Information Technology

SHELLY CASHMAN SERIES

12TH EDITION

SYSTEMS ANALYSIS AND DESIGN

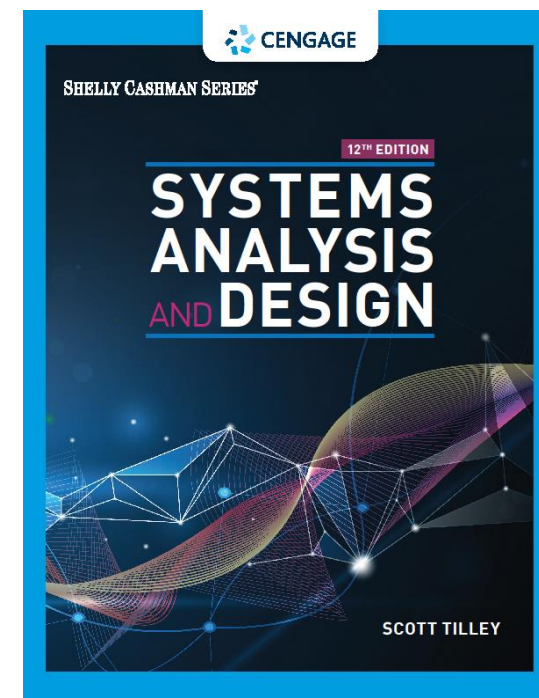SCOTT TILLEY

Objectives (1)

- 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
- Identify various types of information systems and explain who uses them

Objectives (2)

- Distinguish between **structured analysis, object-oriented analysis, and agile methods**

- Compare the traditional **waterfall model** with **agile methods** and **models**

- Apply **five basic guidelines** for systems development

- 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
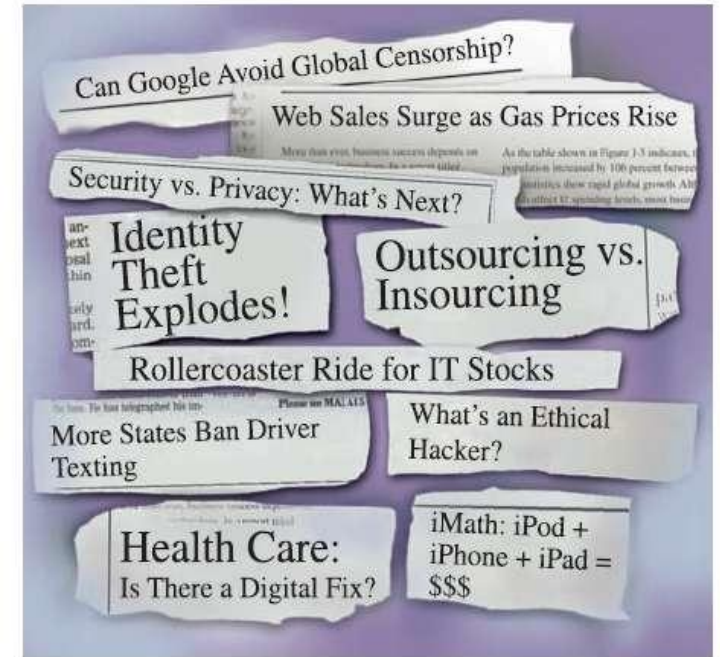
The Impact of Information Technology

- Information Technology (IT)
  - Combination of hardware and software products and services that companies use to manage, access, communicate, and share information
- The Future
  - Three issues that will shape the future
    - Changes in world
    - Changes in technology
    - Changes in client demand

The Impact of Information Technology

- Systems Development
  - Business information systems are developed by people who are technically qualified, business- oriented, and highly motivated
  - Must be good communicators with strong analytical and critical thinking skills

