Management Information Systems: Managing the Digital Firm

Fifteenth edition

Management Information Systems
Managing the Digital Firm
FIFTEENTH EDITION
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Chapter 1
Information Systems in Business Today

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Courtesy:
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- Kenneth C. Laudon and Jane P. Laudon. **Management Information Systems: Managing the Digital Firm**. 15th Edition. Pearson, 2018.
- Kenneth C. Laudon and Jane P. Laudon. **Essentials of Management Information Systems**.10th Edition, Pearson, 2013.

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Learning Objectives

- How are information systems transforming business, and why are they so essential for running and managing a business today?
- What is an information system? How does it work? What are its management, organization, and technology components? Why are complementary assets essential for ensuring that information systems provide genuine value for organizations?
- What academic disciplines are used to study information systems and how does each contribute to an understanding of information systems?

Rugby Football Union Tries Big Data

- Problem
  - Improving fan engagement through Big Data.

- Solutions
  - Provide data visualization and real-time statistics to draw in fans.
  - Provide tactical insights to players and coaches that will improve match play.

- How
  - Rugby Football Union uses TryTrackerto capture and analyzeBig Data that will be useful to both fans and players.
  - Demonstrates IT's role in increasing value and revenue in any business.
  - Illustrates the potential for technology to improve customer experience.

The Role of Information Systems in Business Today

- How information systems are transforming business
  - Emerging *becoming* mobile digital platform (smart phones, broadband, 4/5G, fiber optics)
  - Expanding e-commerce, Internet advertising (Amazon, Alibaba, eBay and growing business use of "big data"
  - Growth in cloud computing
  - Systems used to improve customer experience, respond to customer demand, reduce inventories, and more (FedEx, UPS, CRM…etc)

- Globalization opportunities
  - Internet has drastically reduced costs of operating on global scale
  - Increases in foreign trade, outsourcing
  - Presents both challenges and opportunities (economy, cost, businesses, products, suppliers, jobs….etc.)

Information Technology Capital Investment
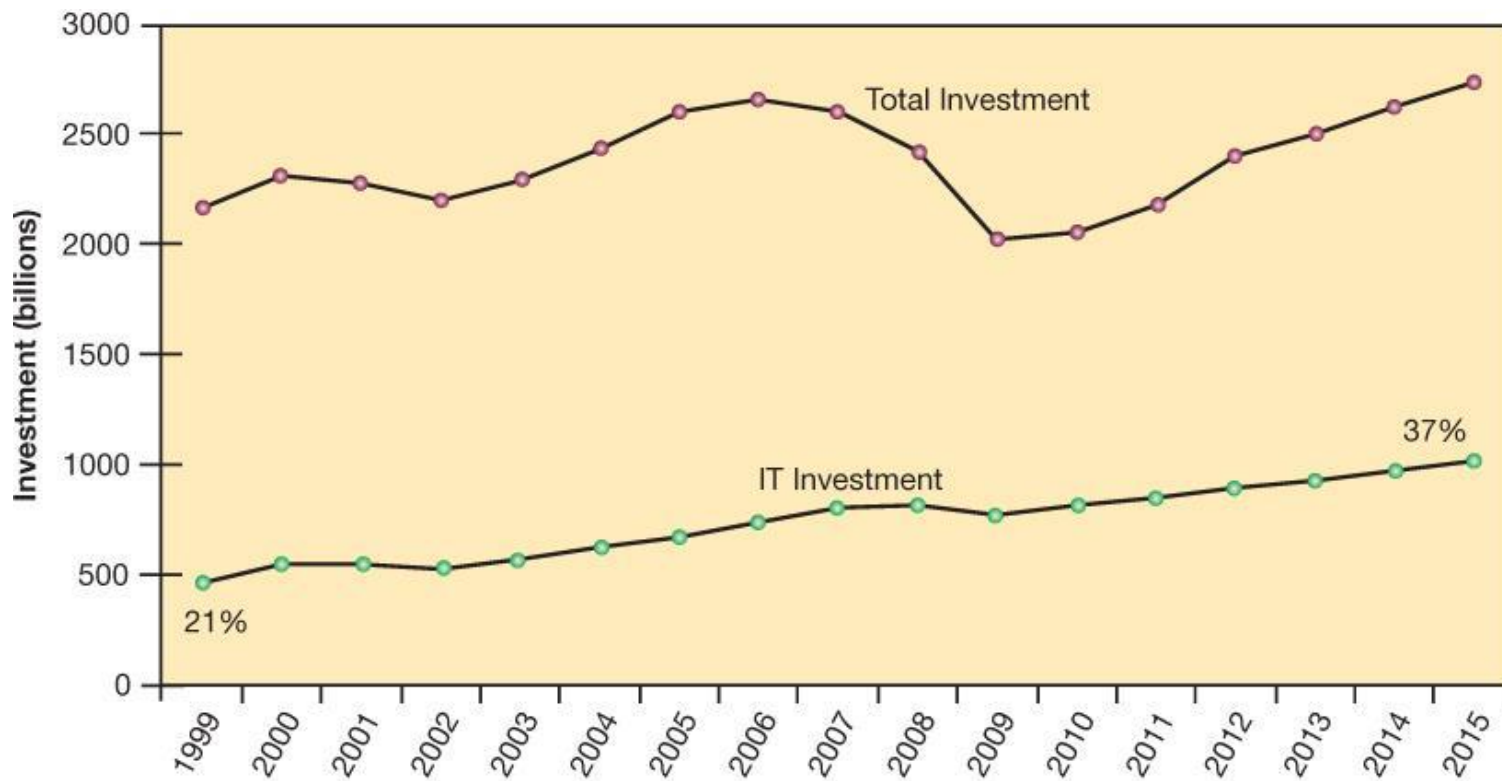
FIGURE 1-1 Information technology capital investment, defined as hardware, software, and communications equipment, grew from 21 percent to 37 percent of all invested capital between 1999 and 2015.

