Chapter 2

Information Technologies: Concepts and Management

Information Technology For Management 6th Edition

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John Wiley & Sons, Inc.

Learning Objectives

- Describe types and categories of information systems (IS)
- Contrast functional IS to transaction processing systems
- Internal support systems and managerial functions related to IS
- Describe IT support in relation to the supply chain and enterprise systems

Learning Objectives (Continued)

- Discuss client/server, P2P, legacy, and other forms of information architectures
- Describe Web-based information systems
- Describe the management of IS

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

Information System – Primary Purpose

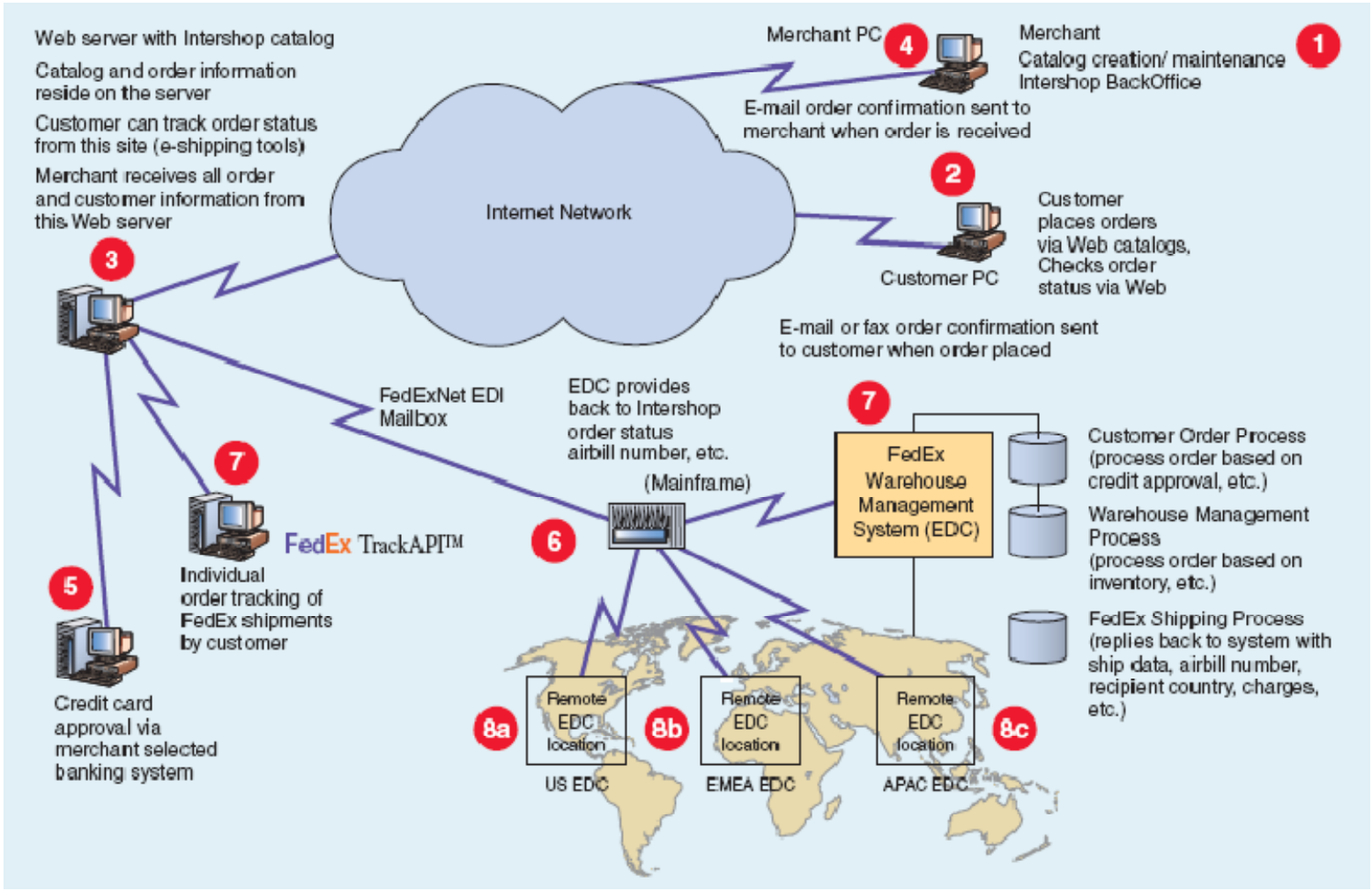
Collects data, processes it into information then converts information into knowledge for a specific purpose.

