
  - The *information systems department* (ISD), which is a corporate entity
  - the *end users*, who are scattered throughout the organization.

MANAGERIAL ISSUES

- **The transition to e-business.** Converting an organization to a networked-computing-based e-business may be a complicated process. The e-business requires a client/ server architecture, an intranet, an Internet connection, and e-commerce policy and strategy, all in the face of many unknowns and risks. However, in many organizations this potentially painful conversion may be the only way to succeed or even to survive. When to do it, how to do it, what the role of the enabling information technologies will be, and what the impacts will be of such a conversion are major issues for organizations to consider.
- **From legacy systems to client/server to intranets, corporate portals, and Web-based systems.** A related major issue is whether and when and how to move from the legacy systems to a Web-based client/server enterprise-wide architecture. While the general trend is toward Web-based client/server, there have been several unsuccessful transformations, and many unresolved issues regarding the implementation of these systems. The introduction of intranets seems to be much easier than that of other client/server applications. Yet, moving to any new architecture requires new infrastructure and a decision about what to do with the legacy systems, which may have a considerable impact on people, quality of work, and budget. A major aspect is the introduction of wireless infrastructure.
- **How to deal with the outsourcing and utility computing trends.** As opportunities for outsourcing (e.g., ASPs) are becoming cheaper, available, and viable, the concept becomes more attractive. In the not-so-distant future, we will see outsourcing in the form of utility computing. How much to outsource is a major managerial issue.

Questions ?