What's New In Management Information Systems

- ## Technology
  - Cloud computing
  - Big data and the Internet of Things (IoT)
  - Mobile digital platform (smart phones, broadband, 4G..etc)

- ## Management
  - Online collaboration and social networking software (Google Apps, Google Sites, Microsoft SharePoint)
  - Business intelligence (Charts, Dashboard, Figures)
  - Virtual meetings (i.e. Skype)

- ## Organizations
  - Social business (i.e. use social media internally/ externally)
  - Telework (i.e. remote work)
  - Co-creation of business value (i.e. outsourcing such as to AWS)

Interactive Session: Management: The Mobile Pocket Office

- Class Discussion
  - –What kinds of applications are described here? What business functions do they support? How do they improve operational efficiency and decision making?
  - –Identify the problems that businesses in this case study solved by using mobile digital devices
  - What kinds of businesses are most likely to benefit from equipping their employees with mobile digital devices such as iPhones and iPads?
  - One company deploying iPhones has said, "The iPhone is not a game changer, it's an industry changer. It changes the way that you can interact with your customers" and "with your suppliers." Discuss the implications of this statement

The Role of Information Systems in Business Today

- In the emerging, fully digital firm:
  - Significant business relationships are digitally enabled and mediated (customers, suppliers, employees).
  - Core business processes are accomplished through digital networks (the entire organization or linking multiple organizations).
  - Key corporate assets are managed digitally (intellectual property, core competencies, financial and human).

- Digital firms offer greater flexibility in organization and management.
  - Time shifting (24/7), space shifting (anywhere)

- Growing interdependence between:
  - Ability to use information technology and
  - Ability to implement corporate strategies and achieve corporate goals

The Interdependence Between Organizations and Information Technology
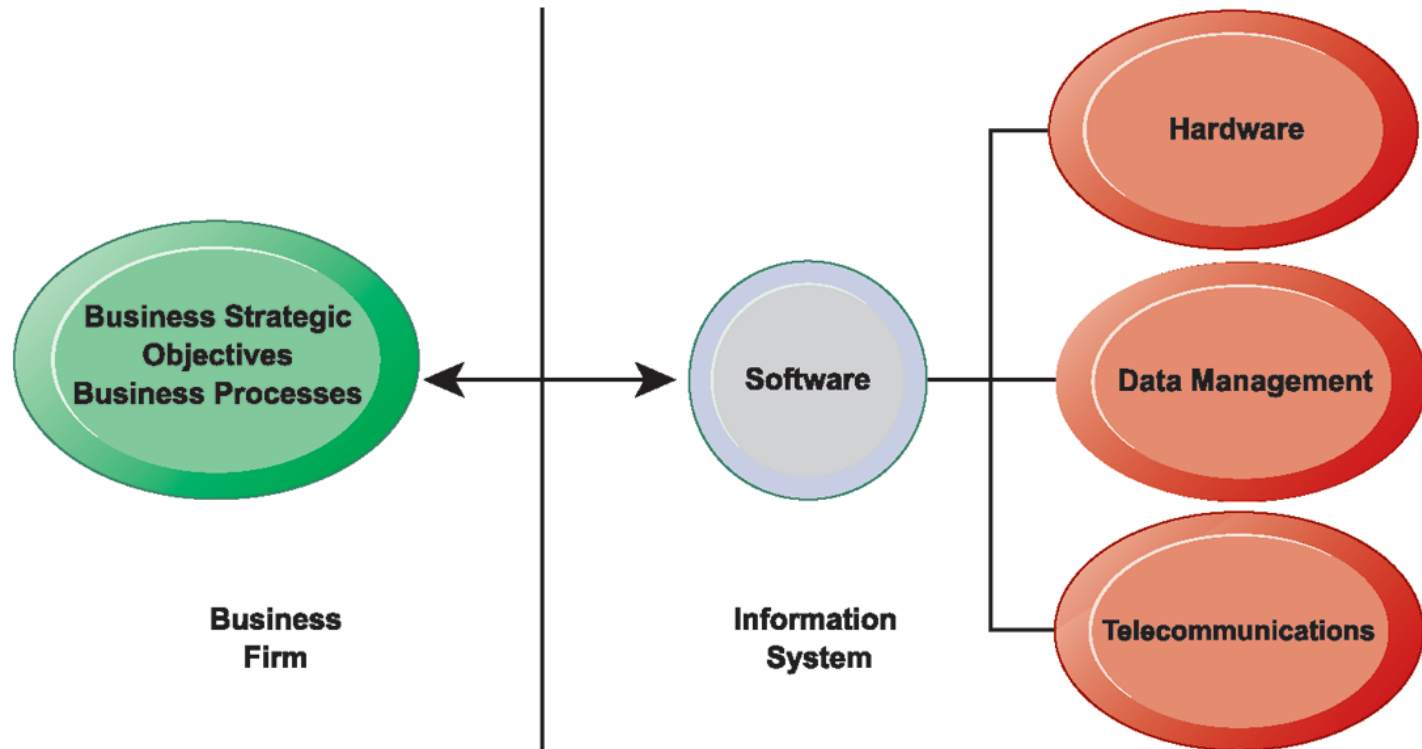

Figure 1.2   In contemporary systems there is a growing interdependence between a firm's information systems and its business capabilities. Changes in strategy, rules, and business processes increasingly require changes in hardware, software, databases, and telecommunications. Often, what the organization would like to do depends on what its systems will permit it to do.

