Turban and Volonino

Information Technologies:
Concepts, Types and IT Support

Information Technology for Management
Improving Performance in the Digital Economy

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Chapter Outline

- 2.1 Information Systems: Concepts and Definitions

- 2.2 Classification and Types of Information Systems

- 2.3 How IT Supports People

- 2.4 How IT Supports Supply Chains and Business Processes

- 2.5 Information Systems Infrastructure, Architecture, and Emerging Computing Environments

Chapter Outline cont'd

- 2.6 Innovative and Futuristic Information Systems

- 2.7 Managerial Issues

Figure IT 7eU The Business Performance Management Cycle and IT Model

Where Do We Want to Go?
Mission, Goals, Objectives

How Shall We Get There?
Strategy, Plans

How Well Are We Doing?
Monitoring, Performance, Comparing

How Can We improve Performance?
Solutions, Critical Responses

Information Technology IT

Teknologi Informasi di Perusahaan
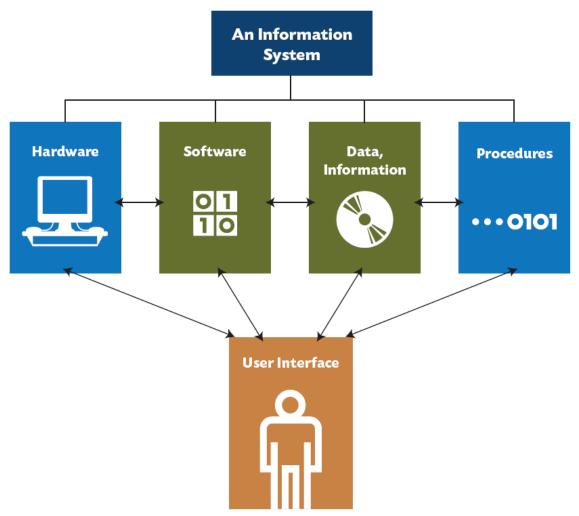
Business Intelligence &

E-Commerce

Supply Chain

Enterprise Resource Planning

Custommer Relationship Management

2.1 Information Systems: Concepts and Definitions

Information System : Concepts and Definitions

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

- Hardware

- Software

- Data

- Network

- Procedures

- People

The basic components of information systems.

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 meaning

- Information
  - Data that has been organized so that they have meaning and value to the recipient

