

Chapter 1

Information Systems in Global Business Today

Video Cases

- Case 1: Business in the Cloud: Facebook and eBay Data Centers
[Facebook's largest Data Center you never seen – YouTube](#)
[A Peek Inside eBay's Utah Data Center - YouTube](#)
- Case 2: UPS Global Operations with the DIAD (Delivery Information Acquisition Device) and Worldport
[UPS's Next-Generation Mobile Devices Are Here - YouTube](#)
- Instructional Video: Tour IBM's Raleigh Data Center

What changed in the 18th edition

MORE EXPLICIT

AI and emerging technology

The chapter now introduces IoT, big data, cloud computing, artificial intelligence, machine learning, and generative AI.

BROADER

Business and careers

Learning objectives connect digital transformation with work, skills, globalization, and the future of business.

STILL CENTRAL

Sociotechnical thinking

Technology creates value only when management, organization, and complementary assets also change.

Learning Objectives

- 1.1 How are information systems transforming business, and why are they so essential for running and managing a business today?
- 1.2 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?
- 1.3 What academic disciplines are used to study information systems, and how does each contribute to an understanding of information systems?
- 1.4 How will (M)IS help my career?

Opening case: Walmart's AI-enabled supply chain

A global retailer is turning inventory data into real-time decisions.

- **Business challenge** Match local demand, reduce waste, and coordinate stores, fulfillment centers, and online channels.
- **Digital response** A unified inventory view, predictive AI, automation, and agentic tools recommend actions.
- **Organizational change** Teams reuse a shared technology platform while adapting workflows to local markets.
- **Expected value** Higher product availability, faster decisions, simpler work, and improved supplier coordination.

CASE

Case analysis: management, organization, and technology

MANAGEMENT

Decisions

Choose where to standardize, which decisions AI may support, and how teams remain accountable.

ORGANIZATION

Processes and people

Redesign replenishment work, train associates, share data across functions, and align suppliers.

TECHNOLOGY

Digital platform

Integrate inventory data, machine learning, automation, mobile tools, and a unified technology stack.

Discussion: Which component would most likely limit the value of the technology?

How Information Systems Are Transforming Business (1 of 2)

- Global spending on information technology (IT) and IT services: nearly \$5.44T in 2025; \$160 billion (in 2019) spent on management consulting and services
- Organizational, management, and cultural changes are often required for firms to derive full business value from IT investments
- By June 2018, more than 160 million businesses worldwide had dot-com Internet sites registered
- In 2018 1.8 billion Internet users purchased online, generating \$2.9 trillion
- Facebook attracted more than 2 billion monthly visitors worldwide

How Information Systems Are Transforming Business (2 of 2)

- Social networking tools being used by businesses to connect employees, customers, and managers
- Internet advertising continues to grow at more than 20 percent per year
- New laws require businesses to store more data for longer periods
- Changes in business result in changes in jobs and careers

78%

Organizations reporting AI use in at least one function in 2024

71%

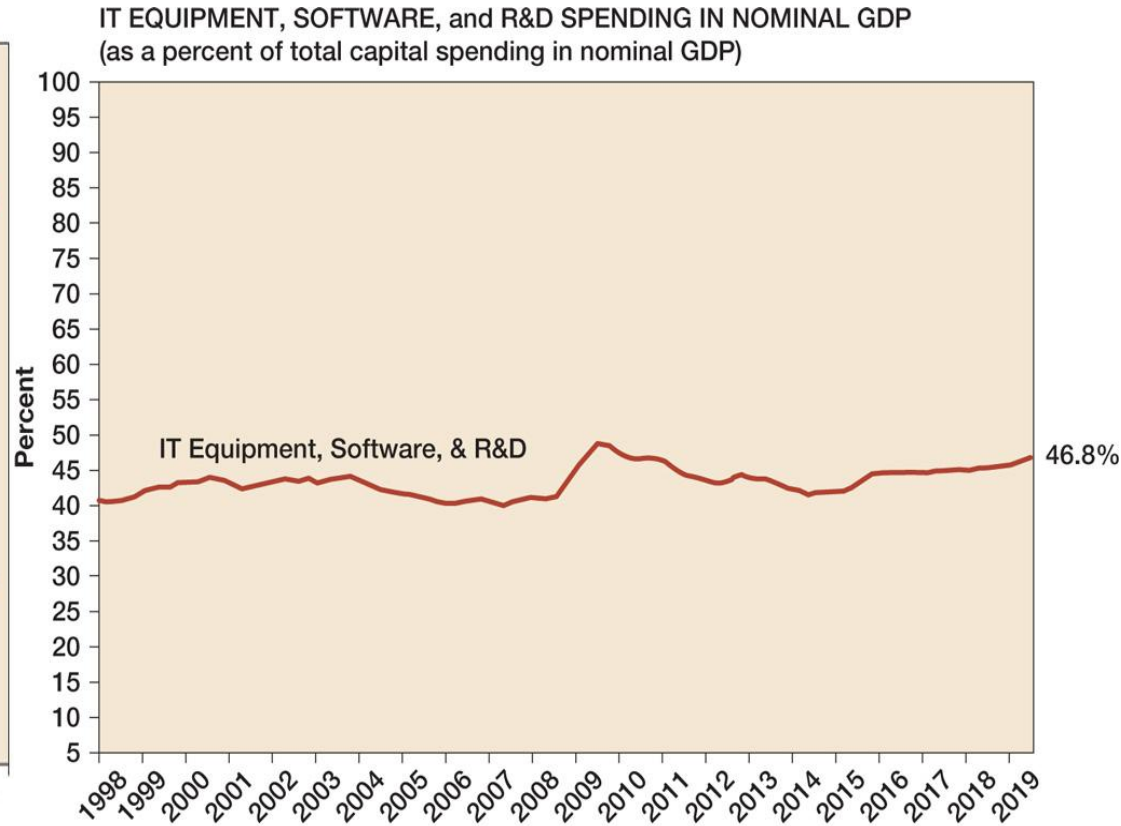
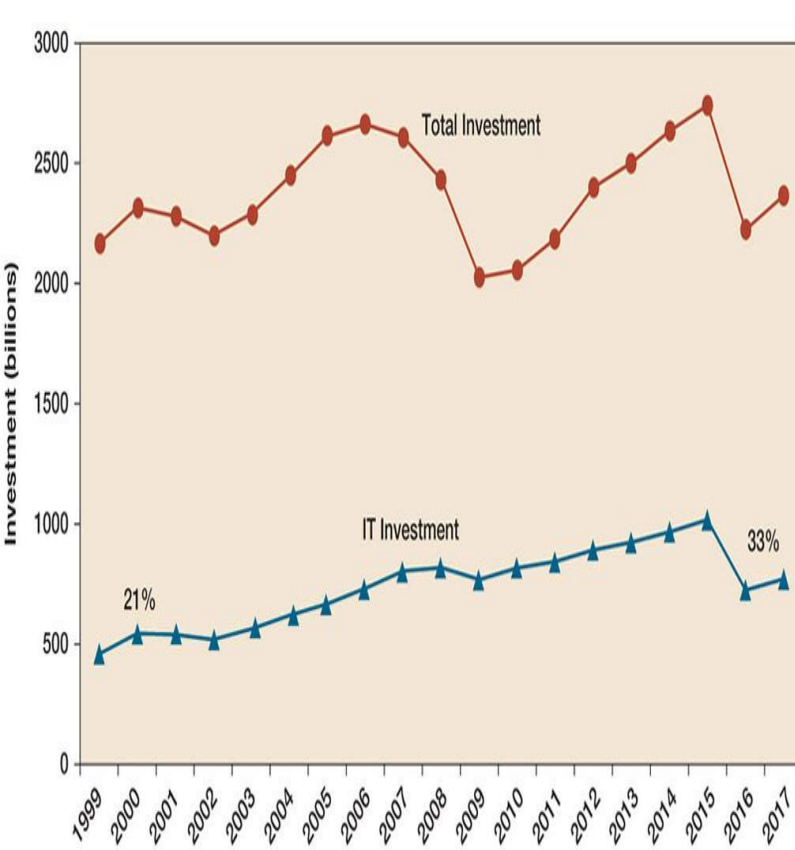
Organizations reporting regular generative AI use in at least one function in 2024