The Role of Information Systems in Business Today

- Firms invest heavily in information systems to achieve six strategic business objectives:
    1. Operational excellence
    2. New products, services, and business models
    3. Customer and supplier intimacy
    4. Improved decision making
    5. Competitive advantage
    6. Survival

Operational excellence

- Improvement of efficiency to attain higher profitability

- Information systems, technology an important tool in achieving greater efficiency and productivity

- Walmart's Retail Link system links suppliers to stores for superior replenishment system

New products, services, and business models:

– Business model: describes how company produces, delivers, and sells product or service to create wealth

– Information systems and technology a major enabling tool for new products, services, business models

  ▪ Examples: Apple's iPad, Google's Android OS, and Netflix

Customer and Supplier Intimacy:

- Serving **customers** well leads to customers returning, which raises revenues and profits.
  - Example: High-end hotels that use computers to track customer preferences and used to monitor and customize environment

- Intimacy with suppliers allows them to provide vital inputs, which lowers costs.
  - Example: JCPenney's information system which links sales records to contract manufacturer

Improved decision making

- Without accurate information:
  - Managers must use forecasts, best guesses, luck
  - Results in:
    - Overproduction, underproduction
    - Misallocation of resources
    - Poor response times
  - Poor outcomes raise costs, lose customers

- Example: Verizon's Web-based digital dashboard to provide managers with real-time data on customer complaints, network performance, line outages, and so on

Source: https://businessfirstfamily.com/sales-dashboard-metrics/
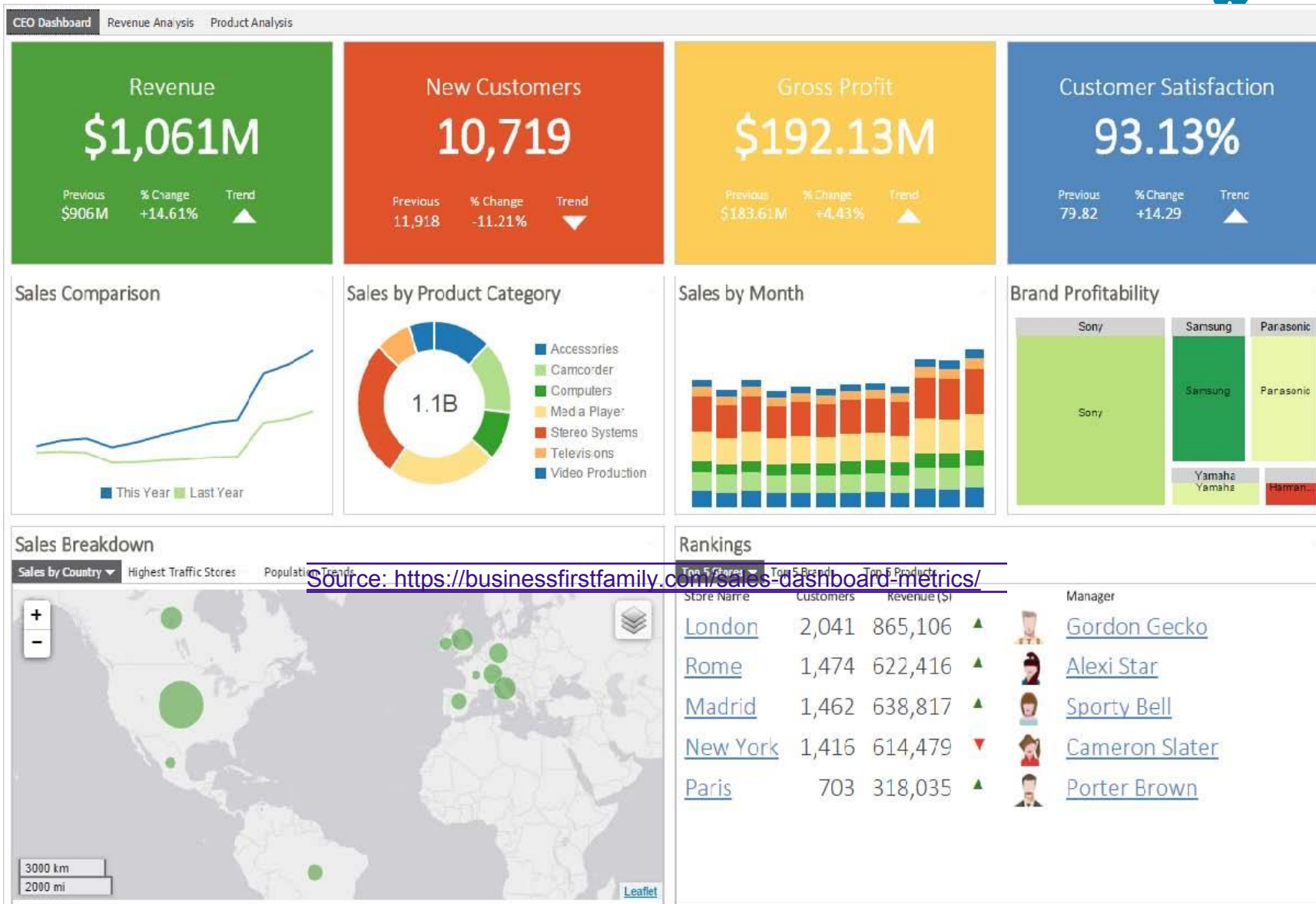
Competitive advantage

– Delivering better performance

– Charging less for superior products

– Responding to customers and suppliers in real time

– Examples: Apple, Walmart, UPS

Survival

– Information technologies as necessity of business

– Industry-level changes

  ▪ Example: Citibank's introduction of ATMs in 1977, pushed all other banks to do so. Now, ATMs everywhere

– Governmental regulations requiring record-keeping

  ▪ Examples: Toxic Substances Control Act, Sarbanes-Oxley Act

  ▪ Dodd-Frank Act

What Is an Information System? (1 of 3)

- Information system
  - Set of interrelated components (S/W, H/W, people, network, telecommunications…)
  - Collect, process, store, and distribute information
  - Support decision making, coordination, and control