The Impact of Information Technology

- 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
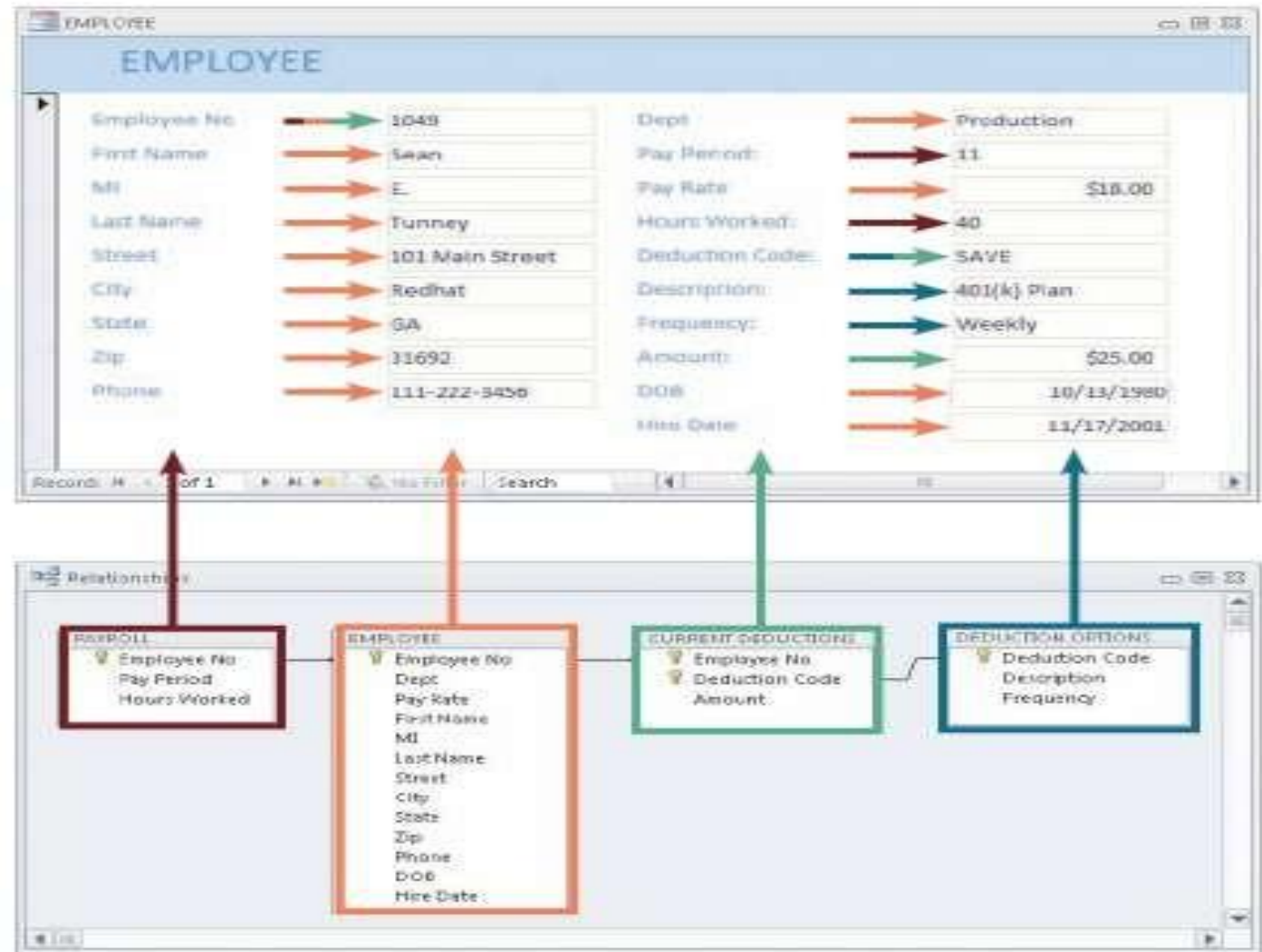
Information System Components