39%

Workers' core skills expected to change by 2030

The managerial question has shifted from whether to digitize to where digital investment creates measurable value.

Figure 1.1 Information Technology Capital Investment



Source: US Bureau of Economic Analysis.

- Information technology capital investment, defined as hardware, software, and communications equipment, grew from 21 percent to 33 percent of all invested capital between 1999 and 2017.

A line graph, with years 1999 to 2017 on the horizontal axis and investment, 0 to 3 trillion dollars, on the vertical axis, two lines show all invested capital for U S businesses and information technology capital investment. Total invested capital grew from about 2.2 trillion dollars in 1999 to about 2.7 trillion dollars in 2006. It then declined to about 2 trillion dollars in 2009 before increasing to about 2.8 trillion dollars by 2015. It declined again to about 2.2 trillion in 2016, rising to 2.4 trillion in 2017. Total information technology capital investment grew steadily from about 500 billion dollars in 1999, which was 21 percent of total capital invested, to about 1 trillion dollars by 2015. It declined to about .6 trillion in 2016, rising slightly to about .7 trillion in 2017, or about 33 percent of total capital invested.

What's New in Management Information Systems (1 of 3)

- IT Innovations
 - Cloud computing, big data, Internet of Things
 - Mobile digital platform
 - AI and machine learning (ML)
 - Use of social networks for business objectives
- New Business Models
 - Online streaming music and video
 - > Examples: Netflix, Apple TV Channels, Amazon
 - On-demand e-commerce services-> Uber, Airbnb

What's New in Management Information Systems (2 of 3)

- E-commerce Expansion
 - E-commerce expands to nearly \$1 trillion in 2018
 - Netflix now has more than 125 million US subscribers
 - Online services now approach online retail in revenue
 - Online mobile advertising now larger than desktop
 - Management Changes
 - Managers use social networks, collaboration tools
 - Business intelligence (BI) applications accelerate
 - Virtual meetings proliferate
- E-commerce Expansion
 - E-commerce worldwide expands to nearly \$3.6 trillion in 2019
 - Growth in social commerce spurred by growth of mobile platform
 - Mobile retail e-commerce growing more than 20 percent a year, reaching almost \$300 billion in 2020
 - Management Changes
 - Managers becoming more mobile

What's New in Management Information Systems (3 of 3)

- Firms and Organizations Change
 - More collaborative, less emphasis on hierarchy and structure
 - Greater emphasis on competencies and skills
 - Higher-speed/more accurate decision making based on data and analysis
 - More willingness to interact with consumers (social media)
 - Better understanding of the importance of IT

Interactive Session: Management: Will the Coronavirus Pandemic Make Working from Home the New Normal?

- Class Discussion
 - Define the problem described in this case. What are the management, organization, and technology issues raised by this problem?
 - Identify the information technologies used to provide a solution to this problem. Was this a successful solution? Why or why not?
 - Will working from home become the dominant way of working in the future? Why or why not?

- The COVID-19 pandemic has impacted almost all aspects of life, requiring not only remote work, as discussed in the Interactive Session, but also remote learning. Share your experience with remote learning (and/or remote work). What challenges does it pose? What benefits?

Globalization Challenges and Opportunities: A Flattened World

(1 of 2)

* Columbus vs. T. Friedman

- **Internet and global (tele)communications have greatly changed how and where business is done**
 - Drastic reduction of costs of operating and transacting on global scale
 - Competition for jobs, markets, resources, ideas
 - Growing interdependence of global economies

Globalization Challenges and Opportunities: A Flattened World

(2 of 2)

- Requires new understandings of skills, markets, opportunities
 - Challenges yes, but opportunities as well
 - Over half of the revenue of S&P 500 US firms is generated off shore
 - Information systems enable globalization of commerce
-
- What does globalization have to do with Information systems (ISs)?
Everything
 - ISs enable globalization.

The Emerging Digital Firm

- In a fully digital firm:
 - Significant business relationships with customers, suppliers, and employees are digitally enabled and mediated
 - * Definition: the set of logically related tasks and behaviors that organizations develop over time to produce specific business results and the unique manner in which these activities are organized and coordinated. (p. 42)
 - Core business processes are accomplished through digital networks
 - Key corporate assets are managed digitally
 - Intellectual property, core competencies, financial and human assets
- Digital firms offer greater flexibility in organization and management
 - Time shifting, space shifting

-> They are connected to globalization. Explain why a digital firm is more likely to benefit from globalization than a traditional firm. One answer is that by allowing business to be conducted at any time (time shifting) and any place (space shifting), digital firms are ideally suited for global operations which take place in remote locations and different time zones.

