Learning Objectives
- Know the features and purposes of functional information systems for human resources, accounting, sales and marketing, operations, and manufacturing.
- Understand the problems caused by the isolation of functional systems.
- Understand how value chains and business process redesign led to the development of integrated applications.
- Know the features and functions of three types of integrated systems: customer relationship management (CRM), enterprise resource planning (ERP), and enterprise application integration (EAI).

Calculation Systems
- The first information system was the calculation system.
- Its purpose was to relieve workers of tedious, repetitive calculations.
- The first systems computed payroll, applied debits and credits to general ledger, balanced accounting records, and kept track of inventory quantities.
- These systems produced very little information.

Figure 7-1 History of IS Within Organizations

<table>
<thead>
<tr>
<th>Name</th>
<th>Era</th>
<th>Scope</th>
<th>Persuasion</th>
<th>Example</th>
<th>Technology Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculation systems</td>
<td>1960-1970</td>
<td>Single purpose</td>
<td>Eliminate tedious human calculations</td>
<td>Payroll, General Ledger, Inventory</td>
<td>Quicksort, Punch card</td>
</tr>
<tr>
<td>Functional systems</td>
<td>1970-1985</td>
<td>Business function</td>
<td>Blue computer to improve operation and management of individual departments</td>
<td>Human resources, financial reporting, Order entry, Manufacturing (MRP)</td>
<td>Telephone, mainframe, mini, network and I/Os</td>
</tr>
<tr>
<td>Integrated systems</td>
<td>1980-1990</td>
<td>Business process</td>
<td>Developed to integrate separate departments into organization-wide business processes</td>
<td>Customer relationship, management (CRM), Business process reengineering, Planning (ERP)</td>
<td>Networked PCs, client-server, The Internet</td>
</tr>
</tbody>
</table>

Functional Systems
- Functional systems facilitate the work of a single department or function.
- These systems grew as a natural expansion of the capabilities of systems of the first era.
  - Payroll expanded to become human resources.
  - General ledger became financial reporting.
  - Inventory was merged into operations or manufacturing.

Functional Systems (Continued)
- These new functional areas added features and functions to encompass more activities and to provide more value and assistance.
- The problem with functional applications is their isolation.
- Functional applications are sometimes called islands of automation.
Integrated, Cross-Functional Systems

- In this era, systems are designed not to facilitate the work of a single department or function.
- The objective is to integrate the activities in an entire business process.
- Since these business activities cross department boundaries, they are referred to as cross-departmental or cross-functional systems.

Integrated, Cross-Functional Systems (Continued)

- The transition from functional systems to integrated systems is difficult.
- Integrated processing requires many departments to coordinate their activities.
- Most organizations today are a mixture of functional and integrated systems.
- To successfully compete internationally, organizations must achieve the efficiencies of integrated cross-department process-based systems.

Figure 7-2 Typical Functional Systems

<table>
<thead>
<tr>
<th>Function</th>
<th>Example Information Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human resources</td>
<td>Personnel, appraisal, payroll</td>
</tr>
<tr>
<td>Accounting and Finance</td>
<td>General ledger, financial planning, budgeting, receivables, payable management</td>
</tr>
<tr>
<td>Sales &amp; Marketing</td>
<td>Lead tracking, customer relationship management, product management</td>
</tr>
<tr>
<td>Operations</td>
<td>Order entry, order management, inventory management, project management</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>Inventory, purchasing, accounting, manufacturing operations</td>
</tr>
</tbody>
</table>

Human Resources Systems

- Human resources systems support recruitment, compensation, evaluation, and development of the organization’s employees and affiliated personnel.

Figure 7-3 Functions Supported by Human Resources System

- Recruiting
  - Job postings
  - Resume processing
  - Scheduling procedures
- Development
  - Training, development, job assessments, salary scales
- Operations
  - Benefits programs, training classes

Accounting and Finance Systems

- Financial reporting applications use the general ledger data to produce financial statements and other reports for management, investors, and federal reporting agencies.
- Cost accounting applications determine the marginal cost and relative profitability of products and product families.
- Budgeting applications allocate and schedule revenues and expenses and compares actual financial results to the plan.
Accounting and Finance Systems (Continued)

- Accounts receivable includes:
  - Recording receivables
  - Recording payments against receivables
  - Account aging and collections management

- Cash management is the process of scheduling payments and receivables and planning the use of cash so as to balance the organization’s cash needs against cash availability.