- 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

Information System – Classification By Organizational Structure

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

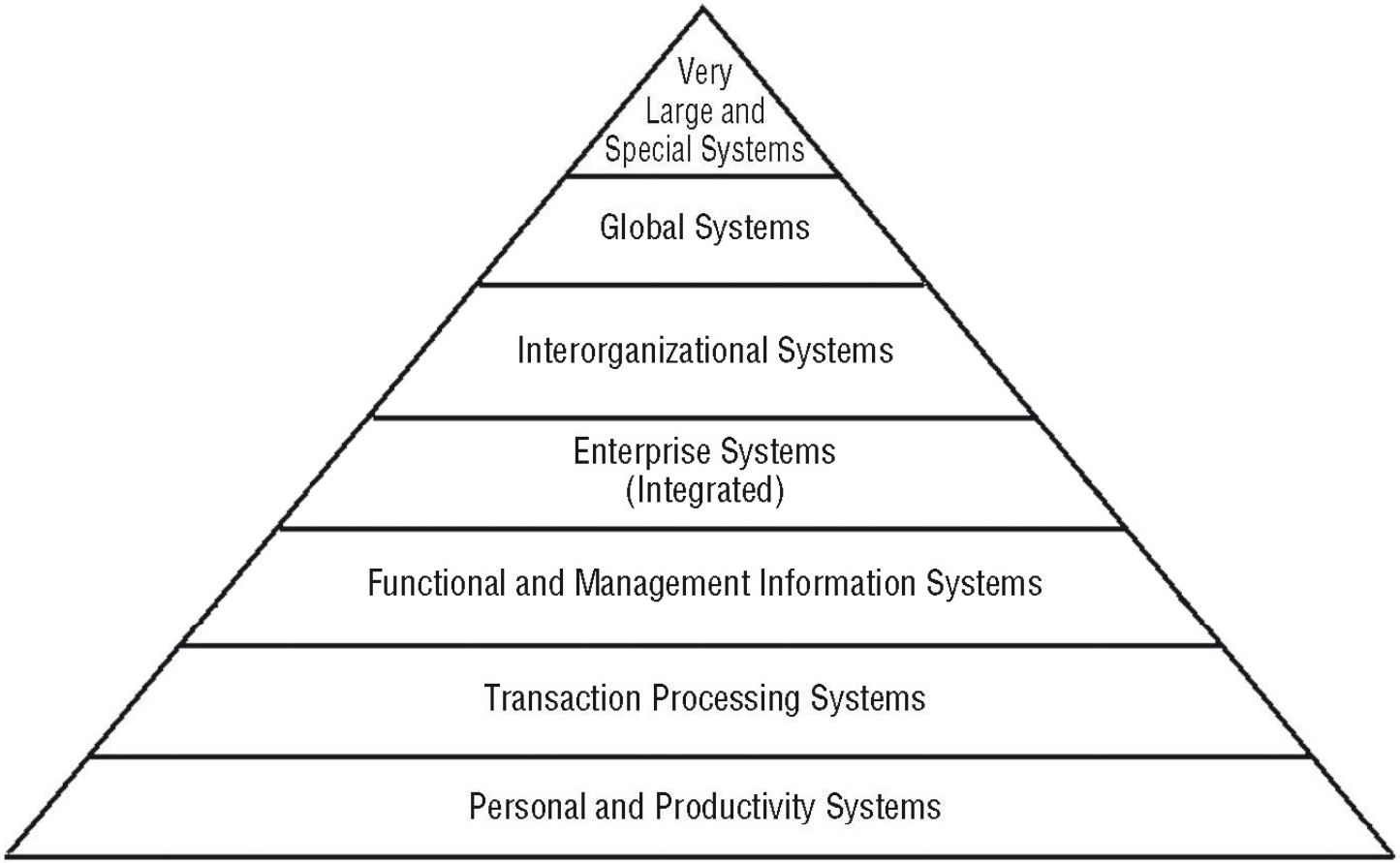
Information System – Classification By Organizational Structure – The FedEx Example