- Knowledge
  - Information that has been organized and processed to convey understanding, experience, and expertise as they apply to a current problem or activity
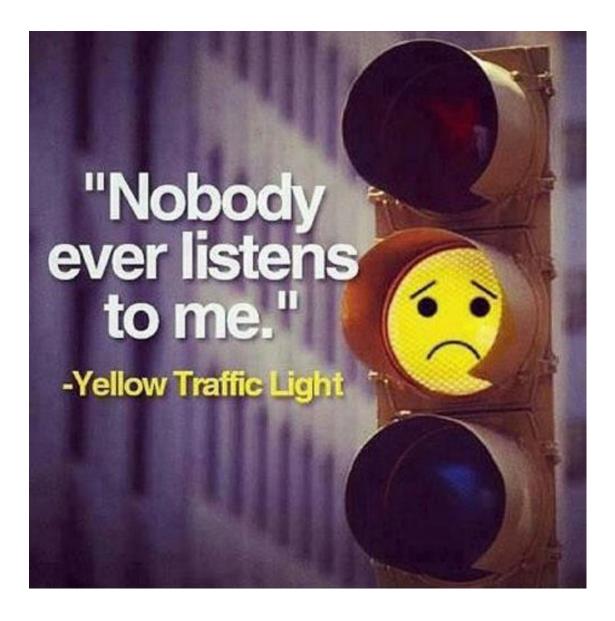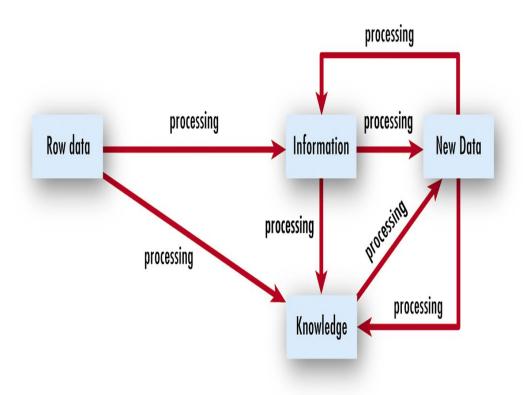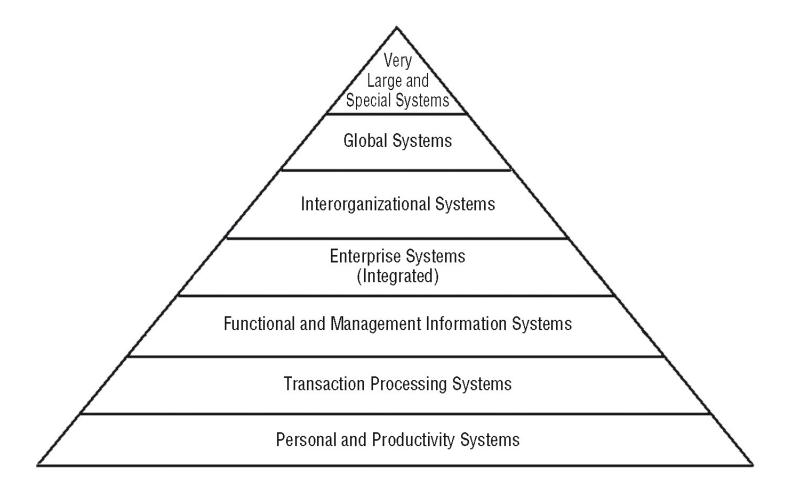
Data vs Information vs Knowledge

Figure 2.1

The relationship among data, information, & knowledge.

2.2 Classification and Types of Information Systems

Figure 2.2

Pyramid diagram (bottom to top):
- Personal and Productivity Systems
- Transaction Processing Systems
- Functional and Management Information Systems
- Enterprise Systems (Integrated)
- Interorganizational Systems
- Global Systems
- Very Large and Special Systems

Transaction Processing System (TPS)

- TPS 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

Table 2.1

TABLE 2.1	Routine Business Transactions in a Manufacturing Company
Payroll and personnel	Employee time cards
	Employee pay and deductions
	Payroll checks
	Fringe benefits
Purchasing	Purchase orders
	Deliveries
	Payments (accounts payable)
Finance and accounting	Financial statements
	Tax records
	Expense accounts
Sales	Sales records
	Invoices and billings
	Accounts receivable
	Sales returns
	Shipping
Production	Production reports
	Quality control reports
Inventory management	Material usage
	Inventory levels

Management Information Systems (MIS)

- These systems access, organize, summarize, and display information for supporting *routine 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

- Typical uses would be in Replenishment, Pricing Analysis (Markdowns) and Sales Management