- Information vs. data
  - Data are streams of raw facts
  - Information is data shaped into meaningful form
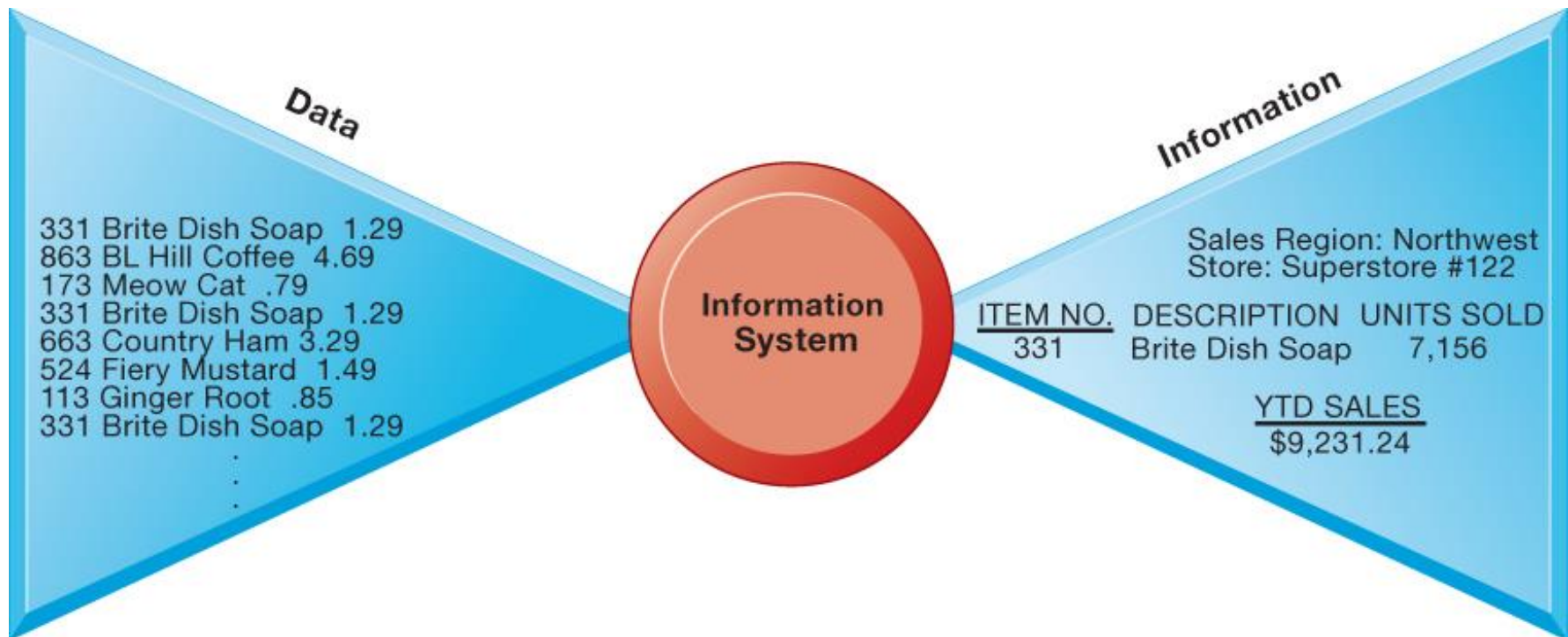
Data and Information

Figure 1.3   Raw data from a supermarket checkout counter can be processed and organized to produce meaningful information, such as the total unit sales of dish detergent or the total sales revenue from dish detergent for a specific store or sales territory.

What Is an Information System? (2 of 3)

- Three activities of information systems produce information organizations need
  - Input: Captures raw data from organization or external environment
  - Processing: Converts raw data into meaningful form
  - Output: Transfers processed information to people or activities that use it

What Is an Information System? (3 of 3)

- Feedback
  - Output is returned to appropriate members of organization to help evaluate or correct input stage

- Computer/computer program vs. information system
  - Computers and software are technical foundation and tools, similar to the material and tools used to build a house
    - i.e. Ticket for a football match: Apply the above

Functions of an Information System

An information system contains information about an organization and its surrounding environment. Three basic activities—input, processing, and output—produce the information organizations need. Feedback is output returned to appropriate people or activities in the organization to evaluate and refine the input. Environmental actors, such as customers, suppliers, competitors, stockholders, and regulatory agencies, interact with the organization and its information systems.
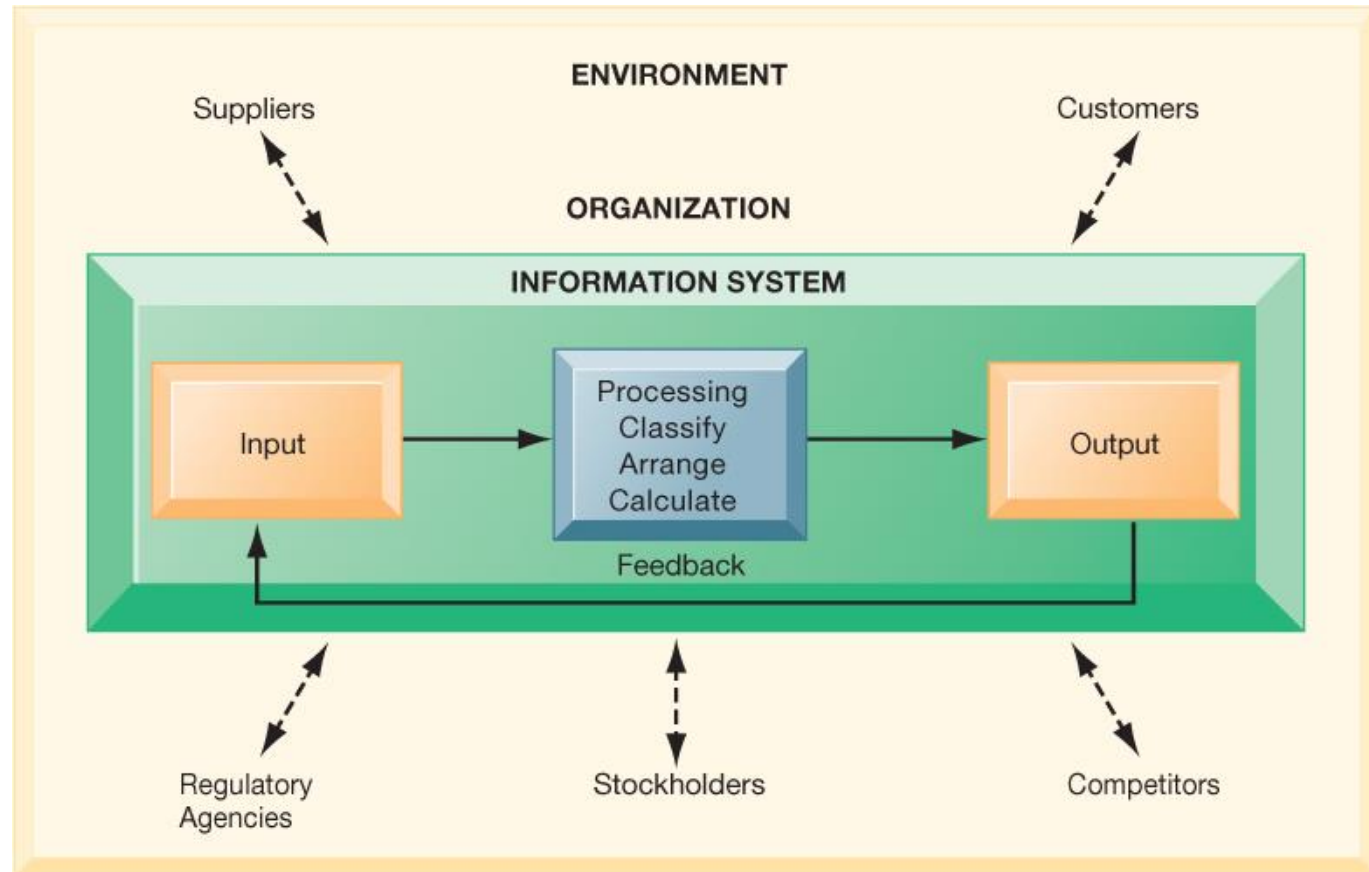
Dimensions of Information Systems