- Hardware
  - Is the physical layer of the information system
  - Moore's Law
- Software
  - System software
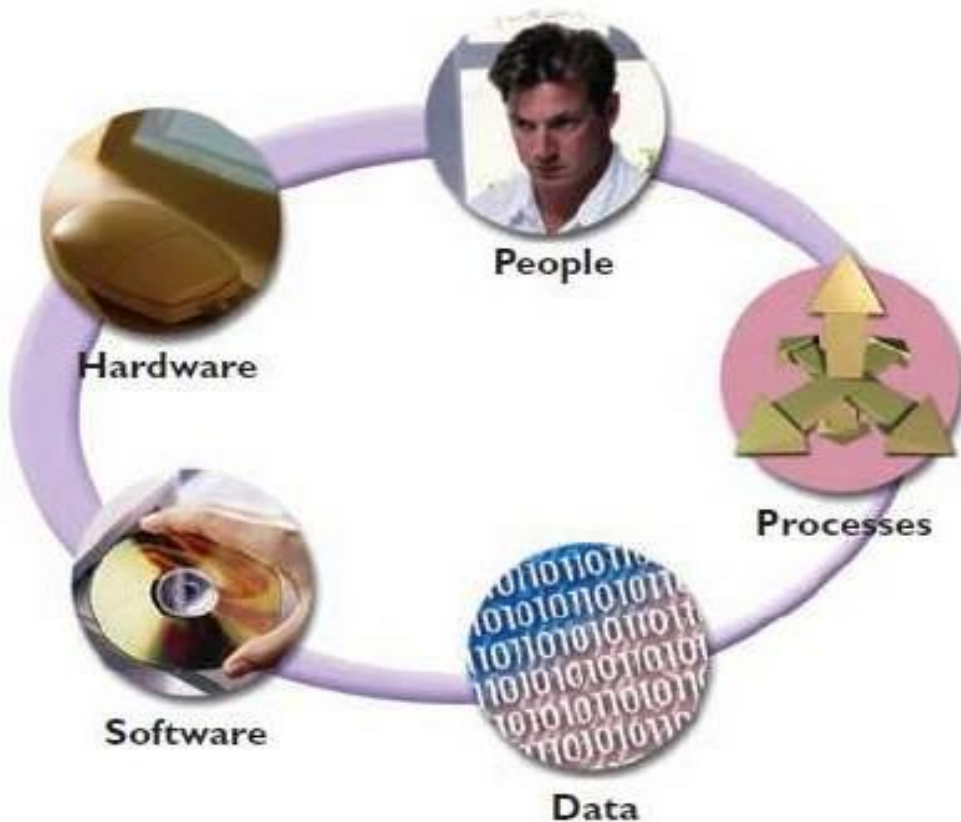 - Application software
  - Enterprise applications

Information System Components

- ## Software
  - Horizontal system
  - Vertical system
  - Legacy systems

- ## Data
  - Tables store data
 - Linked tables work together to supply data

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)
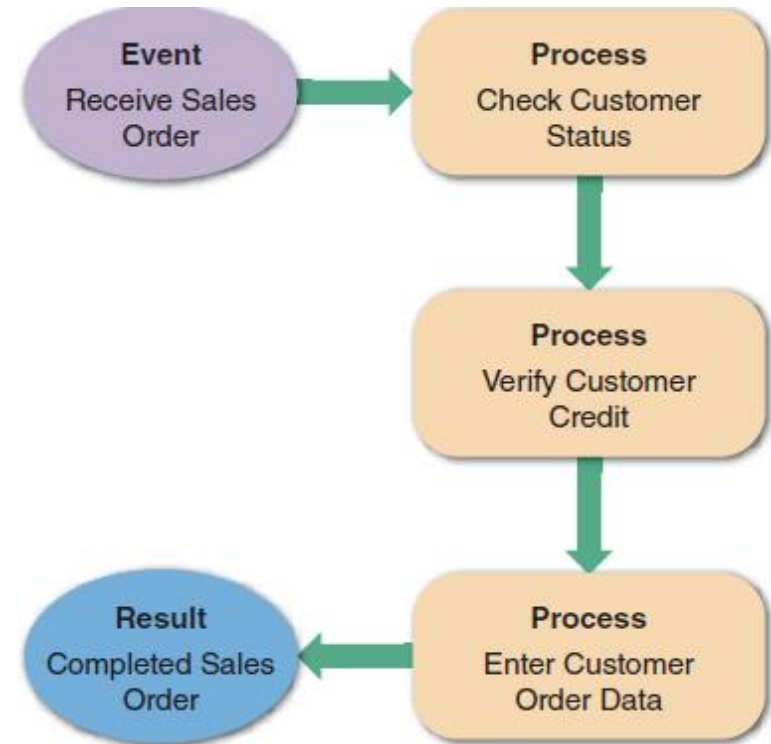
Impact of the Internet

- E-Commerce or I-Commerce
- B2C (Business-to-Consumer)
- B2B (Business-to-Business)
  - EDI
  - Extensible markup language (XML)
  - Supply chain management (SCM)
  - Supplier relationship management (SRM)