- Decisions supported are more structured

- Primary purpose to process data into information

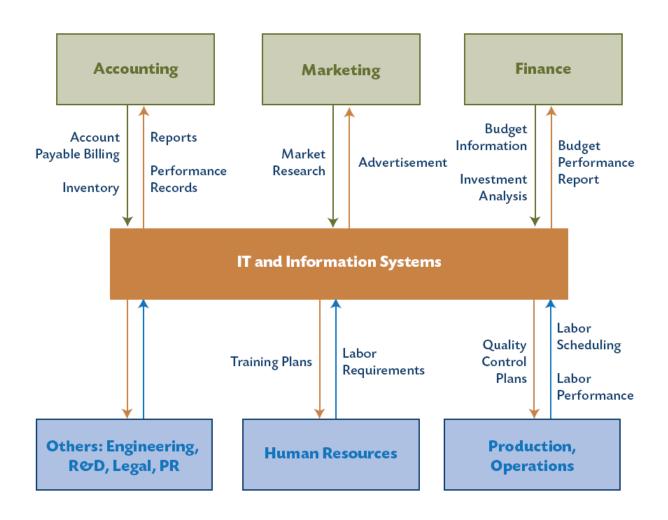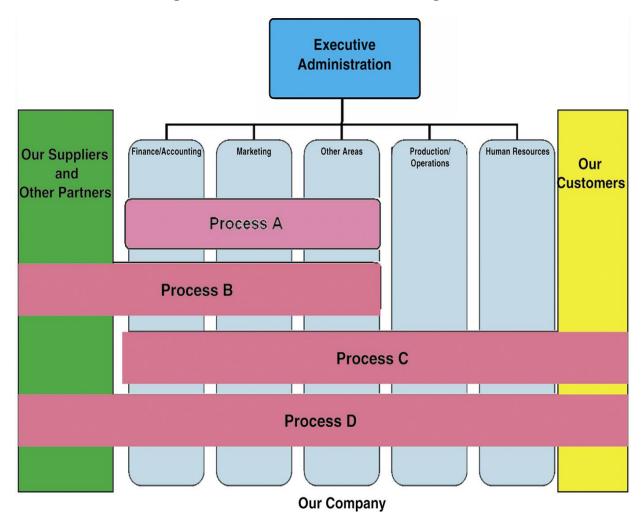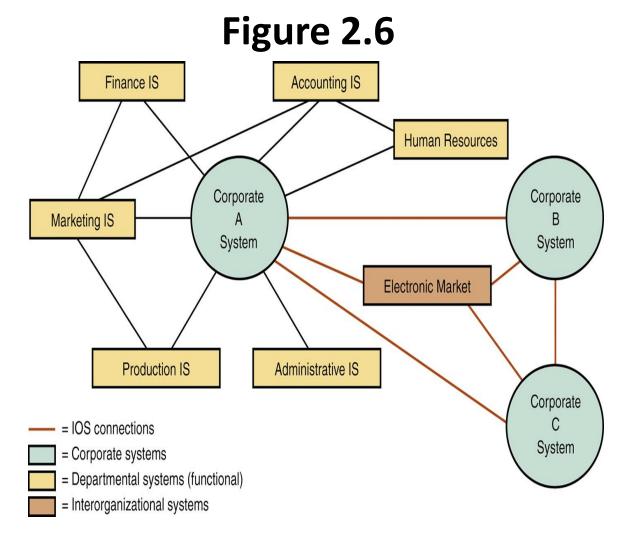# Figure 2.3 – Functional information systems.

Figure 2.5 – Business processes across & beyond the enterprise.

Figure 2.6

Departmental, enterprise, and interorganizational information systems.