Sales and Marketing Systems

- Sales and marketing systems store data about potential customers, their product interests and contact with them by sales personnel.

- Sales management uses sales forecasting systems to predict future sales.

- Customer management systems maintain customer contact data, credit status, past orders, and other data.

Sales and Marketing Systems (Continued)

- Marketing personnel use product management systems, which include a variety of different functions.

- Marketing staff use the product information to evaluate the success of products and to assess the effectiveness of marketing activities, including promotions, advertising, sales channels, etc.

Operations Systems

- Operations activities concern the management of finished-goods inventory and the movement of goods from that inventory to the customer.

- Operations systems are especially prominent for non-manufacturers, such as distributors, wholesalers, and retailers.

- Order entry systems record customer purchases.
Operations Systems (Continued)

• Order management systems
  – track orders
  – arrange and schedule shipping
  – process exceptions (out of stock)
  – inform customers of order status and schedule delivery dates

• Customer service allows customers to call and ask questions about products, order status, problems, and make complaints.

Manufacturing Systems

• Manufacturing systems facilitate the production of goods.

• Manufacturing systems include inventory, planning, scheduling, and manufacturing operations.

Inventory Systems

• Information systems facilitate inventory control, management, and policy.

• Inventory applications track goods and materials into, out of, and between inventories.

• Today most systems use UPC bar codes to scan product numbers as items move in and out of inventories.

• In the future, radio frequency identification tags (RFID) will be in widespread use.

• Inventory management applications use past data to compute stocking levels, reorder levels, and reorder quantities in accordance with inventory policy.

Inventory Systems (Continued)

• Just-in-time (JIT) inventory policy seeks to have production inputs (both raw materials and work in process) delivered to the manufacturing site just as they are needed.

• By using JIT policy, companies are able to reduce inventories to a minimum.
Manufacturing Planning Systems

- In order to plan materials for manufacturing, it is first necessary to record the components of the manufactured items.
- A bill of material (BOM) is a list of the materials that comprise a product.
- The materials that comprise a product can be subassemblies that need to be manufactured.
- The BOM is a list of materials, and materials within materials, and materials within materials, and so forth.

Manufacturing-Scheduling Systems

- Companies use three philosophies to create a manufacturing schedule:
  - Push Manufacturing process
  - Pull Manufacturing process
  - Material Requirements Planning (MRP)
- Manufacturing resource planning (MRP II) is a follow-on to MRP that includes the planning of materials, personnel, and machinery.

The Problems of Functional Systems

- Functional systems provide tremendous benefits to the departments that use them; however, they are limited due to operating in isolation.
- With isolated systems:
  - Data are duplicated because each application has its own database
  - Business processes are disjointed
  - Lack of integrated enterprise data
  - Inefficiency
Competitive Strategy and Value Chains

• When Michael Porter wrote the now-classic *Competitive Advantage* in the mid-1980s his ideas laid the groundwork for solving the problems of isolated information systems.
• Porter defined and described value chains, which are networks of business activity that exist within an organization.
• Porter also developed a model of competitive strategies that helps organizations choose which information systems to develop.

The Value Chain

• Value in the Porter model is the total revenue that a customer is willing to spend for a product or service.
• Value is stressed rather than cost because an organization that has a differentiation strategy may intentionally raise costs in order to create value.
• Margin is the difference between cost and value.

Value Chain Model–Primary Activities

• Each stage of the generic chain primary activities accumulates costs and adds value to the product.
• The net result is the total margin of the chain that is the difference between the total value added and the total costs incurred.
• The generic value chain must be adopted to specific business (for example, your university or place where you work).
Figure 7-14 Task Descriptions for Primary Activities of the Value Chain