Basic Components of Information Systems

- **Hardware**
- **Software**
- **Network**
- **Procedures**
- **People**

Information System - Classification By Support Function



Information System - Classification By Function (Department)

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

Insert Figure 2.5 about here

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

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

Decision Support Systems (DSS)

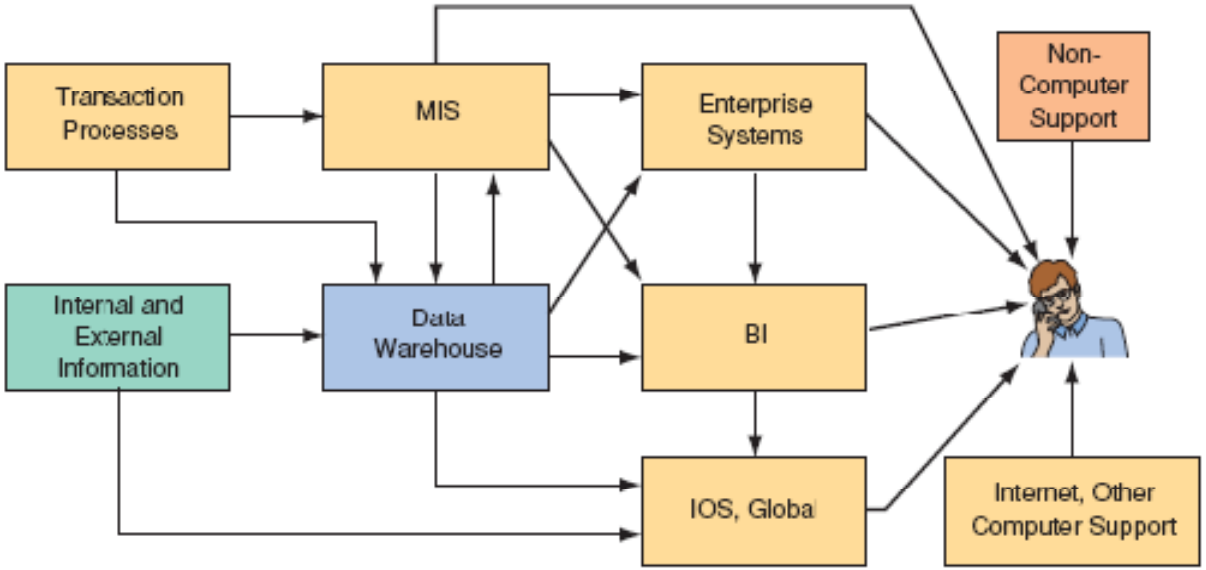
- These systems support complex non-routine decisions
- Primary purpose to process data into information
- DSS systems are typically employed by tactical level management whose decisions and what-if analyses are less structured
- This information system not only presents the results but also expands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

Intelligent Support Systems (ISS)