Table 2.2

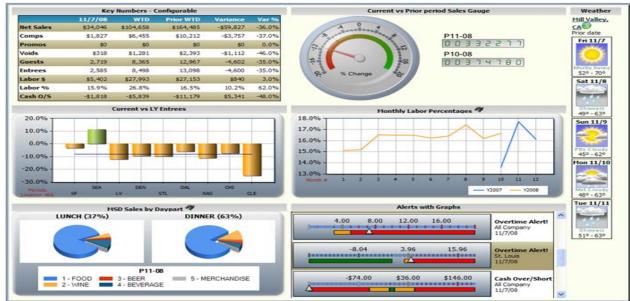| TABLE 2.2	Main Types of IT Support Systems		
System	Employees supported	Description	Detailed description in:
Management information system (MIS)	Middle managers	Provides routine information for planning, organizing, and controlling operations in functional areas	Chapter 9
Office automation system (OAS)	Office workers	Increases productivity of office workers; includes word processing	Chapters 4, 9
CAD/CAM	Engineers, draftspeople	Allows engineers to design and test prototypes; transfers specifications to manufacturing facilities	Chapter 9
Communication and collaboration systems	All employees	Enables employees, partners, and customers to interact and work together more efficiently	Chapters 4, 8
Desktop publishing system	Office workers	Combines text, photos, graphics to produce professional-quality documents	Chapter 3
Document management system (DMS)	Office workers	Automates flow of electronic documents	Chapter 3
Decision support system (DSS)	Decision makers, managers	Combines models and data to solve semistructured problems with extensive user involvement	Chapter 12
Group support system, groupware	People working in groups	Supports working processes of groups of people (including those in different locations)	Chapters 4, 12
Expert system (ES)	Knowledge workers, nonexperts	Provides stored knowledge of experts to nonexperts; provides decision recommendations based on built-in expertise	Chapter 12
Knowledge management system (KM)	Managers, knowledge workers	Supports the gathering, organizing, and use of an organization's knowledge	Chapters 10
Data and text mining	Knowledge workers, professionals	Enables learning from historical cases, even with vague or incomplete information	Chapters 3, 12
Business intelligence	Decision makers, managers, knowledge workers	Gathers and uses large amounts of data for analysis by business analytics and intelligent systems	Chapters 3, 12
Mobile computing systems	Mobile employees	Support employees who work with customers or business partners outside the physical boundaries of the organization	Chapter 7
Automated decision support (ADS)	Frontline employees, middle managers	Supports customer care employees and salespeople who need to make quick, real-time decisions involving small dollar amounts	Chapter 12

Business Performance Management Systems - Dashboards

Giving the Boss the Big Picture

Analyzer Dashboard Screen Shot

Ctuit Radar - Configurable Dashboard for Restaurants

Dashboards – cont'd

BrightPoint's Google Finance Dashboard

Click for interactive version of dashboard

Figure 2.7 Sample of a performance dashboard.

Executive Support Systems (ESS)

- ESS systems or Enterprise Information Systems (EIS) were originally 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 Activities* which deals with situations that may significantly change the manner in which business is done

Figure 2.8

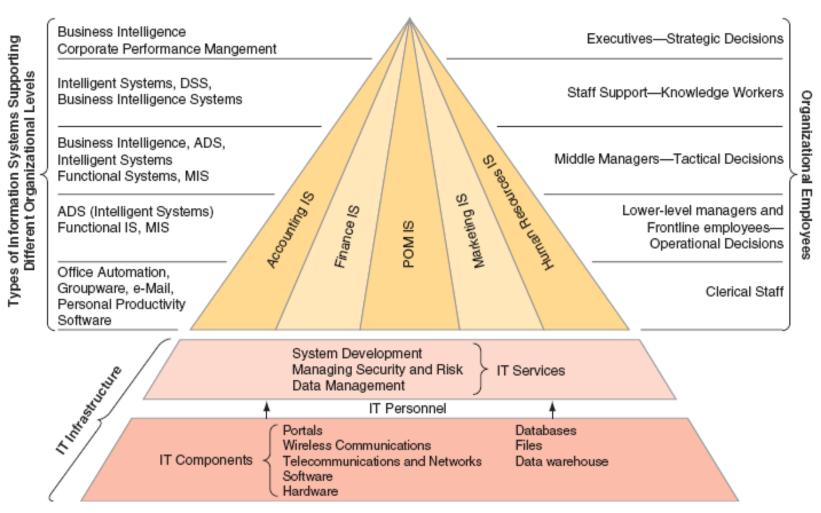**Interrelated support systems. The TPS collects information that is used to build the MIS and the data warehouse. These feed the BI and other enterprise systems.**

2.3 How IT Supports People

Figure 2.9 – The information systems support of people in organizations.

Types of Information Systems Supporting Different Organizational Levels

- Business Intelligence Corporate Performance Mangement
- Intelligent Systems, DSS, Business Intelligence Systems
- Business Intelligence, ADS, Intelligent Systems Functional Systems, MIS
- ADS (Intelligent Systems) Functional IS, MIS
- Office Automation, Groupware, e-Mail, Personal Productivity Software

Organizational Employees

- Executives—Strategic Decisions
- Staff Support—Knowledge Workers
- Middle Managers—Tactical Decisions
- Lower-level managers and Frontline employees—Operational Decisions
- Clerical Staff

Accounting IS • Finance IS • POM IS • Marketing IS • Human Resources IS

IT Infrastructure

System Development
Managing Security and Risk
Data Management } IT Services

IT Personnel

IT Components {
- Portals
- Wireless Communications
- Telecommunications and Networks
- Software
- Hardware
- Databases
- Files
- Data warehouse

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*, which later developed into *electronic commerce*.