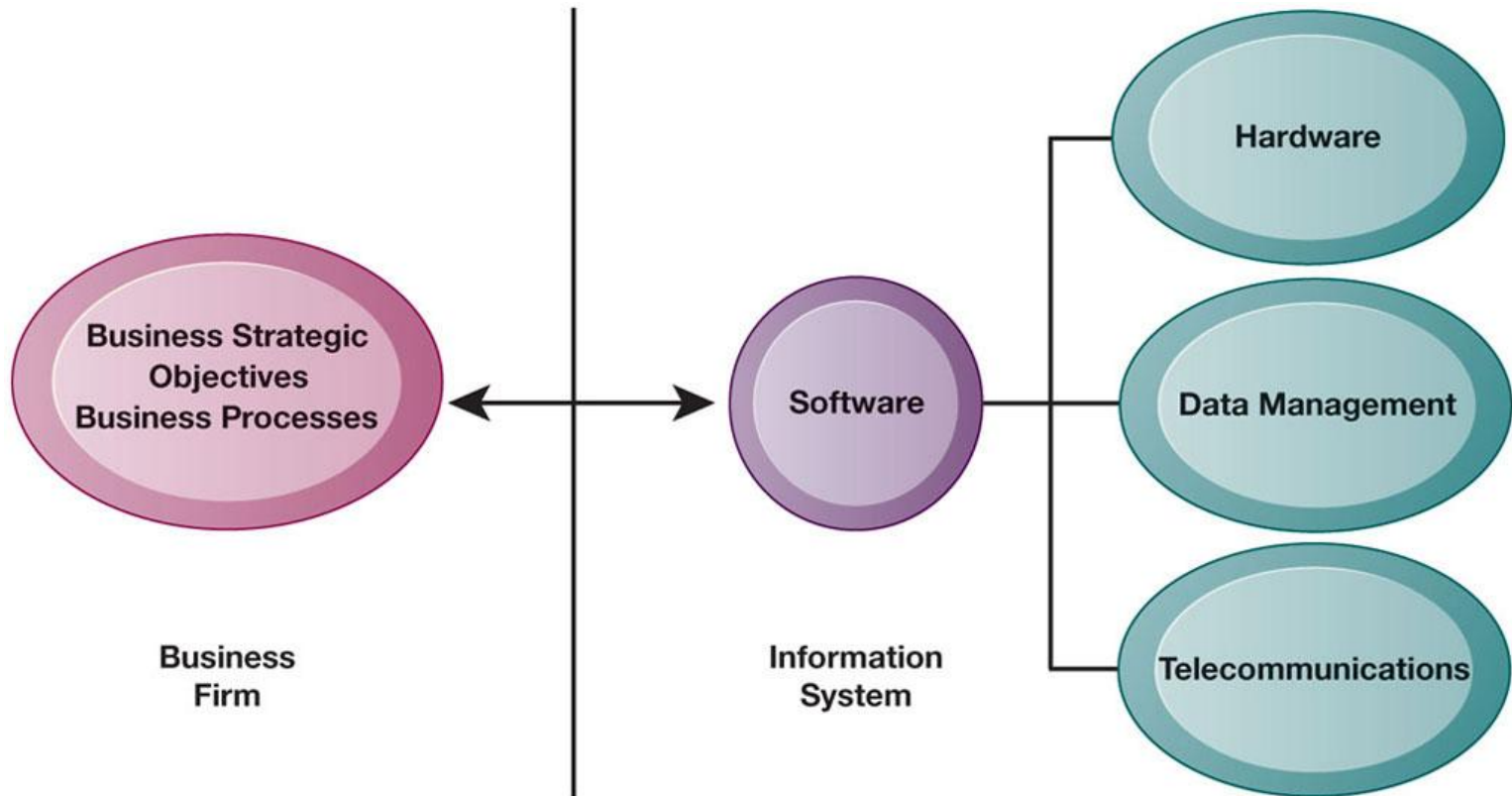
Strategic Business Objectives of Information Systems (1 of 2)

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

When discussing the cases and Interactive Sessions throughout the book, it will be useful to explain how various information systems succeeded or failed in achieving the six strategic business objectives. Think about some other business objectives and think about how IT might help firms achieve them. For instance, speed to market is very important to firms introducing new products. How can IT help achieve that objective?

Figure 1.2 The Interdependence Between Organizations and Information Systems

* Businesses shape their information systems and information systems shape businesses.



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.

Strategic Business Objectives of Information Systems (2 of 2)

- 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

* six strategic business objectives

1) Operational Excellence

- Improved efficiency results in higher profits
- Information systems and technologies help improve efficiency and productivity
- Example: Walmart
 - Walmart's Retail Link system links suppliers to stores for superior replenishment system
 - Power of combining information systems and best business practices to achieve operational efficiency—and over \$524 billion in sales in 2019
 - Most efficient retail store in the world as result of digital links between suppliers and stores

* Walmart is the most efficient retailer in the industry and exemplifies operational excellence.

2) New Products, Services, and Business Models

- Information systems and technologies enable firms to create new products, services, and business models
- **Business model**: describes how a company produces, delivers, and sells its products and services to create wealth
- Example: Apple
 - Transformed old model of music distribution with iTunes
 - Constant innovations—iPod, iPhone, iPad, etc.

3) Customer and Supplier Intimacy

- Customers who are served well become repeat customers who purchase more
 - Example: Mandarin Oriental Hotel/ High-end hotels
 - Uses IT to foster an intimate relationship with its customers, keeping track of preferences, etc.
- Close relationships (intimacy) with suppliers result in lower costs
 - Examples: JC Penney (US's department chain firm)
 - JC Penney uses IT to enhance relationship with supplier (TAL Apparel Ltd.) in Hong Kong
 - > TAL sends the shirts to each JCPenney store, bypassing completely the retailer's warehouses. In other words, JCPenney's shirt inventory is near zero, as is the cost of storing it.

4) 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
- Real-time data improves ability of managers to make decisions.
- Example: Verizon's web-based digital dashboard to provide managers with real-time data on customer complaints, network performance, line outages, etc.

5) Competitive Advantage

- Often results from achieving previous business objectives
- Advantages over competitors
- Charging less for superior products, better performance, and better response to suppliers and customers
- Examples: Apple, Walmart, UPS are industry leaders because they know how to use information systems for this purpose

* Achieving any of the previous four business objectives represents the achievement of a competitive advantage as well.

6) Survival

- Information technologies as necessity of business
- Businesses may need to invest in information systems out of necessity; simply the cost of doing business
필요성 때문에
- Keeping up with competitors (Industry-level changes)
뒤지지 않음
 - Citibank's introduction of ATMs
- Federal and state regulations and reporting requirements
 - Toxic Substances Control Act and the Sarbanes-Oxley Act (2002)