Business 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
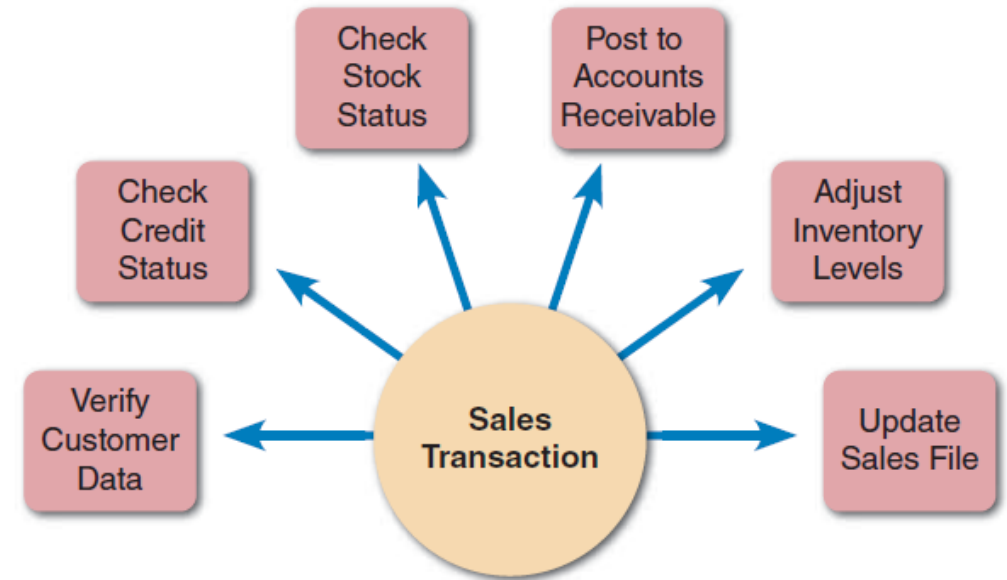 - Executive information systems

Business 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
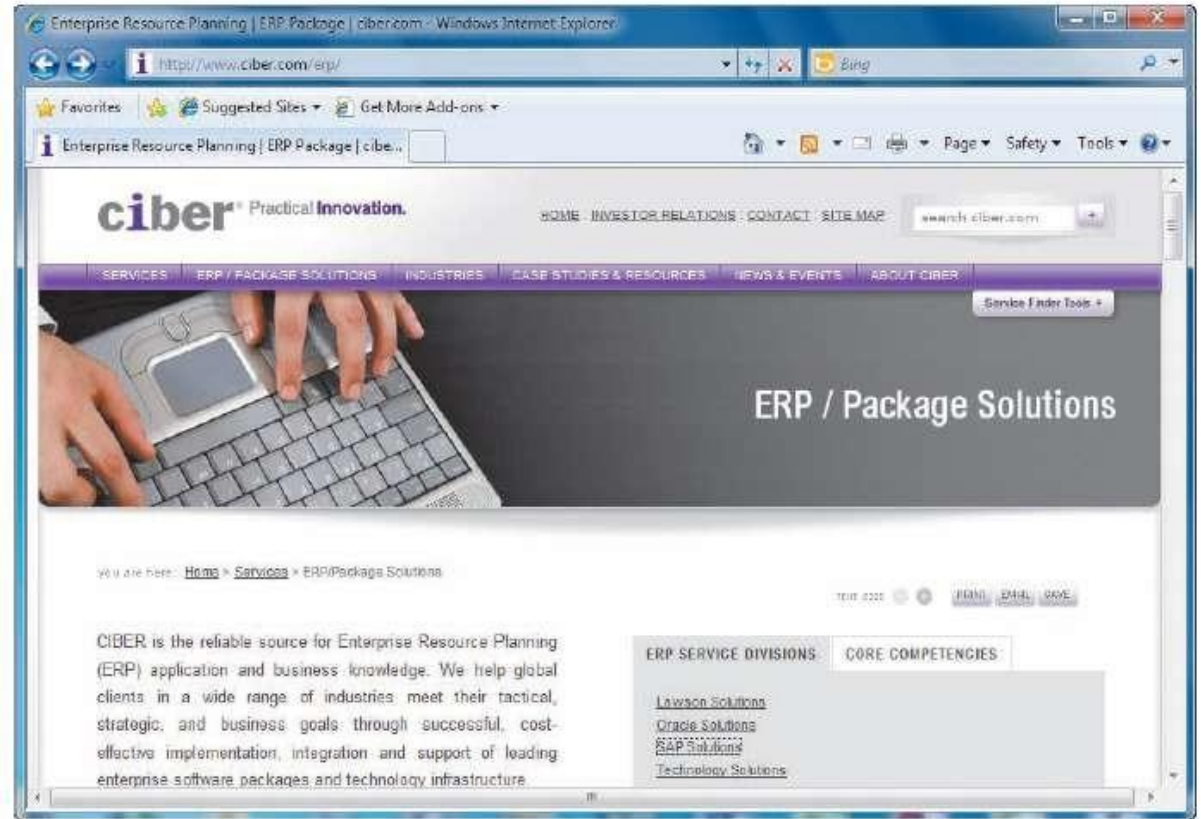
Business Information Systems

- Today, identify a system by its functions and features, rather than by its users
  - Enterprise computing systems
  - Transaction processing systems
  - Business support systems
  - Knowledge management systems
  - User productivity systems

Business 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

Business 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

Business 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

Business 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

What Information Do Users Need?