- Organizations
- Management
- Technology

Figure 1.5: Information Systems Are More Than Computers

Using information systems effectively requires an understanding of the organization, management, and information technology shaping the systems. An information system creates value for the firm as an organizational and management solution to challenges posed by the environment.

Pearson

Dimensions of Information Systems: Organizations (1 of 2)

- Elements are people, structure, business processes, politics and culture

- Hierarchy of authority, responsibility
  – Senior management
  – Middle management
  – Operational management
  – Knowledge workers
  – Data workers
  – Production or service workers
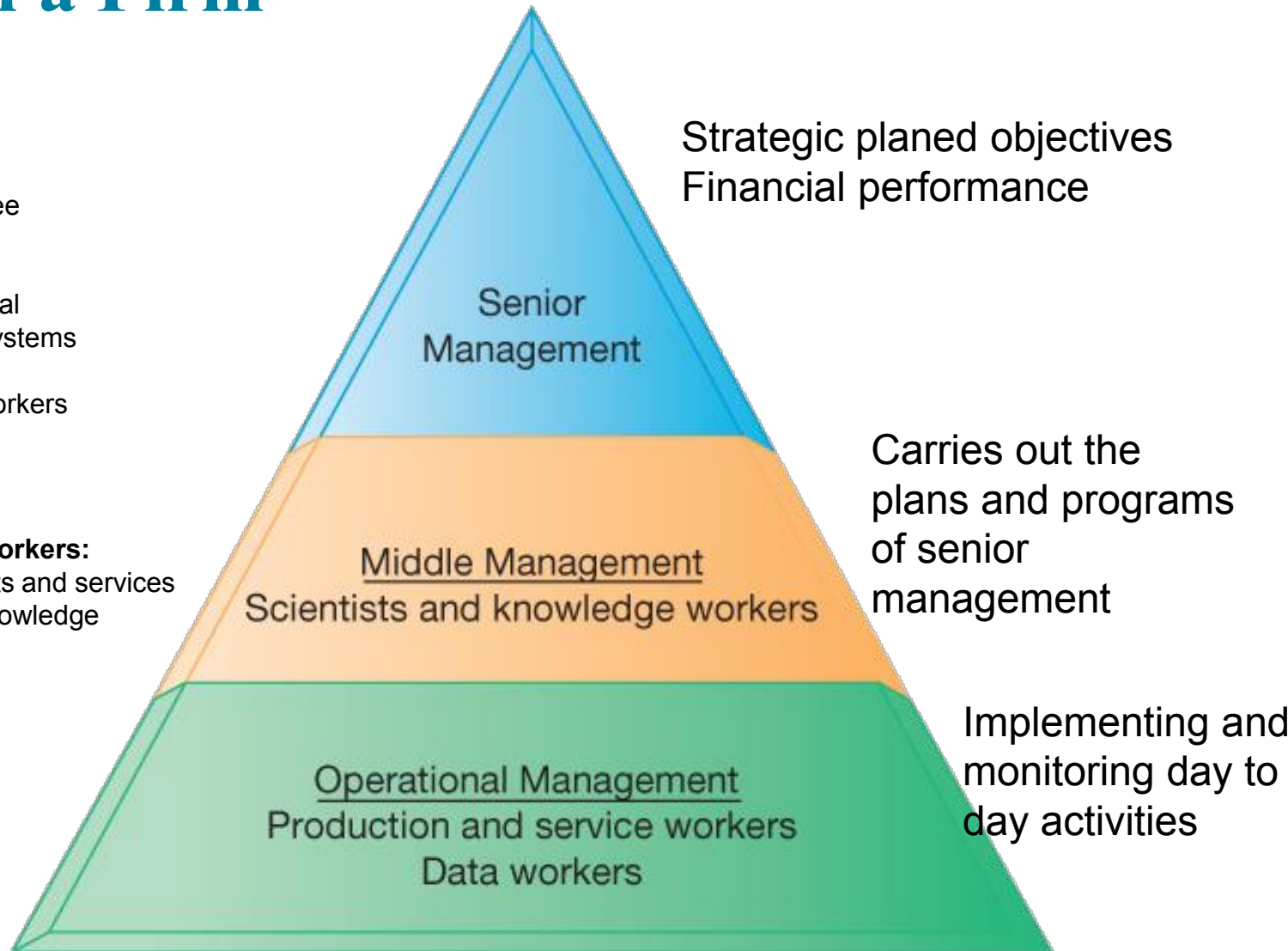
Levels in a Firm

Figure 1.6:

Business organizations are hierarchies consisting of three principal levels: senior management, middle management, and operational management. Information systems serve each of these levels. Scientists and knowledge workers often work with middle management.