*** Sarbanes-Oxley Act** (2002) requires that public firms keep all data, including e-mail, on record for 5 years.

1.2 What is an Information System?

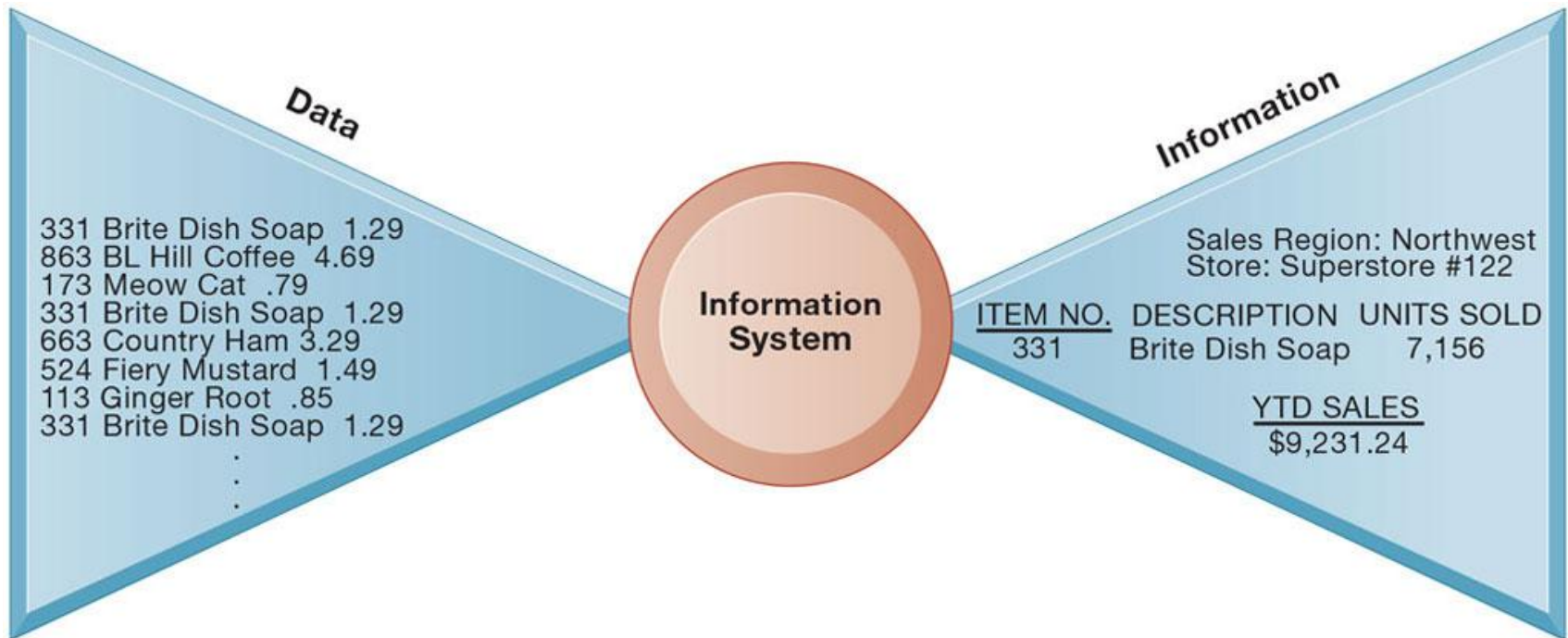
(1 of 3)

- **Information technology:** the hardware and software a business uses to achieve objectives
- **Information system:** interrelated components that manage information to:
 - * IS: set of interrelated components
 - Support decision making, coordination, and control
 - Help with analysis, visualization, and product creation
- **Data:** streams of raw facts
- **Information:** data shaped into meaningful, useful form

Information is an ordered set of data that you can understand and act on.

정리된

Figure 1.3 Data and Information



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.

- The diagram depicts the input to information systems. Data shown here that flow into information systems include item number, item description, and item price at a supermarket checkout. These data are organized into meaningful information such as item units sold, year-to-date sales, and location of sales.

YTD

What is an Information System?

(2 of 3)

- Activities in an information system that 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
 - Feedback
- Sharp distinction between computer or computer program versus information system

What is an Information System?

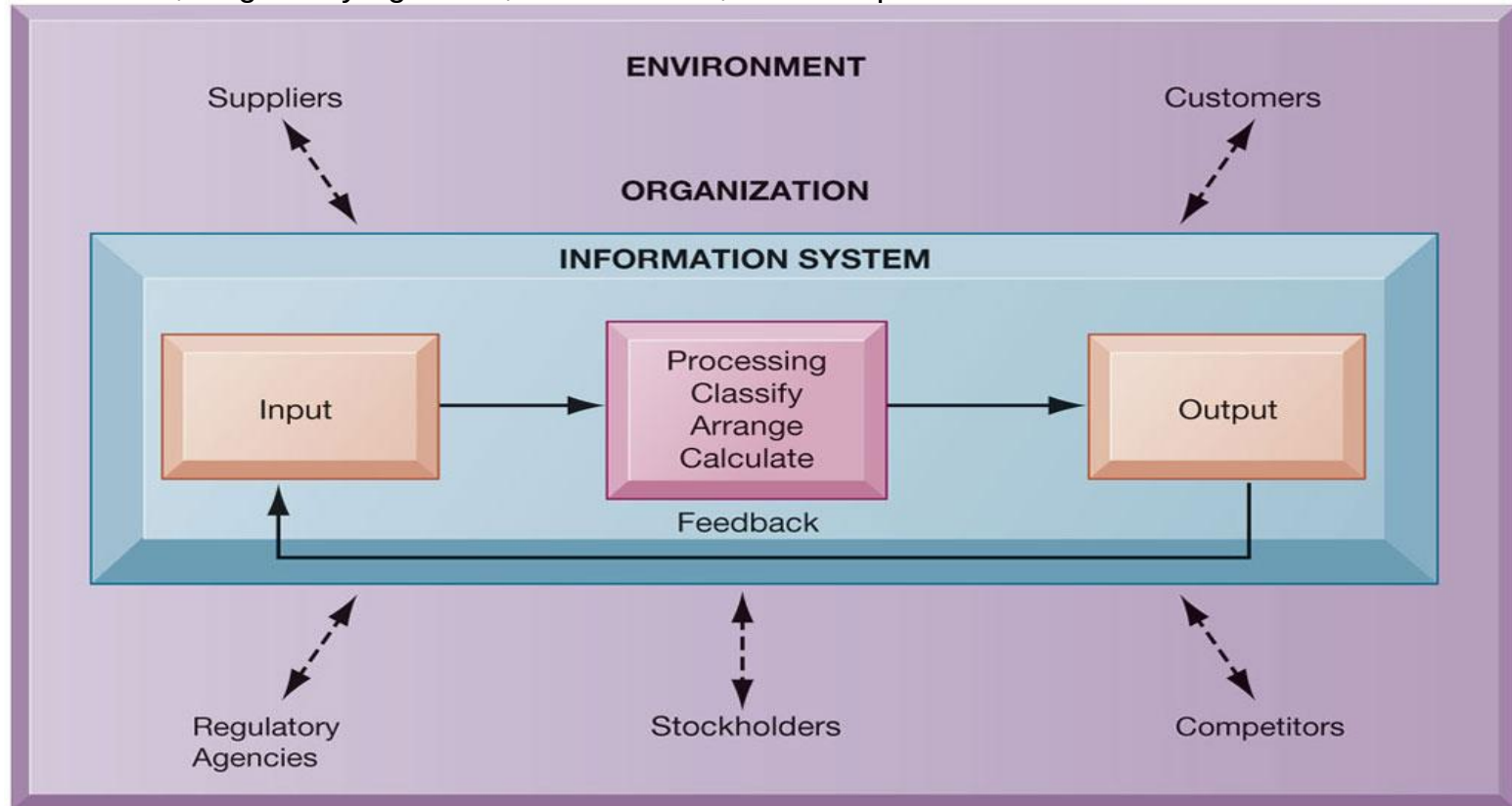
(3 of 3)

- Feedback
 - Output is returned to appropriate members of organization to help evaluate or correct (refine) 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

* “house” analogy works: assuming that a successful information system is like a completed “house”, computers and software represent only the tools and materials used to build the house. Tools and materials don’t just suddenly become a completed house—outside (human) input is required. Systems need to be designed to fit the firms and the humans who work with the systems.

