Chapter 1
Introduction to Systems Analysis and Design
Chapter Objectives

• Discuss the impact of information technology on business strategy and success
• Define an information system and describe its components
• Explain how profiles and models can represent business functions and operations
• Explain how the Internet has affected business strategies and relationships
Chapter Objectives

• Identify various types of information systems and explain who uses them
• Distinguish between structured analysis, object-oriented analysis, and agile methods
• Compare the traditional waterfall model with agile methods and models
• Discuss the role of the information technology department and the systems analysts who work there
Introduction

• Companies use information as a weapon in the battle to increase productivity, deliver quality products and services, maintain customer loyalty, and make sound decisions.

• Information technology can mean the difference between success and failure.
The Impact of Information Technology

• Information Technology (IT)
  – Combination of hardware and software products and services that companies use to manage, access, communicate, and share information

• The Future of IT
  – Will see robust growth for at least a decade
  – The greatest need will be for systems analysts, network administrators, data communications analysts, and software engineers
The Impact of Information Technology

• The Role of Systems Analysis and Design
  – Systems Analysis and Design
    • Step-by-step process for developing high-quality information systems
  – Systems Analyst
    • Plan, develop, and maintain information systems
The Impact of Information Technology

• Who develops Information Systems?
  – In-house applications
  – Software packages
  – Internet-based application services
  – Outsourcing
  – Custom solutions
  – Enterprise-wide software strategies
  – How versus What
Information System Components

• A system is a set of related components that produces specific results
• A Mission-critical system is one that is vital to a company’s operations
• Data consists of basic facts that are the system’s raw material
• Information is data that has been transformed into output that is valuable to users
• Information systems have five key components: hardware, software, data, processes, and people
Information System Components

- **Hardware**
  - Is the physical layer of the information system
  - Moore’s Law

- **Software**
  - System software
  - Application software
  - Enterprise applications
Information System Components

• **Software**
  – Horizontal system
  – Vertical system
  – Legacy systems

• **Data**
  – Tables store data
  – By linking the tables, the system can extract specific information
Information System Components

• Processes
  – Describe the tasks and business functions that users, managers, and IT staff members perform to achieve specific results

• People
  – Stakeholders
  – Users, or end users
Understanding The Business

• Business Process Modeling
• Business Profile
• Business Models
  – Business model
  – Business process
  – Business process reengineering (BPR)
Understanding The Business

• New Kinds of Companies
  – Production-oriented
  – Service-oriented
  – Internet-dependent
  – Dot-com (.com)
  – Brick-and-mortar
Impact of the Internet

• E-Commerce or I-Commerce
• B2C (Business-to-Consumer)
• B2B (Business-to-Business)
  – EDI
  – Extensible markup language (XML)
  – Supplier relationship management (SRM)
Impact of the Internet

- Web-Based System Development
  - WebSphere
  - .NET
  - Web services
  - Internet-based systems involve various hardware and software designs
How Business Uses Information Systems

• In the past, IT managers divided systems into categories based on the user group the system served
  – Office systems
  – Operational systems
  – Decision support systems
  – Executive information systems
How Business Uses Information Systems

- Enterprise computing systems
  - Support company-wide operations and data management requirements
- Enterprise resource planning (ERP)
- Many hardware and software vendors target the enterprise computing market
How Business Uses Information Systems

• Transaction processing systems
  – Involve large amounts of data and are mission-critical systems
  – Efficient because they process a set of transaction-related commands as a group rather than individually
How Business Uses Information Systems

• Business support systems
  – Provide job-related information to users at all levels of a company
  – Management information systems (MIS)
  – Radio frequency identification (RFID)
  – What-if
How Business Uses Information Systems

• Knowledge management systems
  – Called expert systems
  – Simulate human reasoning by combining a knowledge base and inference rules
  – Many knowledge management systems use a technique called fuzzy logic
How Business Uses Information Systems

• User productivity systems
  – Technology that improves productivity
  – Groupware

• Information systems integration
  – Most large companies require systems that combine transaction processing, business support, knowledge management, and user productivity features
Information System Users and Their Needs
Systems Development Tools

• Modeling
  – Business model
  – Requirements model
  – Data model
  – Object model
  – Network model
  – Process model
Systems Development Tools