- *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.

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 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
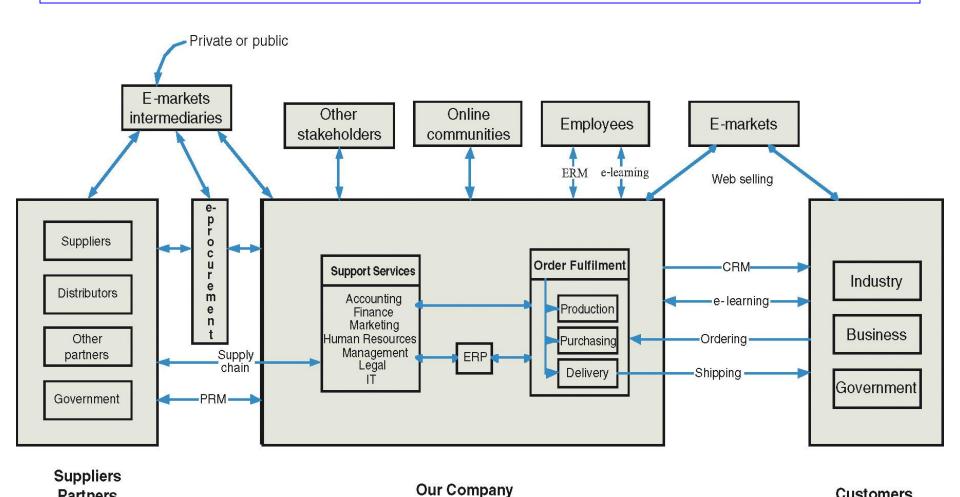- Extranets
- Corporate Portals
- E-commerce Systems

- Electronic Storefronts
- Electronic Markets
- Electronic Exchanges
- M-Commerce
- Enterprise Web

Extranets

- Connect several intranets via the Internet, by adding a security mechanism and some additional functionalities

- 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

E-Business and E-Commerce

The Structure of E-Commerce

Private or public

E-markets intermediaries

Other stakeholders

Online communities

Employees

E-markets

ERM   e-learning

Web selling

Suppliers
- Suppliers
- Distributors
- Other partners
- Government

e-procurement

Support Services
- Accounting
- Finance
- Marketing
- Human Resources
- Management
- Legal
- IT

ERP

Order Fulfilment
- Production
- Purchasing
- Delivery

Supply chain

PRM

CRM

e-learning

Ordering

Shipping

- Industry
- Business
- Government

Suppliers Partners

Our Company

Customers

E-Business – Transaction Types

E-commerce transactions can be done between various parties.

- **Business-to-business (B2B):** Both the sellers and the buyers are business organizations

- **Collaborative commerce (c-commerce):** In c-commerce, business partners collaborate electronically

- **Business-to-consumers (B2C):** The sellers are organizations, and the buyers are individuals

- **Consumers-to-businesses (C2B):** Consumers make known a particular need for a product or service, and suppliers compete to provide it

E-Business – Transaction Types (Continued)

E-commerce transactions can be done between various parties.