Figure 1.4 Functions of an Information System

The diagram depicts the three activities of an information system within an organization. The activities are listed as follows. 1, Input. 2, Processing, including classify, arrange, calculate. 3, Output. These activities form a loop as feedback that follows output leads to the input at the beginning of the cycle. The activities of an organization's information system take place within the business's environment, which is influenced by numerous factors, including Suppliers, Customers, Regulatory agencies, Stockholders, and Competitors.



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.

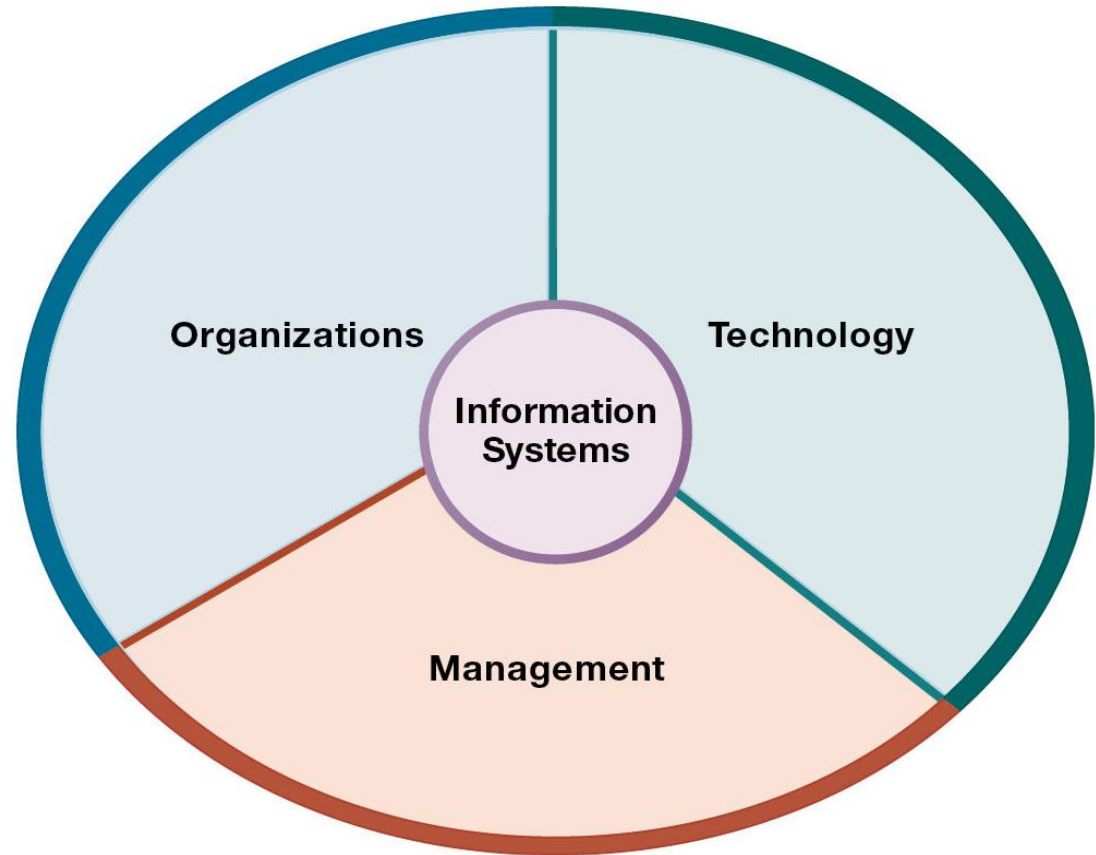
Dimensions of Information Systems

- Organizations
- Management
- Technology

- *To fully understand ISs, you must understand the broader organization, management, and IT dimensions of systems and their power to provide solutions to challenges and problems in the business environment. ISs literacy<-> computer literacy*

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.



* These three themes (management, organizations, and technology) will reappear throughout the book. Understanding the interaction among these factors and information systems is known as **information system literacy**. Knowing how to optimize the relationship between technology, organizations, and management is the purpose of this book and course.

Dimensions of Information Systems:

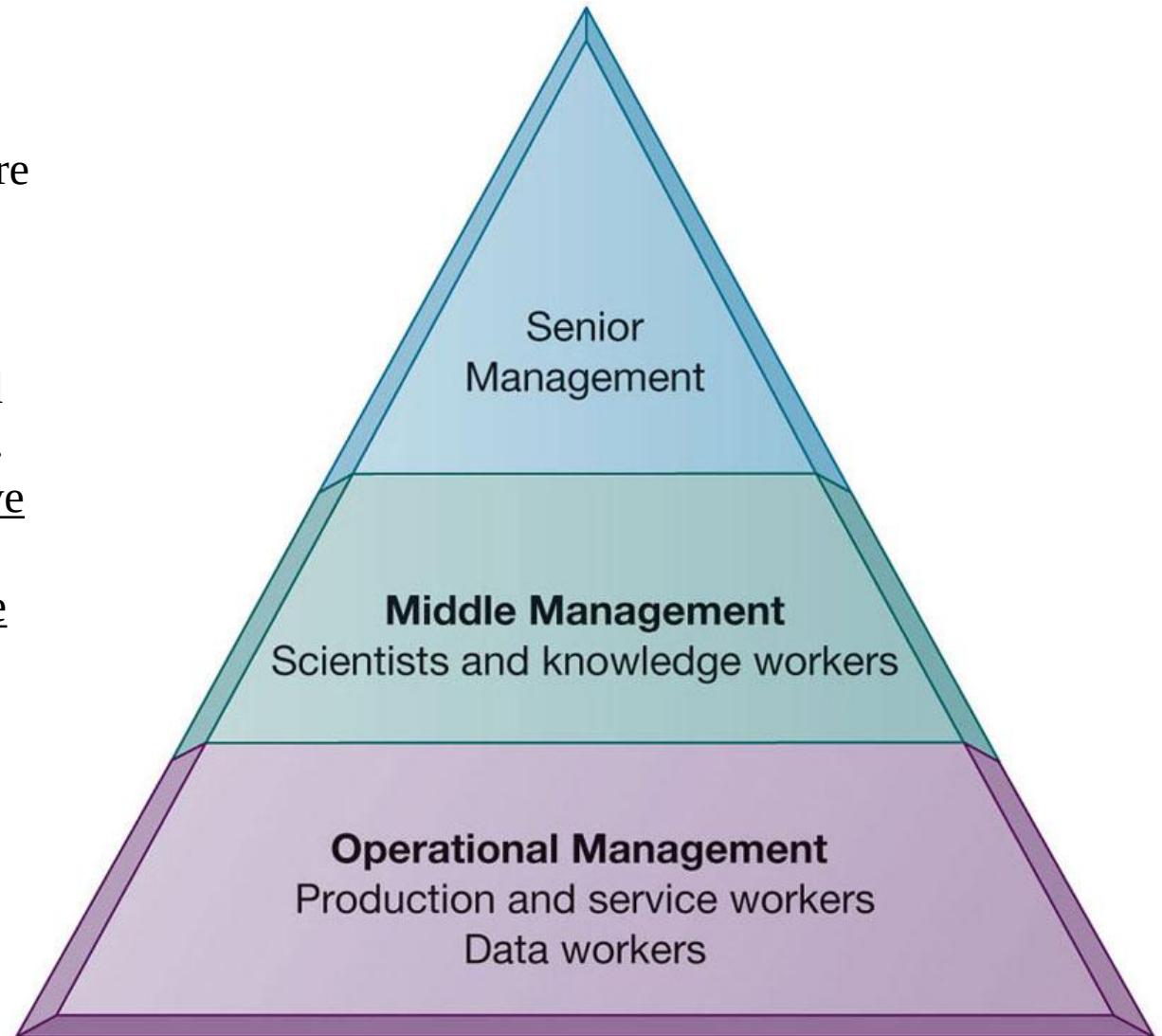
Organizations (1 of 2)