Knowledge workers:
design products and services
Create new knowledge

Data workers:
secretaries

Strategic planed objectives
Financial performance

Senior Management

Middle Management
Scientists and knowledge workers

Operational Management
Production and service workers
Data workers

Carries out the plans and programs of senior management

Implementing and monitoring day to day activities

Production and Service Workers:
Produce the product, Deliver the service

Dimensions of Information Systems: Organizations (2 of 2)

- Separation of business functions
  - Sales and marketing
  - Human resources
  - Finance and accounting
  - Manufacturing and production

- Unique business processes

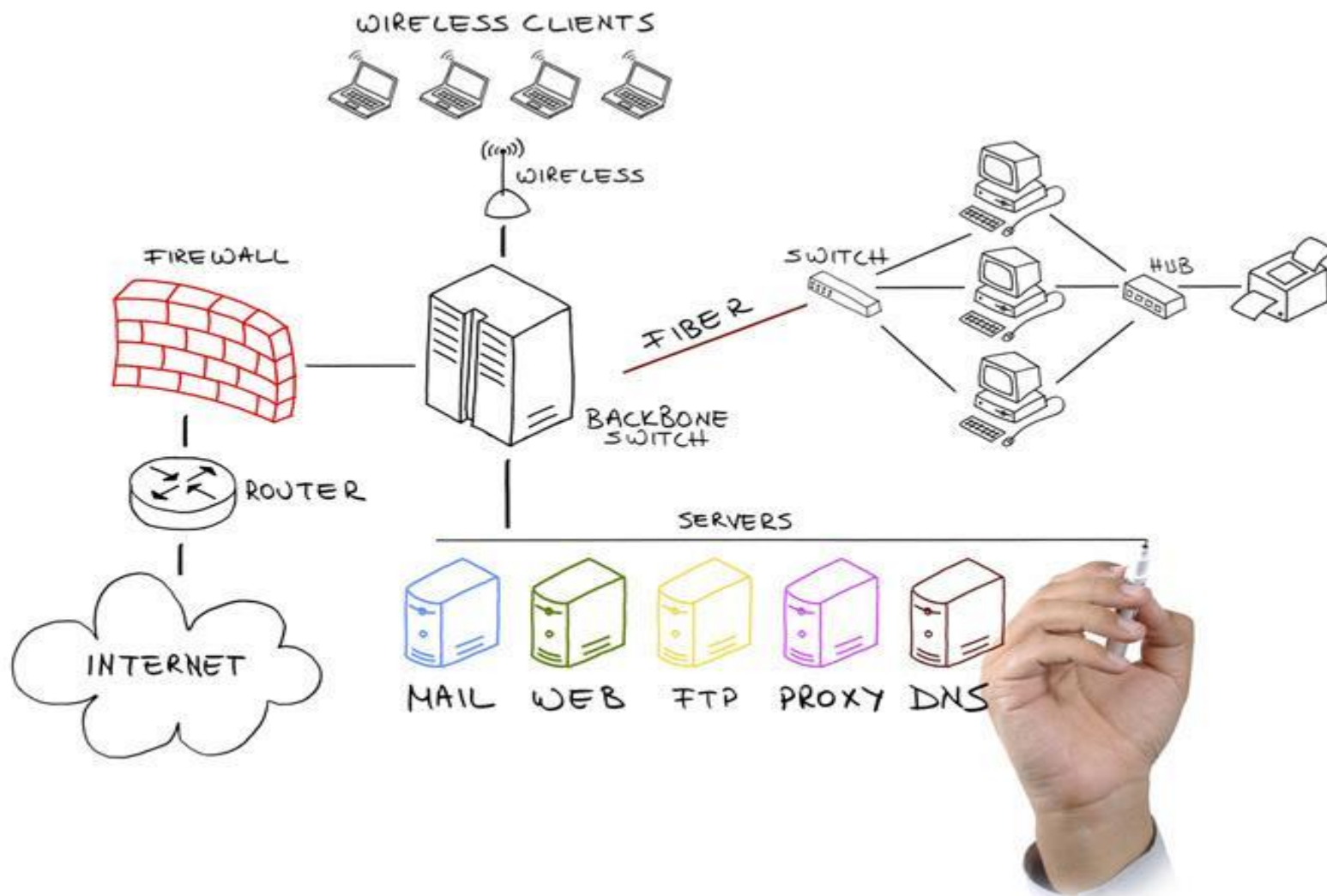- Unique business culture

- Organizational politics

Dimensions of Information Systems: Management

- Management dimension of information systems
  - Managers set organizational strategy for responding to business challenges
  - In addition, managers must act creatively
    - Creation of new products and services
    - Occasionally re-creating the organization

Dimensions of Information Systems: Technology

- Technology dimension of information systems
  - Computer hardware and software
  - Data management technology
  - Networking and telecommunications technology
    - Networks, the Internet, intranets and extranets, World Wide Web
  - IT infrastructure: provides platform that system is built on

WIRELESS CLIENTS

WIRELESS

FIREWALL

SWITCH

HUB

FIBER

BACKBONE SWITCH

ROUTER

SERVERS

INTERNET

MAIL   WEB   FTP   PROXY   DNS

• http://www.onecomputing.com.au/network-solutions/

The Problem-Solving Approach

- Few business problems are simple or straightforward.