<table>
<thead>
<tr>
<th>Primary Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inbound logistics</td>
<td>Receiving, storing, and disseminating inputs to the product</td>
</tr>
<tr>
<td>Operations</td>
<td>Transforming inputs into the final product</td>
</tr>
<tr>
<td>Outbound logistics</td>
<td>Collecting, storing, and physically distributing the product to buyers</td>
</tr>
<tr>
<td>Marketing and sales</td>
<td>Inducing buyers to purchase the product and providing a means for them to do so</td>
</tr>
<tr>
<td>Service</td>
<td>Assisting customer’s use of the product and thus maintaining and enhancing the product’s value</td>
</tr>
</tbody>
</table>

Value Chain Model—Support Activities
- The support activities in the generic value chain contribute indirectly to production, sale, and service of the product which includes:
  - Procurement
  - Technology
  - Research
  - Firm infrastructure

Linkages in the Value Chain
- Linkages are interactions across value activities.
- Linkages are important sources of efficiencies and are readily supported by information systems.
- (Material Requirements Planning) MRP and (Manufacturing Resource Planning) MRP II are functional systems that use linkages to reduce inventory costs.

Business Process Design
- The idea of the value chain as a network of value-creating activities became the foundation of a movement called business process design, or sometimes business process redesign.
- The central idea is that organizations should not automate or improve existing functional systems.
- Rather they should create new, more efficient, business processes that integrate the activities of all departments involved in a value chain.
- The goal was to take advantage of as many activities of all departments involved in a value chain.

Challenges of a Business Process Design
- Process design projects are expensive and difficult.
- Highly trained systems analysts interview key personnel from many departments and document the existing system as well as one or more systems alternatives.
- Managers review the results of the analysts’ activity, usually many times, and attempt to develop new, improved processes.
- The new information systems are developed to implement those new business processes.

Challenges of a Business Process Design (Continued)
- Changes in process design may have to take place before the new system (project) is completed.
- Greater challenges can occur such as employees resistance to change.
- An organization that embarks on a business process design project does not know ahead of time how effective the ultimate outcome will be.
- Some businesses were successful in their process design activities, but many others failed.
Benefits of Inherent Processes

• When an organization acquires, say, a business application from Siebel Systems, the processes for using the software are built-in or inherent processes.
• In most cases, the organization must conform its activities to those processes.
• If the software is designed well, the inherent processes will save the organization the substantial, sometimes staggering, cost of designing new processes itself.

Customer Relationship Management

• Customer relationship management (CRM) is the set of business processes for attracting, selling, managing, and supporting customers.
• The difference between CRM systems and traditional functional applications is that CRM addresses all activities and events that touch the customer and provides a single repository for data about all customer interactions.
• CRM systems store all customer data in one place and thus make it possible to access all data about the customer.

Customer Relationship Management (Continued)

• The components for each stage of the customer life cycle are:
  - Solicitation
  - Lead Tracking (presale)
  - Relationship management (postsale)
• Information systems that support solicitation include email applications and organizational Web sites.
• Additionally, some information systems support traditional direct mail, catalog, and other solicitations.
Customer Relationship Management (Continued)

- Organizational Web site is an increasingly important solicitation tool.
  - Web addresses are easy to promote and remember.
  - Once a target prospect is on the Web site, product descriptions, use cases, success stories, and other solicitation materials can be provided easily.
  - The cost of distributing these materials via the Web is substantially less than the cost of creating and distributing printed materials.
  - Many Web sites require customer name and contact information before releasing high-value promotional material.

- Sales management applications
  - Support sales to existing customers
  - Contain features to prioritize customers according to their purchase history
  - Salespeople can increase sales to existing customers by focusing on customers who have already made large purchases, by focusing on large organizations that have the potential to make large purchases, or both.
  - The goal of such applications is to ensure that sales management has sufficient information to prioritize and allocate sales time and effort.

- Customer support applications
  - Order management applications help the customer to determine the status of an order, how and when it was shipped, the status of returns, etc.
  - Other customer support applications track customer problems and resolutions and ensure that customers need not repeat their problem history to each new support representative.
  - Customer support has an important linkage to product marketing and development; it knows more that any other group what customers are doing with the product and what problems they are having with it.