Organizational Levels

- Top Managers
- Middle Managers and Knowledge Workers
- Supervisors and Team Leaders
- Operational Employees

Business Functions

- IT
- Human Resources
- Accounting
- Sales
- Marketing
- Production
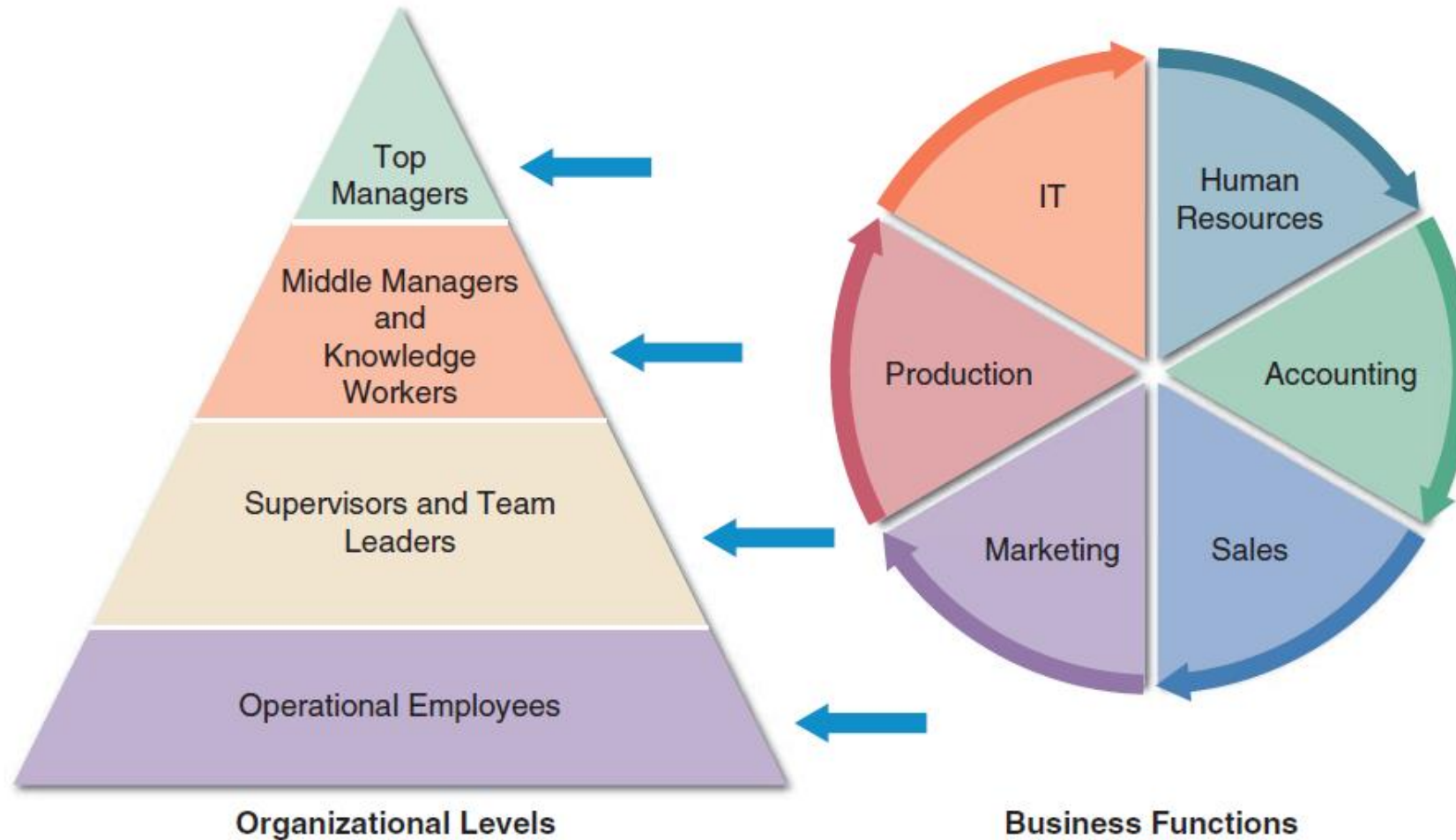
Systems Development Tools