• Prototyping
  – Prototype
  – Speeds up the development process significantly
  – Important decisions might be made too early, before business or IT issues are thoroughly understood
  – Can be an extremely valuable tool
Systems Development Tools

• Computer-Aided Systems Engineering (CASE) Tools
  – Also called computer-aided software engineering
  – CASE tools
  – Can generate program code, which speeds the implementation process
Overview of Systems Development Methods

• Structured Analysis
  – Systems development life cycle (SDLC)
  – Predictive approach
  – Uses a set of process models to describe a system graphically
  – Process-centered technique
  – Waterfall model
Overview of Systems Development Methods

• Structured Analysis
  – Deliverable or end product
  – Disadvantage in the built-in structure of the SDLC, because the waterfall model does not emphasize interactivity among the phases
  – This criticism can be valid if the SDLC phases are followed too rigidly
  – Adjacent phases usually interact
Overview of Systems Development Methods

• Structured Analysis
  – The SDLC model usually includes five steps
    • Systems planning
    • Systems analysis
    • Systems design
    • Systems implementation
    • Systems support and security
Overview of Systems Development

Methods

• Structured Analysis
  – Systems Planning
    • Systems planning phase
    • Systems request – begins the process & describes problems or desired changes
    • Purpose of this phase is to perform a preliminary investigation
    • Key part of preliminary investigation is a feasibility study
Overview of Systems Development Methods

• Structured Analysis
  – Systems Analysis
    • Deliverable is the System requirements document
  – Systems Design
    • Deliverable is system design specification
    • Management and user involvement is critical
Overview of Systems Development Methods

• Structured Analysis
  – Systems Implementation
    • New system is constructed
  – Systems Support and Security
    • A well-designed system must be secure, reliable, maintainable, and scalable
    • Most information systems need to be updated significantly or replaced after several years of operation
Overview of Systems Development Methods

- **Object-oriented Analysis**
  - Combines data & processes that act on the data into things called objects
  - Object is a member of a class
  - Objects possess properties
  - Methods change an object’s properties
Overview of Systems Development Methods

• Object-Oriented Analysis
  – A message requests specific behavior or information from another object
  – Usually follow a series of analysis and design phases that are similar to the SDLC
  – Interactive model
Overview of Systems Development Methods

- Agile Methods
  - Are the newest development
  - Emphasizes continuous feedback
  - Iterative development
  - Agile community has published the Agile Manifesto
  - Spiral model
Overview of Systems Development Methods

• Agile Methods
  – Agile process determines the end result
  – Other adaptive variations and related methods exist
  – Two examples are Scrum and Extreme Programming (XP)
  – Analysts should understand the pros and cons of any approach before selecting a development method
Overview of Systems Development Methods

• Other Development Methods
  – Joint application development (JAD)
  – Rapid application development (RAD)
  – Might encounter other systems development techniques
  – Rational Unified Process (RUP®)
  – Microsoft Solutions Framework (MSF)
Systems Development Guidelines

• Develop a project plan
• Involve users and listen carefully to them
• Use project management tools to identify tasks and milestones
• Develop accurate cost and benefit information
• Remain flexible
Information Technology Department
The Systems Analyst Position

• Responsibilities
  – Translate business requirements into IT projects

• Required Skills and Background
  – Solid technical knowledge, strong oral and written communication skills and analytic ability, and an understanding of business operations and processes

• Certification
  – Important credential
The Systems Analyst Position

• Career Opportunities
  – Job titles
  – Company organization
  – Company size
  – Corporate culture
  – Salary, location, and future growth
Chapter Summary

• IT refers to the combination of hardware and software resources that companies use to manage, access, communicate, and share information

• The essential components of an information system are hardware, software, data, processes, and people

• Most companies offer a mix of products, technical and financial services, consulting, and customer support
Chapter Summary

• Systems analyst use modeling, prototyping, and computer aided systems engineering (CASE) tools

• Three popular system development approaches are structured analysis, object-oriented analysis (O-O), and agile methods, also called adaptive methods

• Regardless of the development strategy, people, tasks, timetables, and cost must be managed effectively using project management tools
Chapter Summary

• The IT department develops, maintains and operates a company’s information systems

• Systems analysts need a combination of technical and business knowledge, analytical ability, and communication skills

• Systems analysts need to consider salary, location, and future growth potential when making a career decision
Chapter Summary

• Chapter 1 complete