Enterprise Resource Planning

- Enterprise resource planning (ERP) integrates all of the organization’s principal processes.
- ERP is an outgrowth of MRP II manufacturing systems, and the primary ERP users are manufacturing companies.
- The first and most successful vendor of ERP software is SAP (SAP AG Corp., headquartered in Germany).
**Figure 7-19 Characteristics of ERP**

- Provides cross-functional, process view of organization
- Has a formal approach based on formal business models
- Maintains data in centralized database
- Offers large benefits but is difficult, fraught with challenges, and can be slow to implement
- Often very expensive

**Enterprise Application Integration**

- **ERP Characteristics**
  - ERP takes a cross-functional, process view of the entire organization.
  - With ERP, the entire organization is considered a collection of interrelated activities.
  - ERP is a formal approach that is based on documented, tested business models.
  - ERP applications include a comprehensive set of inherent processes for all organizational activities.
  - SAP defines this set as the process blueprint and documents each process with diagrams that use a set of standardized symbols.

**Enterprise Application Integration (Continued)**

- **ERP Characteristics (continued)**
  - ERP is based on formally defined procedures, organizations must adapt their processing to the ERP blueprint.
  - If they do not, the system cannot operate effectively, or even correctly.
  - With ERP systems, organizational data are processed in a centralized database.
  - The process of moving from separated, functional applications to an ERP system is difficult, fraught with challenge, and can be slow.

**Figure 7-20 Potential Benefits of ERP**

- Efficient business processes
- Inventory reduction
- Lead time reduction
- Improved customer service
- Greater, real-time insight into organization
- Higher profitability

**Enterprise Application Integration**

- **ERP Benefits**
  - The processes in the business blueprint have been tried and tested over hundreds of organizations.
  - The processes are always effective and often very efficient.
  - Organizations that convert to ERP do not need to reinvent business processes.
  - By taking an organization-wide view, many organizations find they can reduce their inventory dramatically.
  - With better planning, it is not necessary to maintain large buffer stocks.
Enterprise Application Integration (Continued)

- ERP Benefits (Continued)
  - Items remain in inventory for shorter periods of time, sometimes no longer than a few hours or a day.
  - ERP helps organizations reduce lead times.
  - Data inconsistency problems are not an issue because all ERP data are stored in an integrated database.
  - ERP-based organizations often find that they can produce and sell the same products at lower costs due to:
    - Smaller inventories
    - Reduced lead times
    - Cheaper customer support

Implementing an ERP System

- The first task is to model the current business processes.
- Managers and analysts compare these processes to the ERP blueprint processes and note the differences.
- The company must then find ways to eliminate the differences by either:
  - Changing the existing business process to match the ERP process
  - Altering the ERP system

Implementing an ERP System (Continued)

- Once the differences between the as-is processes and the blueprint have been reconciled, the next step is to implement the system.
- Before implementation starts, users must be trained on the new processes, procedures, and use of the ERP system features and functions.
- The company needs to conduct a simulation test of the new system to identify problems.

Implementing an ERP System (Continued)

- SAP blueprint contains over a thousand process models.
- Organizations that are adopting ERP must review these models and determine which ones are appropriate to them.
- The organizations compare the ERP models to the models developed based on their current practices.

Implementing an ERP System (Continued)

- The organization must convert its data, procedures, and personnel to the new ERP system.
- Because so much organizational change is required, all ERP projects must have full support of the CEO and executive staff.
Problem Solving Guide–Thinking about Change

- New information systems, especially those that cross departmental boundaries, require employees to change.
- At the very least, they will certainly use new information systems, forms, reports, and other features.
- Many organizations have found that implementing such change is the most difficult part of IS implementation.
- Change management is a blend of business, engineering, sociology, and psychology that strives to understand the dynamics of organizational change and to develop and communicate theories, methods, and techniques that enable successful organizational change.

(Continued)

Problem Solving Guide–Thinking about Change (Continued)

- The top obstacle to successful change is employee resistance.
- Employees resist change for several reasons:
  - Change requires adapting to a new situation or system, and, for a while, all changes make work harder, not easier.
  - Unless, employees understand the need for change, they will be unwilling to devote the extra energy and work required.
  - To be willing to change, employees need to understand the importance of and need for the new system or project.

Security Guide–Centralized Vulnerability

- With ERP and other multifunction systems, a centralized database enables authorized users to obtain integrated information.
- However, a centralized database also makes it easier for unauthorized users and criminals to obtain the same integrated information.
- Further, in the event of a catastrophic data loss, all of the applications in the ERP suite will be unavailable and the entire organization can become paralyzed.
- Databases that support ERP, and even functional applications that span several business activities, increase organizational vulnerability.