- The key elements of an organization are its people, structure, business processes, politics, and culture.

- Hierarchy of authority, responsibility
 - Senior management
 - Middle management
 - Operational management
- **Knowledge workers:** (such as engineers, scientists, or architects) design products or services and create new knowledge for the firm
- **Data workers:** (such as secretaries or clerks) assist with scheduling and communications at all levels of the firm
- **Production or service workers:** actually produce the product and deliver the service

Figure 1.6 Levels in a Firm

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.



Secretaries or clerks

Dimensions of Information Systems: Organizations (2 of 2)

-> Chap. 3

- Separation of business functions
 - Sales and marketing
 - Human resources
 - Finance and accounting
 - Manufacturing and production
- Unique business processes
- Unique business culture
- Organizational politics

* **Business processes:** logically related tasks and behaviors for accomplishing work e.g.) ~~~
-> include formal rules+ informal work practices
-> IS automates many business processes.

* **Culture:** fundamental set of assumptions, values, and ways of doing things, that has been accepted and shared by most of its members.

} -> e.g.) UPS

* **Conflicts** is the basis for **organizational politics**. Information systems come out of this cauldron of differing perspectives, conflicts, compromises, and agreements that are a natural part of all organizations.

Dimensions of Information Systems: Management

- 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
 - ∴ Organizations quickly become obsolete unless they continue to change.

Dimensions of Information Systems: Technology

- 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

- Information technology is at the heart of information systems. Although organization and management are important too, it's the technology that enables the systems and the organizations and managers who use the technology.

Interactive Session – Technology: Healthcare at Singapore's JurongHealth Services

- Class Discussion
 - What technologies are used by JurongHealth? What purpose do they serve?
 - Search the web for RFID. Suggest an example of using RFID for locating and tracking people.
 - What information systems are implemented by JurongHealth? Describe the input, processing, and output of any one such system.
 - Why are information systems important for JurongHealth?

It Isn't Just Technology: A Business Perspective on Information Systems

(1 of 3)

- **Information system is instrument for creating value**
- **Investments in information technology will result in superior returns**
 - **Productivity increases** -> The end result of the business information value chain will always be profitability.
 - **Revenue increases**
 - **Superior long-term strategic positioning**

- Consider how this view of information systems might contrast with the sociotechnical view or other views. Consider the circumstances under which information systems might not result in increased productivity and revenue.

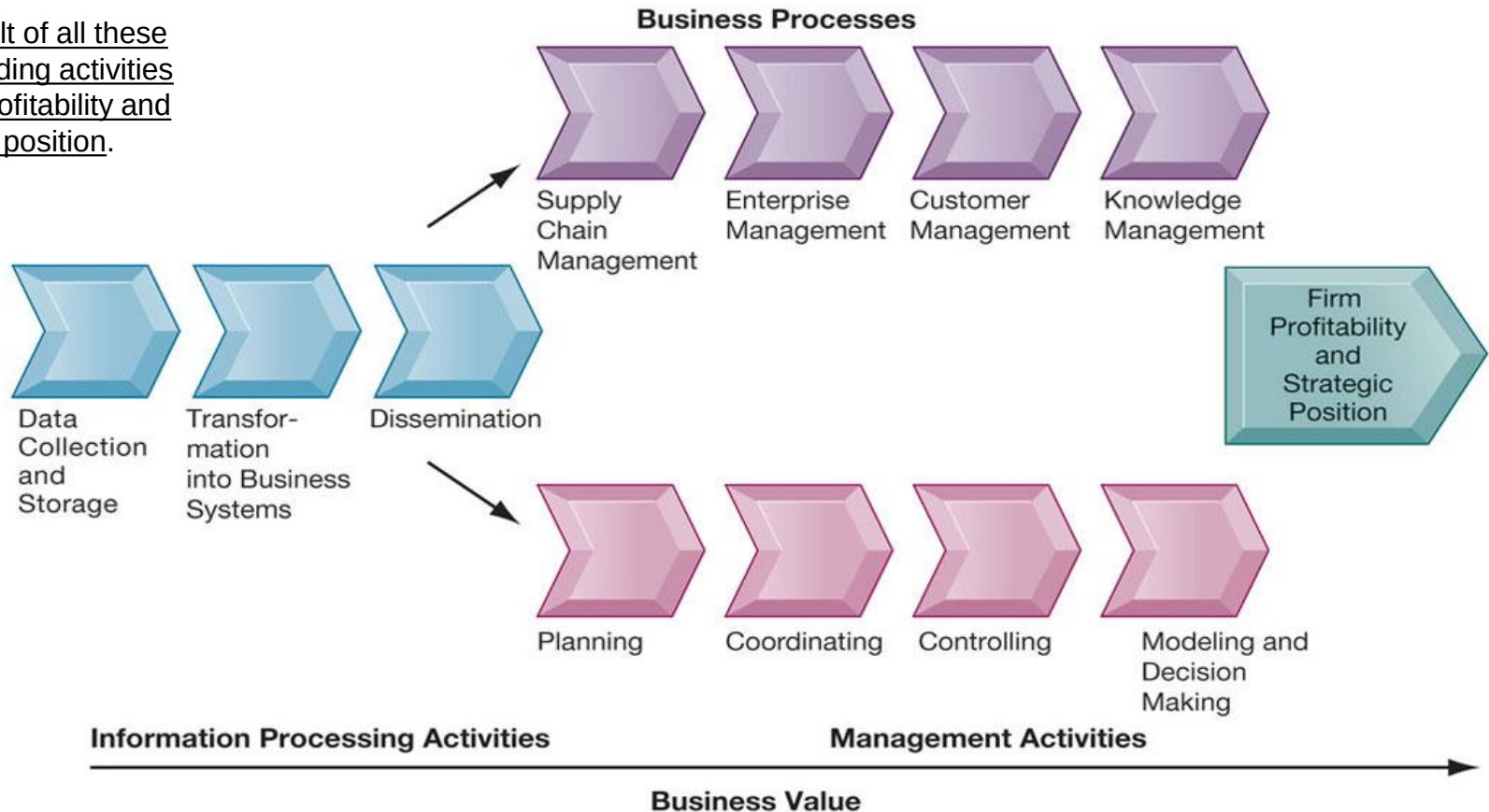
It Isn't Just Technology: A Business Perspective on Information Systems

(2 of 3)

- 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

Figure 1.7 The Business Information Value Chain

The result of all these value adding activities is firm profitability and strategic position.