- **Consumer-to-consumer (C2C):** Individuals sell products or services to other individuals

- **Intrabusiness (intraorganizational) commerce:** An organization uses EC internally to improve its operations. A special case is known as B2E (business to its employees)

- **Government-to-citizens (G2C):** A government provides services to its citizens via EC technologies

- **Mobile commerce (m-commerce):** When e-commerce is done in a wireless environment

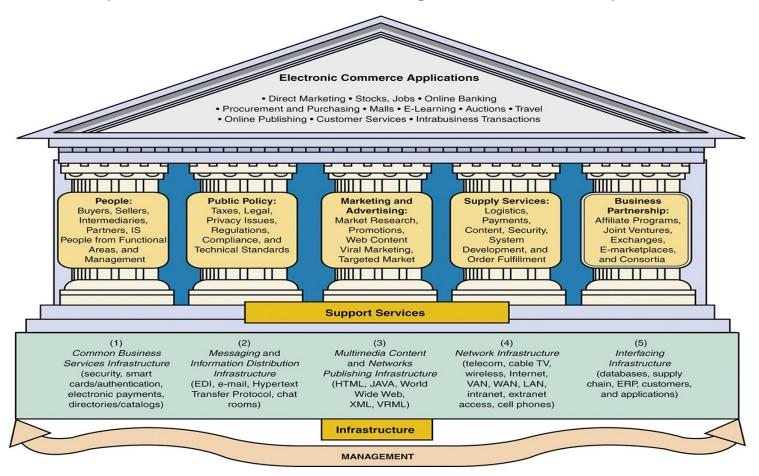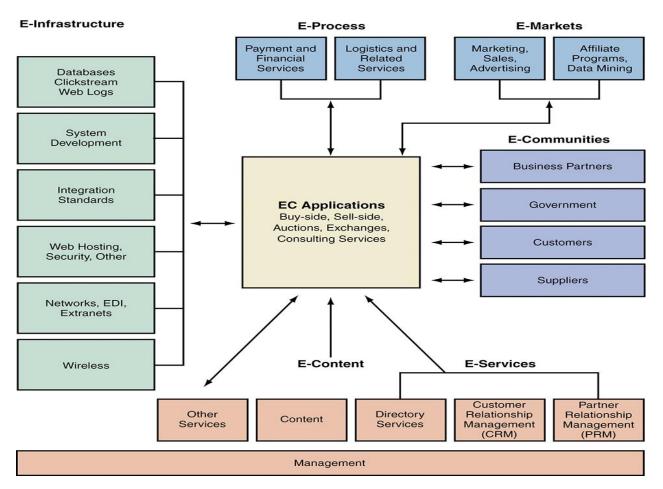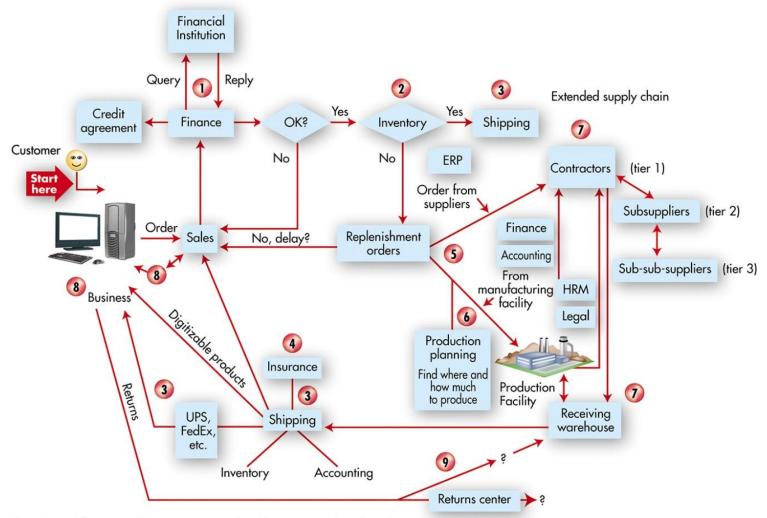# Figure 6.2 A framework for E-commerce. (Source: Drawn by E. Turban)

Figure 6.3 E-commerce support services. (Source: Drawn by E. Turban. Based on S.Y. Choi et al., 1997, p. 18.)

Order fulfillment and the logistics system.
(Source: Turban et al., Electronic Commerce: A Managerial Perspective 2008, Exhibit 13.2, p. 591).