(Continued)

Security Guide–Centralized Vulnerability (Continued)

- Because of this increased vulnerability, security, backup, and recovery become critical.
- There are several types of controls and procedures that can be put in place such as:
  - Ensure that appropriate security measures exist to protect the organizational network and organizational databases
  - Ensure that appropriate roles are defined for application users and that permissions and passwords are set to enforce those roles
  - The goal of such controls is to promote appropriate separation of duties and authorities
  - The organization must protect data assets from loss due to natural disaster or other catastrophic loss.

(Continued)
Reflections Guide–ERP and the Standard Blueprint

- Designing business processes is difficult, time consuming, and very expensive.
- Highly trained experts conduct seemingly countless interviews with users and domain experts to determine business requirements.
- ERP vendors such as SAP have invested millions of labor hours into business blueprints that underlie their ERP solutions.
- These blueprints consist of hundreds or thousands of different business processes.
- Example, processes for hiring employees, acquiring consumable goods, etc.

Reflections Guide–ERP and the Standard Blueprint (Continued)

- ERP vendors have developed software solutions that fit their business-process blueprints.
- In theory, no software development is required at all if the organization can adapt to the standard blueprint of the ERP vendor.
- Most organizations choose to modify their processes to meet the blueprint, rather than the other way around.
- From a standpoint of cost, effort, risk, and avoidance of future problems, there is a huge incentive for organizations to adapt to the standard ERP blueprint.

Reflections Guide–ERP and the Standard, Standard Blueprint (Continued)

- SAP was the only true ERP vendor, but other companies have developed and acquired ERP solutions as well.
- Because of the competitive pressure across the software industry, all of these products are beginning to have the same sets of features and functions.
- All of this is fine as far as it goes, but it introduces a nagging question: If, over time, every organization tends to implement the standard ERP blueprint, and if, over time, every software company develops essentially the same ERP features and functions, then won’t every business come to look just like the other business?

Reflections Guide–ERP and the Standard, Standard Blueprint (Continued)

- All of this is fine as far as it goes, but it introduces a nagging question: (continued)
  - How will organizations gain a competitive advantage if they all use the same business processes?
  - How will a company distinguish itself?
  - Does the use of “commoditized” standard blueprints mean that no company can sustain a competitive advantage?

Dimensions of Managerial Effectiveness
Chapter 10 – Information Systems Management

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Learning Objectives
• Understand the relationship of the CIO and CTO to other senior executives.
• Know the IS department’s responsibilities for planning the use of IT/IS, managing infrastructure, developing systems, and protecting information assets.
• Understand the purpose and advantages of outsourcing.
• Understand the risks of outsourcing.
• Know users’ rights and responsibilities with regard to the IS organization.

The Information Systems Department
• The main functions of the information systems department are as follows:
  – Plan the use of IT to accomplish organizational goals and strategy.
  – Develop, operate, and maintain the organization’s computing infrastructure.
  – Develop, operate, and maintain enterprise applications.
  – Protect information assets.
  – Manage outsourcing relationships.

The Information Systems Department (Continued)
• The title of the principal manager of the IS department varies from organization to organization.
  – A common title is chief information officer, or CIO.
  – Other common titles are vice president of information services, director of information services, and, less commonly, director of computer services.
  – The CIO, like other senior executives, reports to the chief executive officer (CEO), though sometimes these executives report to the chief operation officer (COO), who in turn reports to the CEO.
  – In some companies, the CIO reports to the chief financial officer (CFO).

The Information Systems Department (Continued)
• Most IS departments include a technology office that investigates new information systems technologies and determines how the organization can benefit from them.
  – Today many organizations are investigating Web services technology and planning on how they can best use that technology to accomplish their goals and objectives.

The Information Systems Department (Continued)
• The chief technology officer or CTO, often heads the technology group.
  – The CTO sorts through new ideas and products to identify those that are most relevant to the organization.
  – The CTO’s job requires deep knowledge of information technology and the ability to envision how new IT will affect the organization over time.
The Information Systems Department (Continued)

- The group **operations**, manages the computing infrastructure, including individual computers, computer centers, networks, and communications media.
  - This group includes system and network administrators.
  - An important function of this group is to monitor the user experience and respond to user problems.