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 information value chain is one way to visualize the relationship among information activities, business processes, and management activities. Think if you could imagine any reason to create an information system besides profitability or strategic positioning. One reason to create a system that is not primarily profit-oriented is to meet the information reporting requirements of government and other authorities.

It Isn't Just Technology: A Business Perspective on Information Systems

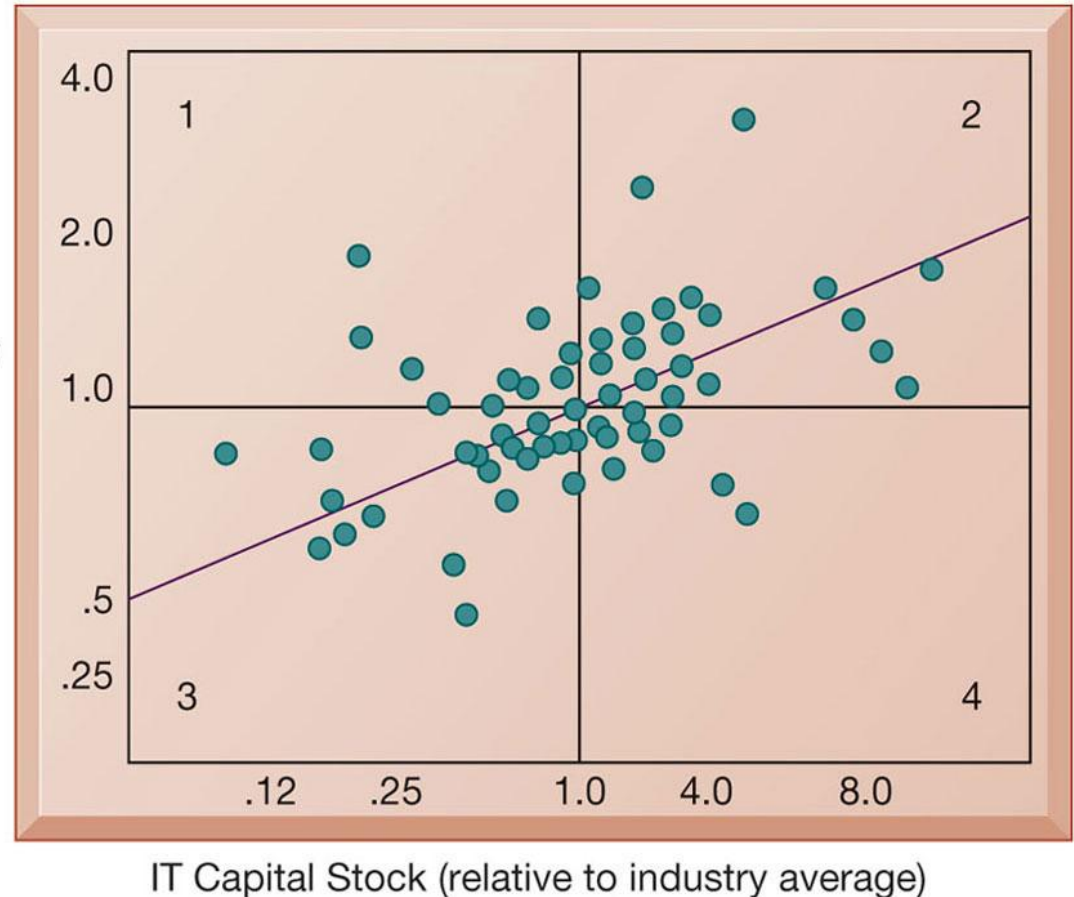
(3 of 3)

- 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)

Figure 1.8 Variation in Returns on Information Technology

- Although, on average, investments in information technology produce returns far above those returned by other investments, there is considerable variation across firms.

Productivity
(relative to
industry
average)



* The purpose of the course and book is to show you how to end up in top quadrant (2).

Complementary Assets: Organizational Capital and the Right Business Model (1 of 2)

- 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

* For automobile companies, these companies rely on investments in highways, other roads, gas stations, repair facilities, and so on to maximize the value of their primary investment.

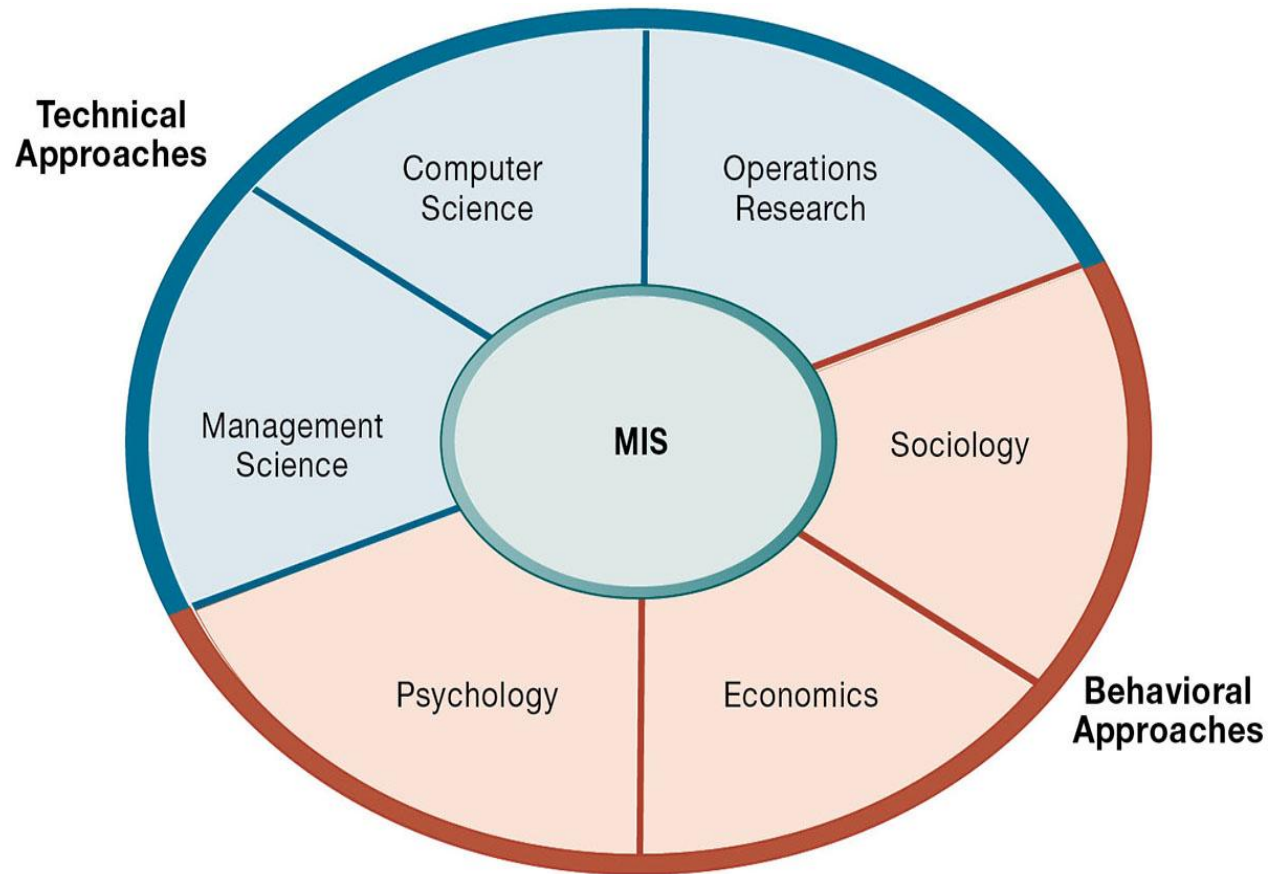
Complementary Assets: Organizational Capital and the Right Business Model (2 of 2)