- Modeling
  - Business model
  - Requirements model
  - Data model
  - Object model
  - Network model
  - Process model
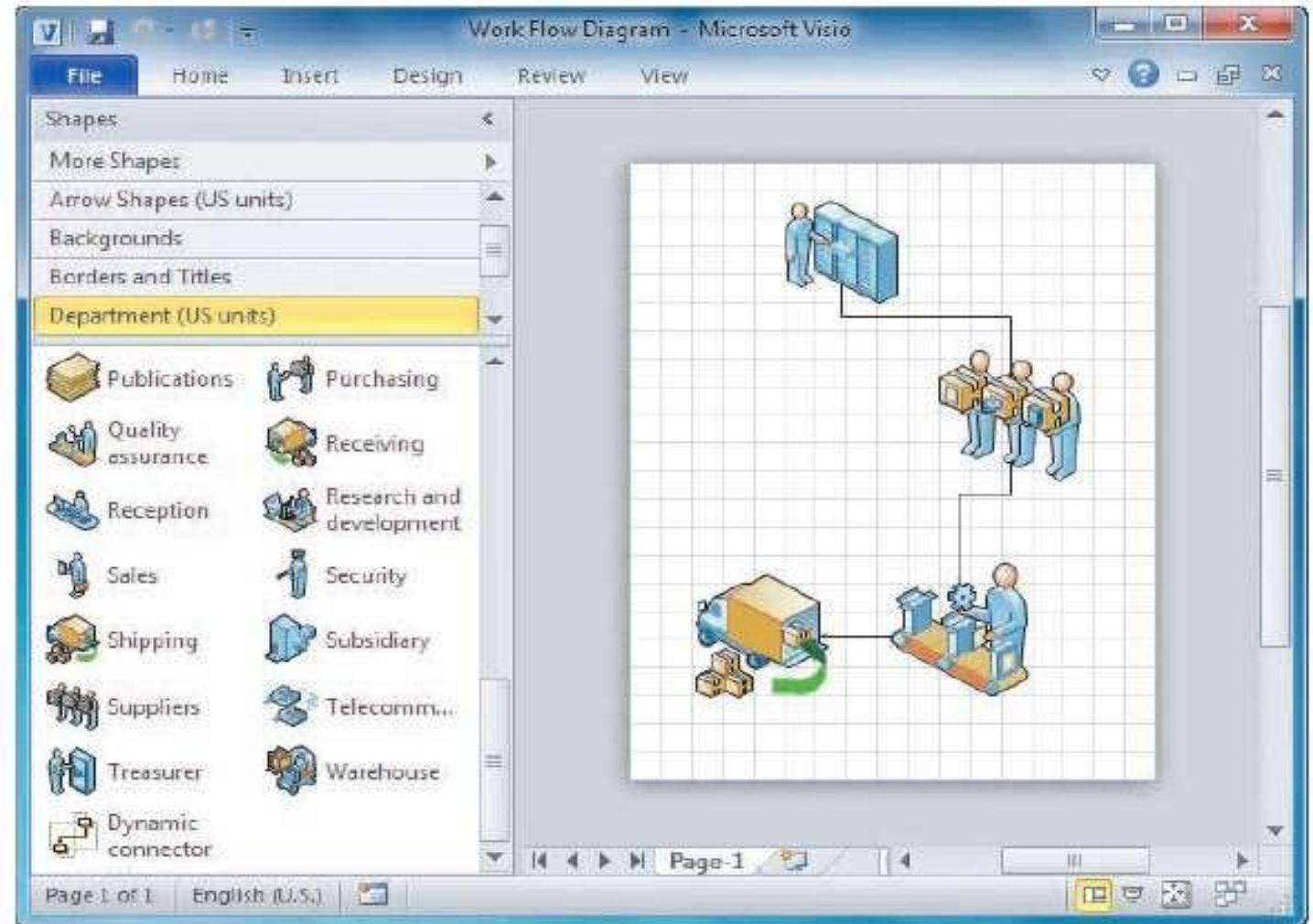
Systems Development Tools