- Another group in the IS department is **development**
  - This group manages the process of creating new information systems as well as maintaining existing information systems.

The Information Systems Department (Continued)

- The size and structure of the development group depends on whether programs are developed in-house.
  - If not, this department will be staffed primarily by systems analysis who work with users, operations, and vendors to acquire and install licensed software and to set up the system components around that software.
  - If the organization develops programs in-house, then this department will include programmers, test engineers, technical writers, and other development personnel.

The Information Systems Department (Continued)

- The last IS department is **outsourcing relations**.
  - This group exists in organizations that have negotiated outsourcing agreements with other companies to provide equipment, applications, or other services.

- There is also a **data administration** staff function.
  - The purpose of this group is to protect data and information assets by establishing data standards and data management practices and policies.

- Keep the distinction between IS and IT.
  - Information systems (IS) exist to help the organization achieve its goals and objectives.
  - Information technology (IT) is just technology.
    - It concerns the products, techniques, procedures, and designs of computer-based technology.
    - IT must be placed into the structure of an IS before an organization can use it.

Align Information Systems with Organizational Strategy

- Information systems must be aligned with organizational strategy.

- The purpose of an information system is to help the organization accomplish its goals and objectives.

Figure 10-1 Typical Senior-Level Reporting Relationships

Figure 10-2 Planning the Use of IS/IT

- Align information systems with organizational strategy; maintain alignment as organization changes.
- Communicate IS/IT issues to executive group.
- Develop/enforce IS priorities within the IS department.
- Sponsor steering committee.
Communicate IS issues to the Executive Group

- The CIO is the representative for IS and IT issues within the executive staff.
- Provides the IS perspective during discussions of problems, solutions, proposals, and new initiatives.

Develop Priorities and Enforce Within the IS Department

- The CIO must evaluate every proposal, at the earliest stage possible, as to whether it is consistent with the goals of the organization and aligned with its strategy.
- No organization can afford to implement every good idea.
- Projects that are aligned with the organization’s strategy must be prioritized.
- The IS department must develop the most appropriate systems possible, given constraints on time and money.

Managing the Computing Infrastructure

- Managing the computing infrastructure is the most visible of all of the IS department’s functions.
- To many employees, the IS department is the “computer department”.
- This management function must be in alignment with infrastructure design.

Align Infrastructure Design with Organizational Structure

- The structure of the IS infrastructure must mirror the structure of the organization.
- A highly controlled and centralized organization needs highly controlled and centralized information systems.
- A decentralized organization with autonomous operating units requires decentralized information systems that facilitate autonomous activity.

Create, Operate, and Maintain Computing Infrastructure

- Three more tasks in managing the computing infrastructure are to:
  - Create and maintain infrastructure for end-user computing.
  - Create, operate, and maintain networks.
  - Create, operate, and maintain data centers, data warehouses, and data marts.

Track Problems and Monitor Resolutions

- The IS department provides the computing infrastructure as a service to users.
- The system is used to record user problems and monitor their resolution.
- When a user reports a problem the department assigns a tracking number, and the problem enters a queue for service.
Track Problems and Monitor Resolutions (Continued)

- Problems are prioritized on the basis of how critical they are to the user’s work.
- Higher-priority items are serviced first.
- The user is told its priority and given an approximate date for resolution.

Manage Computing Infrastructure Staff

- The IS department must manage the computing infrastructure staff.
- The organization of an operation department has subdepartments for the network, computer center, data warehouse and user support.
- The operations staff must constantly update its knowledge to keep up with upgrades in both hardware and software products.

Figure 10-6 Organization of a Typical IS Operation Group

Managing Enterprise Application

- In addition to managing the computing infrastructure, the IS department manages enterprise applications as well.
- Enterprise applications means software programs that span more than one department, such as some functional applications as well as ERP, EAI, and SCM applications.