- Complementary assets
 - Examples of organizational assets -> Table 1.3
 - Appropriate business model
 - Efficient business processes
 - Examples of managerial assets
 - Incentives for management innovation
 - Teamwork and collaborative work environments
 - Examples of social assets : Not made by the firm but by the society at large, other firms, governments, and other key market actors
 - The Internet and telecommunications infrastructure
 - Technology standards

- Firms that make significant investment in complementary assets tend to derive greater benefit from information technology investment than those that do not. Consideration of complementary assets should be a part of any firm's broader view of how to create and implement their information systems. Managers must consider dimensions such as complementary assets in order to derive benefit from information systems and be successful.

Figure 1.9 Contemporary Approaches to Information Systems

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



- The technical approach does not ignore behavior and the behavioral approach does not ignore technology, but that they are indeed two distinct approaches.

Technical Approach

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

Behavioral Approach

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

* The most accurate position is that there is no single approach that can truly capture the full scope and importance of information systems by itself.

Approach of This Text:

Sociotechnical Systems (1 of 2)

- (Management) information systems
 - Combine 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)

Approach of This Text:

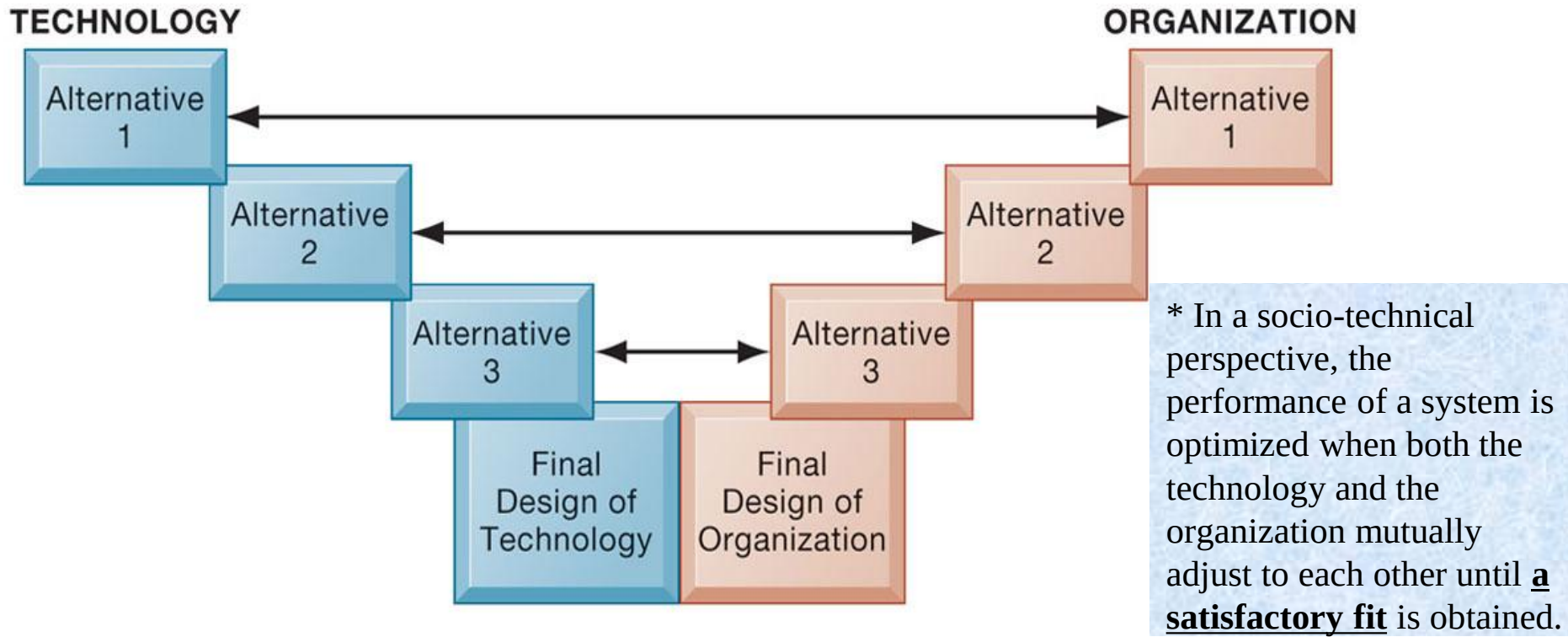
Sociotechnical Systems (2 of 2)

- **Sociotechnical view**

- Optimal organizational performance achieved by jointly optimizing both social and technical systems used in production
- Helps avoid purely technological approach

* The critical aspect of this view is the balance between technological and social/behavioral concerns. Sometimes a lesser form of technology may be the best option because it is more suited to the personal needs of the individual, for example.

Figure 1.10 A Sociotechnical Perspective on Information Systems



* **This graphic** illustrates the interplay between technology and the organization. The two continue to grow closer together until an approach satisfying both perspectives is reached. Ensure that you understand that the two sides do not always need to form an equal compromise. Sometimes highly advanced technology may be more acceptable than at other times. As you will see with packaged software solutions and enterprise systems, firms are often required to change greatly in order to make the software applications work.

* **A diagram** depicts a matchup of alternatives in a sociotechnical perspective on information systems. In the diagram, the final design of technology presents three alternatives. The final design of organization also presents three alternatives. Performance of an information system occurs within Alternative 1 for technology matches up with Alternative 1 for organization, Alternative 2 for technology matches up with Alternative 2 for organization, and Alternative 3 for technology matches up with Alternative 3 for organization.

How Will (M)IS Help My Career?

- The Company: Power Financial Analytics Data Services
- Position: Financial client support and sales assistant
- Job Requirements
- Interview Questions
- Author Tips