- Most business problems involve a number of major factors that can fall into three main categories:

  - Organization

  - Technology

  - People

A Model of the Problem-Solving Process

- Problem solving: four-step process

    1. Problem identification

    2. Solution design

    3. Choice

    4. Implementation

A Model of the Problem-Solving Process

1. Problem identification includes:

- Agreement that problem exists

- Definition of problem

- Causes of problem

- What can be done given resources of firm

Typical problems

- **Organizational problems**

  - Outdated business processes

  - Unsupportive culture and attitudes

  - Political in-fighting

  - Turbulent business environment, change

  - Complexity of task

  - Inadequate resources

- **Technology problems**

  - Insufficient or aging hardware

  - Outdated software

  - Inadequate database capacity

  - Insufficient telecommunications capacity

  - Incompatibility of old systems with new technology

  - Rapid technological change

- **People problems**

  - Lack of employee training

  - Difficulties of evaluating performance

  - Legal and regulatory compliance

  - Work environment, ergonomics

  - Poor or indecisive management

  - Lack of employee support and participation

A Model of the Problem-Solving Process

2.Solution design

- Often many possible solutions

- Consider as many as possible to understand range of solutions

3.Solution Evaluation and Choice: Factors include

- Cost

- Feasibility given resources and skills

- Length of time needed to implement solution

A Model of the Problem-Solving Process

4. Implementation

- Building or purchasing solution

- Testing solution, employee training

- Change management

- Measurement of outcomes

- Feedback, evaluation of solution

• Problem solving is a continuous process, not a single event

- Sometimes chosen solution doesn't work or needs adjustment

Problem Solving Is a Continuous Four-Step Process

- During implementation and thereafter, the outcome must be continually measured and the information about how well the solution is working is fed back to the problem solvers. In this way, the identification of the problem can change over time, solutions can be changed, and new choices made, all based on experience.

Problem identification

Solution design

Solution evaluation and choice

Implementation

Feedback
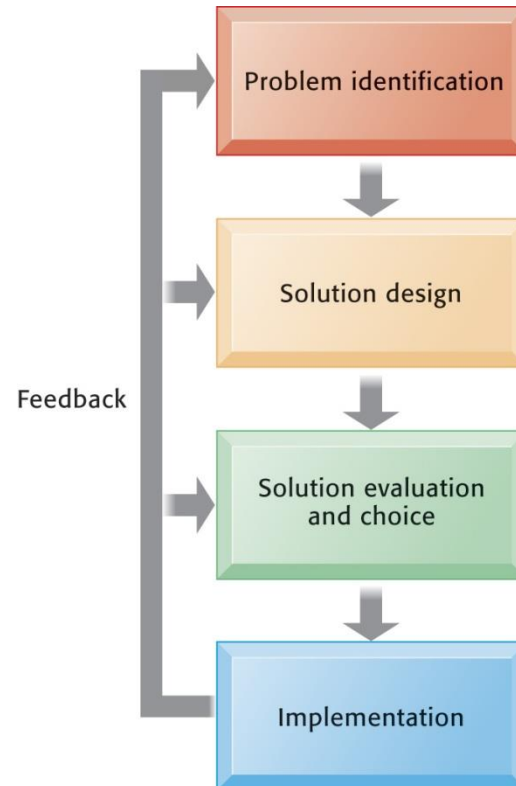
Business perspective on information systems

- Information system is instrument for creating value
- Investments in information technology will result in superior returns:
  - Productivity increases
  - Revenue increases
  - Superior long-term strategic positioning

Business perspective on information systems (cont.)

- Business information value chain
  - Raw data acquired and transformed through stages that add value to that information
  - Value of information system determined in part by extent to which it leads to better decisions, greater efficiency, and higher profits

- Business perspective:
  - Calls attention to organizational and managerial nature of information systems

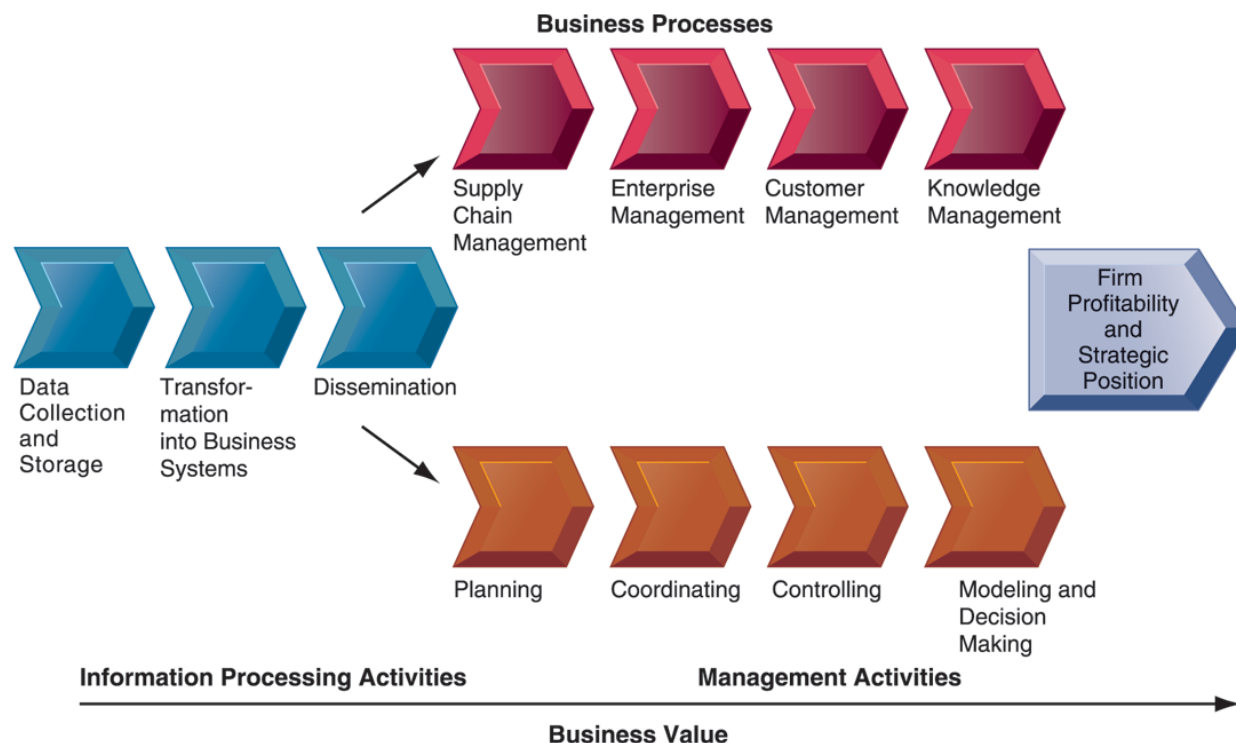# The Business Information Value Chain

Figure 1-7   From a business perspective, information systems are part of a series of value-adding activities for acquiring, transforming, and distributing information that managers can use to improve decision making, enhance organizational performance, and, ultimately, increase firm profitability.