Figure 10-7 Managing Enterprise Applications

Develop New Applications

- The IS department manages the development of new applications.
- The process of creating a new application begins when the IS department aligns its priorities with the organization’s strategy.
- The IS department develops system plans and proposals and submits them to the steering committee for approval.
- Once approved, the development process is initiated.
Maintain Systems

- The IS department has the responsibility for system maintenance.
- Maintenance means either to fix the system to do what it is supposed to do in the first place or to adapt the system to changed requirements.
- The IS department must have a means to track user issues and problems, prioritize them, and record their resolution.

Integrate Enterprise Applications

- A third element concerns enterprise application integration.
- EIA requires developers to create intermediary layers of software, and possibly intermediary databases, to enable the integration of disparate systems.

Figure 10-8 Organization of a Typical IS Development Group

Manage Development Staff

- The last management function is to manage the development staff.
- A computer programmer or developer is both a software designer as well as a programmer.
- Sustaining-application developers work on existing applications.
- Sustaining developers have fewer years of experience or less knowledge than new-application developers.

Administer Data

- Data administration describes a function that pertains to all of an organization’s data assets.
- Database administration describes a function that pertains to a particular database.

Define Data Standards

- Data standards are definitions, or metadata, for data items shared across the organization. They describe the name, official definition, usage, relationship to other data items, processing restrictions, version, security code, format and other features of data items that are shared across the organization.
- Data standards can also include data owner.
Maintain the Data Dictionary
- A **data dictionary** is a file or database that contains data definitions.
- Without maintenance, the data dictionary, an essential tool, loses its value.

Define Data Policies
- Data administration is concerned with the creation and dissemination of data policies.
- The data administrator works with senior executives, the legal department, functional department managers, and others to determine data policy.
- Data policies are dynamic and must change as new corporate policies and new systems are developed and as new laws are created.

Outsourcing
- Outsourcing is the process of hiring another organization to perform a service.
- Outsourcing is done to save costs, to gain expertise, and to free up management time.

International Outsourcing
- Large companies outsource outside of the United States because of a large, well-educated, English-speaking population that will work for 20 to 30 percent of the labor cost here in this country.
- International outsourcing is advantageous for customer support and other functions that must be operational 24/7.
Alternatives to Outsourcing

- Some organizations outsource the acquisition and operation of computer hardware.
- Acquiring licensed software
- Outsource entire system
- Web storefront
- Entire business function

Figure 10-13 Outsourcing Risks
- Loss of control
  - Vendor or buyer's seat
  - Technology direction
  - Potential loss of intellectual capital
  - Product flaws, enhancements in writing priority.
  - Vendor management, direction, or identity changes.
  - CIO synergy
- Benefits outweighed by long-term costs
  - High unit cost, forever
  - Paying for someone else's mismanagement.
  - In time, outsourcing vendor de facto a de source.
  - May not get what you pay for but don't know it.
- No easy exit
  - Critical knowledge in minds of vendors, not employees.
  - Expanse and scale to change vendors.

Figure 10-14 User Information Systems Rights and Responsibilities

You have rights:
- Computer hardware and programs that always perform your job functions
- Reliable network and Internet connections
- A secure computing environment
- Protection from viruses, worms, and other threats
- Contributions to requirements for your system hardware and software
- Reliable system development and maintenance
- Prompt attention to problems, concerns, and complaints
- Properly maintained problem tickets and resolutions
- Effective training

You have responsibilities:
- Learn basic computer skills
- Learn standard techniques and procedures for the applications you use
- Follow security and operating procedures
- Protect your password
- Use computer resources according to your employer's computer use policy
- Make no unauthorized hardware modifications
- Install only authorized programs
- Keep software patches and files when assigned to do so
- When asked, devote the time required to read new and existing policies
- Report requirements for new system hardware and software
- Avoid reporting trivial problems

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- Brainard and Litan cite research that indicates that organizations will move about 250,000 jobs per year overseas between now and 2015.
- Although that may sound like a lot, in the context of the 137 million U.S. workers, and in the context of the 15 million US Americans who lose their jobs due to other factors, 250,000 jobs overseas is not much.

Reflections Guide—Jumping Aboard the Bulldozer (Continued)
- The culprit is not overseas outsourcing; it is productivity.
- Because of information technology, Moore's Law, and all the information systems that you have learned about in this book, workers productivity continues to increase, and it is possible to have an economic recovery without a binge of new hiring.