- 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

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
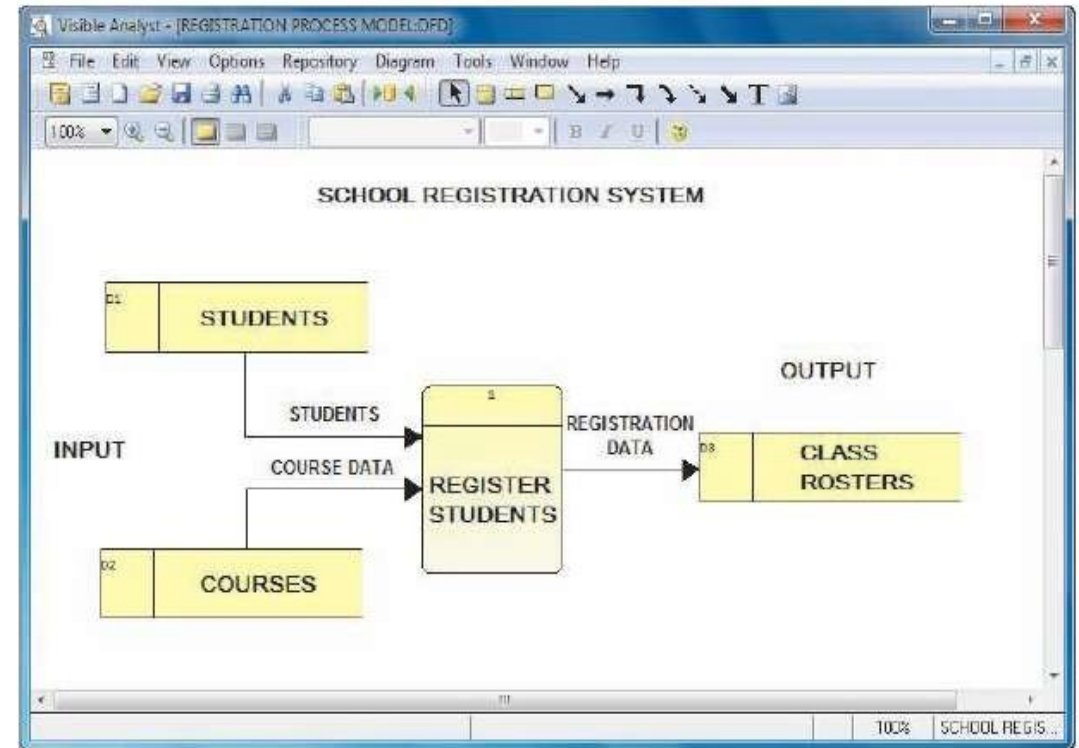
Systems Development Methods

- 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

Systems Development Methods

- Structured Analysis
  - The SDLC model usually includes five steps
    - Systems planning
    - Systems analysis
    - Systems design
    - Systems implementation
    - Systems support and security

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

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

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

Systems Development Methods
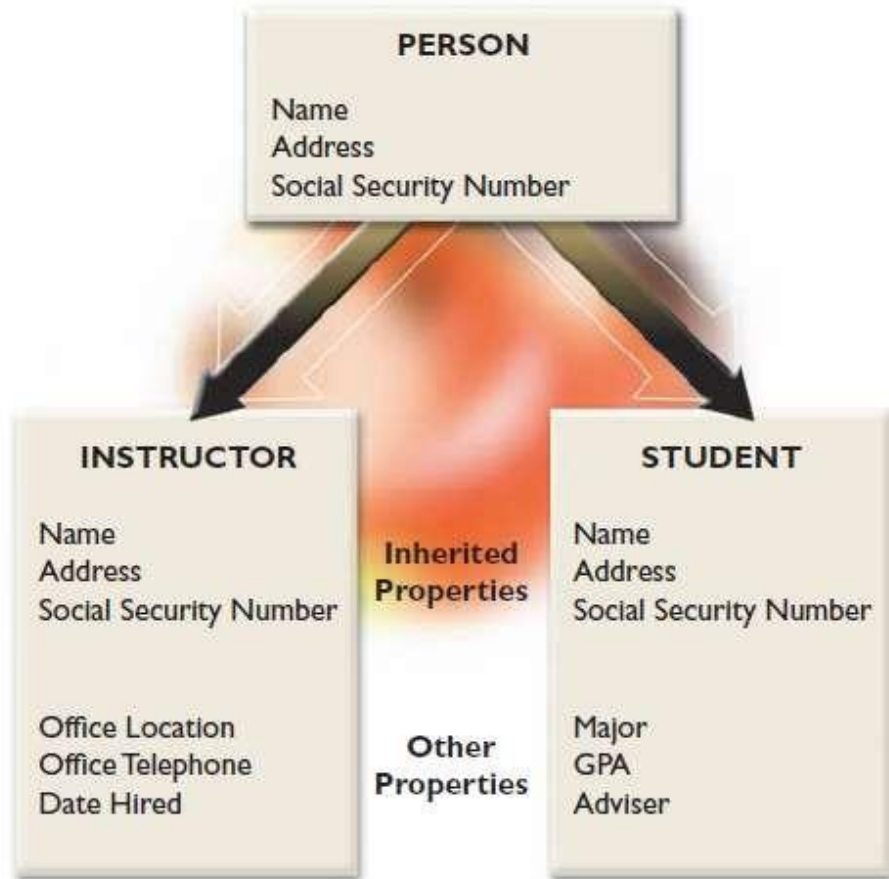
Object-oriented Analysis