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

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



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**

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

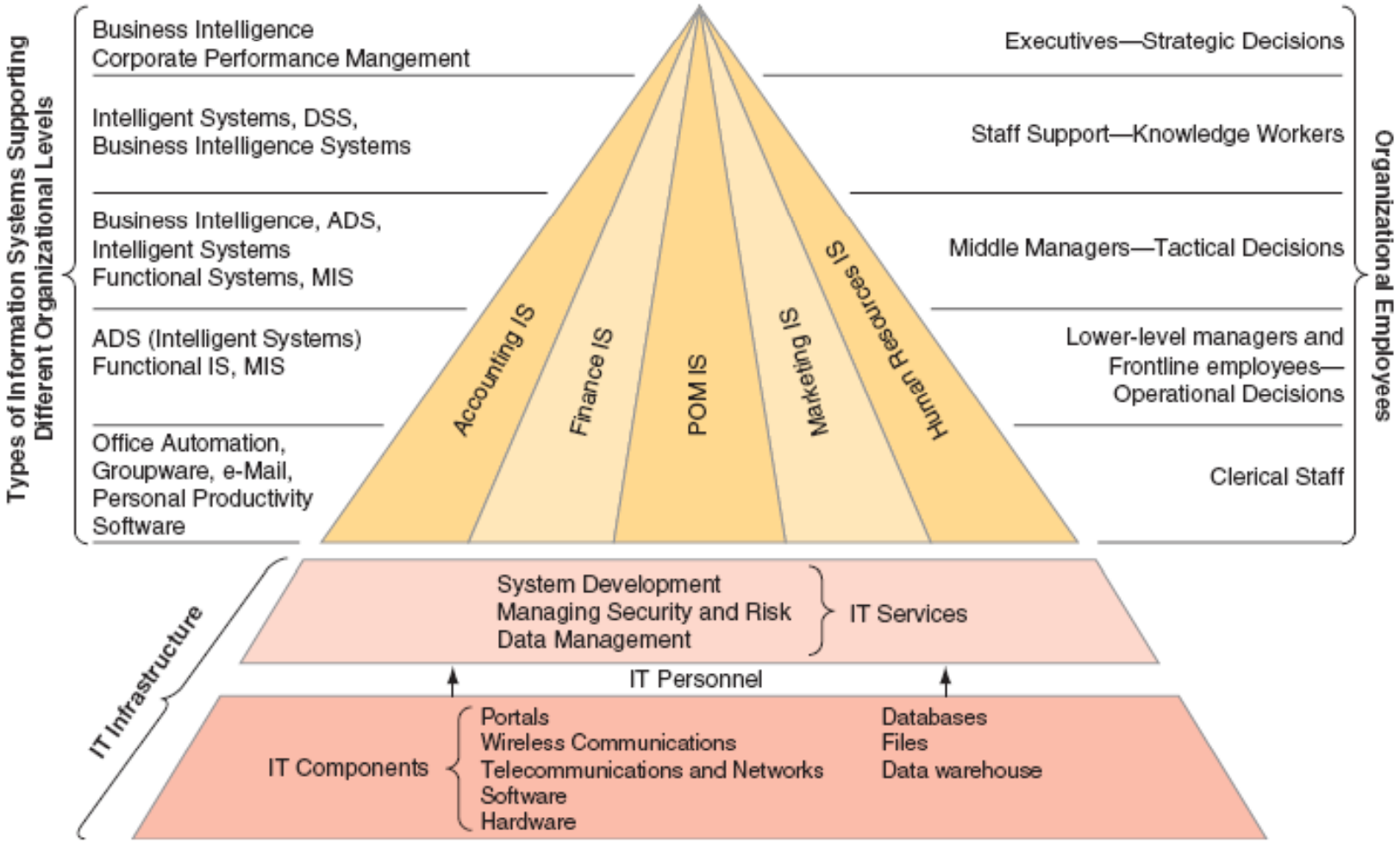
Expand our Scope to Include External Environments

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

Components of the Supply Chain

- **Upstream supply chain**
  - includes the organizations 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

People in Organizations



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

Managing Information Systems

- Information Systems (IS) have enormous strategic value. 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 are 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, 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.

Managerial Issues (Continued)

- **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.

- **How much infrastructure?** Justifying information system applications is not an easy job due to the intangible benefits and the rapid changes in technologies that often make systems obsolete. Justifying infrastructure is even more difficult since many users and applications share the infrastructure that will be used for several years in the future. This makes it almost impossible to quantify the benefits. Basic architecture is a necessity, but there are some options.

Managerial Issues (Continued)

- **The roles of the ISD and end users.** The role of the ISD can be extremely important, yet top management frequently mistreats it. By constraining the ISD to technical duties, top management may jeopardize an organization's entire future. However, it is not economically feasible for the ISD to develop and manage all IT applications in an organization. End users play an important role in IT development and management. The end users know best what their information needs are and to what degree they are fulfilled. Properly managed end-user computing is essential for the betterment of all organizations.

- **Ethical issues.** Systems developed by the ISD and maintained by end users may introduce some ethical issues. The ISD's major objective should be to build efficient and effective systems. But, such systems may invade the privacy of the users or create advantages for certain individuals at the expense of others.

Chapter 2

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