The Business Information Value Chain (cont.)

- Investing in information technology does not guarantee good returns.

- There is considerable variation in the returns firms receive from systems investments.

- Factors:
  - Adopting the right business model
  - Investing in complementary assets (organizational and management capital)

Contemporary Approaches to Information Systems

- Complementary assets:
  - Assets required to derive value from a primary investment
  - Firms supporting technology investments with investment in complementary assets receive superior returns
  - Example: Invest in technology and the people to make it work properly

Contemporary Approaches to Information Systems

- Complementary assets include:
  - Organizational assets, for example:
    - Appropriate business model
    - Efficient business processes
  - Managerial assets, for example:
    - Incentives for management innovation
    - Teamwork and collaborative work environments
  - Social assets, for example:
    - The Internet and telecommunications infrastructure
    - Technology standards

Contemporary Approaches to Information Systems

Figure 1.9

The study of information systems deals with issues and insights contributed from technical and behavioral disciplines.
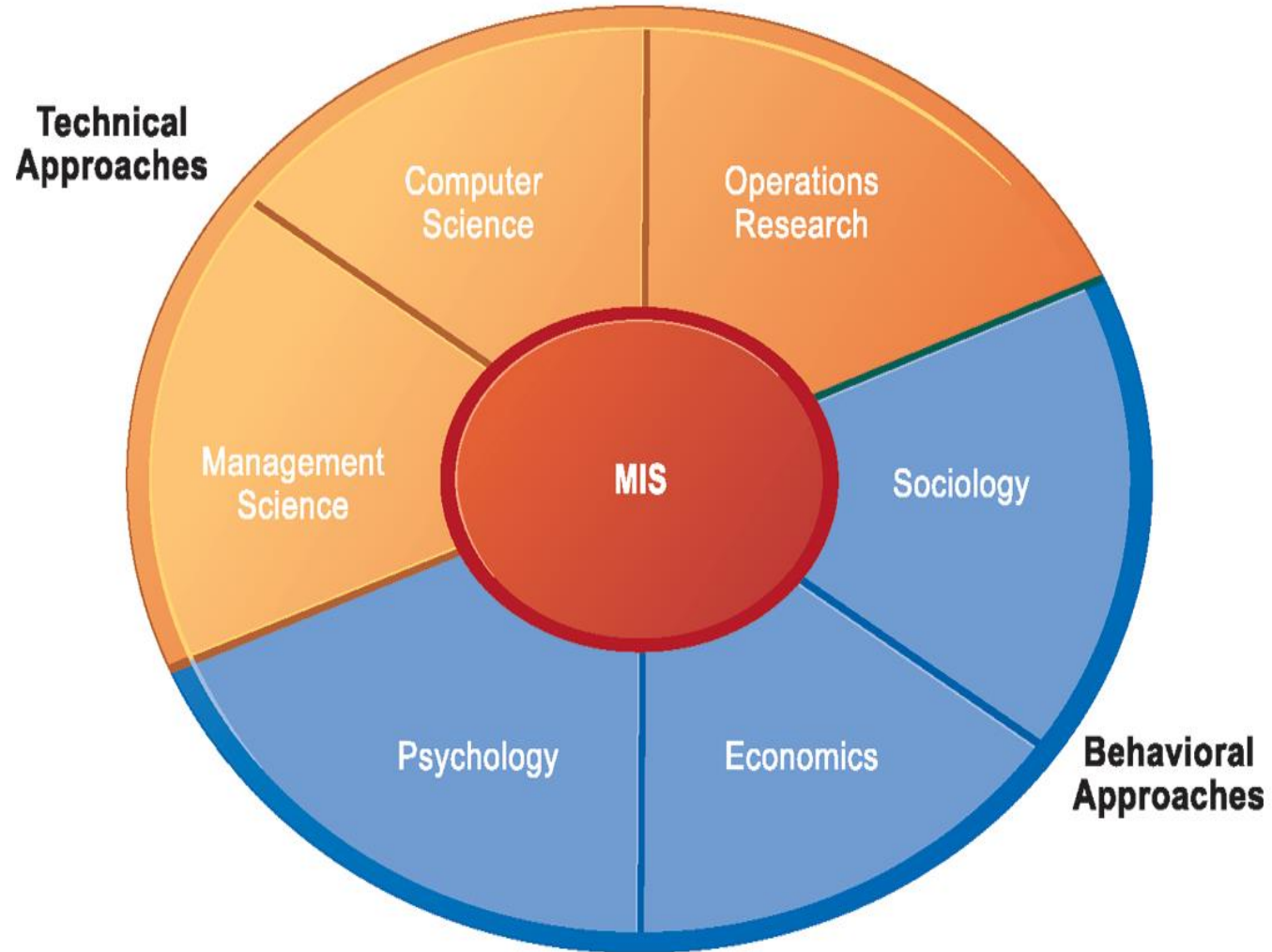
Studying Information Systems

- Technical approach
  - Emphasizes mathematically based models
  - Computer science, management science, operations research

- Behavioral approach
  - Behavioral issues (strategic business integration, implementation, etc.)
  - Psychology, economics, sociology

- Management Information Systems
  - Combines computer science, management science, operations research, and practical orientation with behavioral issues

- Four main actors
  - Suppliers of hardware and software
  - Business firms
  - Managers and employees
  - Firm's environment (legal, social, cultural context)

References

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- **Chapter 1** - Kenneth C. Laudon and Jane P. Laudon. Essentials of Management Information Systems.10th Edition, Pearson, 2013.