– 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

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

Systems Development Methods

- Agile Methods
  - Are the newest development
  - Emphasize continuous feedback
  - Iterative development
  - Agile community has published the Agile Manifesto
  - Spiral model

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
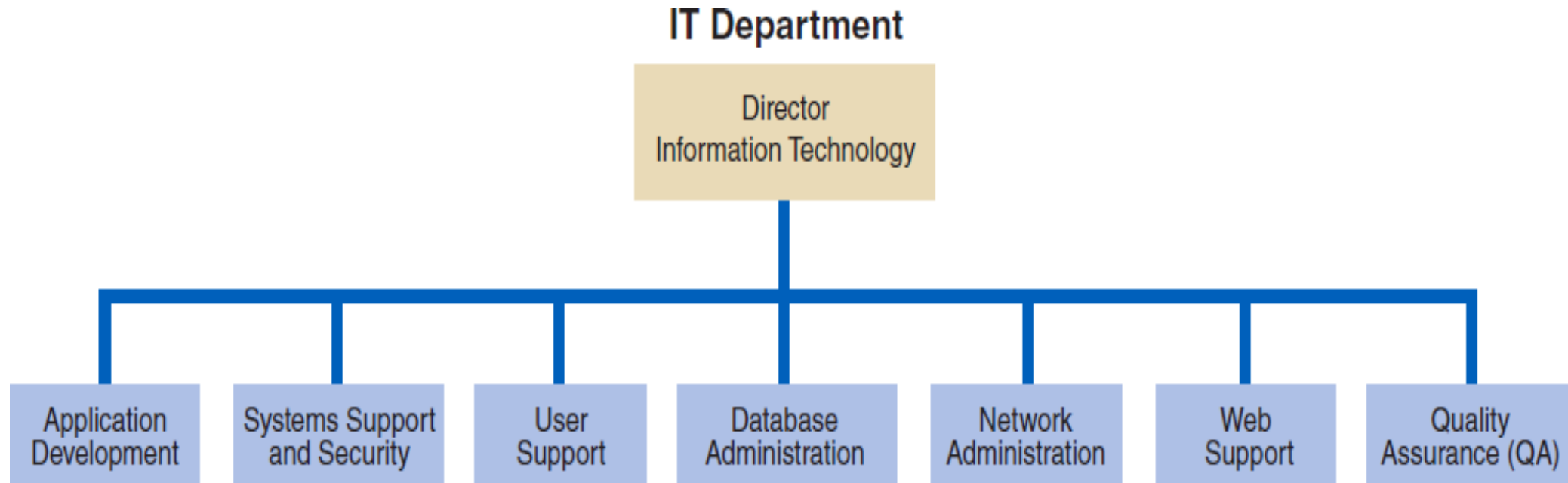
Systems Development Methods

- 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

IT Department

Director
Information Technology

| Application Development | Systems Support and Security | User Support | Database Administration | Network Administration | Web Support | Quality Assurance (QA) |

The Systems Analyst

- Responsibilities
  - Translate business requirements into IT projects
- Knowledge, Skills, and Education
  - Needs technical knowledge, strong oral and written communication skills and analytic ability, an understanding of business operations, and critical thinking skills
- Certification
  - Important credential

The Systems Analyst

- Career Opportunities
  - Job titles
  - Company organization
  - Company size
  - Corporate culture
  - Salary, location, and future growth

Summary (1)

- 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*

- Successful companies offer a mix of products, technical and financial services, consulting, and customer support

- Information systems are identified as enterprise computing systems, transaction processing systems, business support systems, knowledge management systems, or user productivity systems

Summary (2)

- Organization structure includes top managers, middle managers and knowledge workers, supervisors and team leaders
- 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

END