សាកលវិទ្យាល័យភូមិន្ទភ្នំពេញ

ROYAL UNIVERSITY OF PHNOM PENH

CHAPTER 2

Information Systems in Organizations

MIS

Chea Daly

Why Learn About Information Systems in Organizations?

- After graduating, a marketing major might use a software application to analyze customer needs in different areas of the country.
- An accounting major might work for a consulting firm using an information system to audit a client company's financial records.
- A biochemist might conduct research for a drug company and use a computer model to evaluate the potential of a new cancer treatment.
- …

Why Learn About Information Systems in Organizations?

- Although your job might be different from those in the previous examples, throughout your career, you will almost certainly use information systems to help you and your organization become more efficient, effective, productive, and competitive.

Organizations and Information Systems

- However, the implementation of new information systems has a major impact on an organization, affecting people's roles and responsibilities, their day-to-day routines and processes for accomplishing work, who they interact with, what skills and knowledge they need, and how they are rewarded and compensated.

Organizations and Information Systems

- The resulting changes can be highly disruptive and agonizing to work through, and as a result, the introduction of a new system often faces considerable resistance.
- As a manager in an organization undergoing such change, you must anticipate resistance and work actively to mitigate it.

Organizations and Information Systems

- Organization:
  - Formal collection of people and other resources established to accomplish a set of goals.
  - A system.
  - Constantly uses money, people, materials, machines and other equipment, data, information, and decisions.
- Organizations of all types use information systems to cut costs and increase profits.

Organizations and Information Systems

- Organizations are considered to be open systems, meaning that they affect and are affected by their surrounding environment.

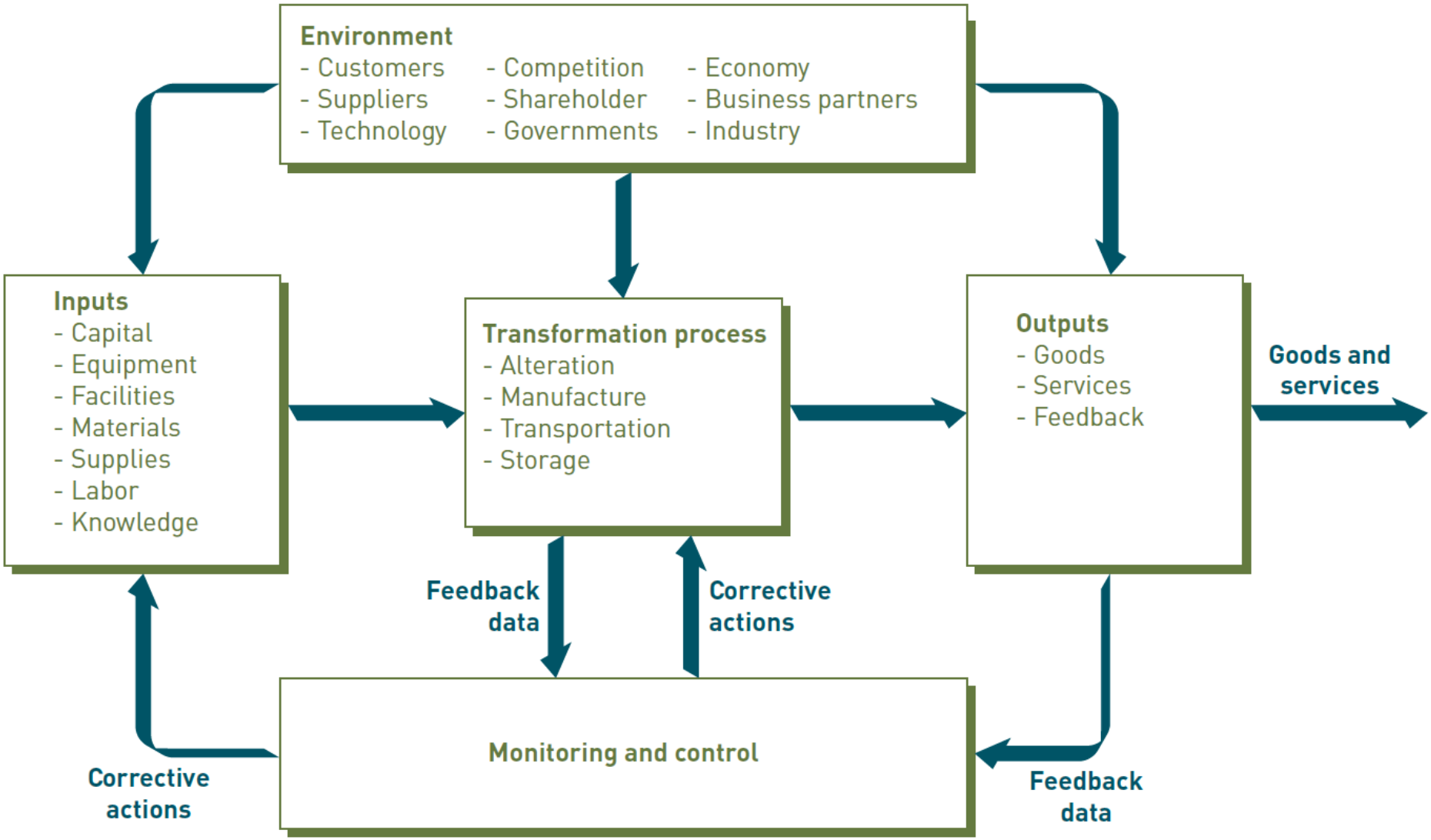


FIGURE 2.1

General model of an organization

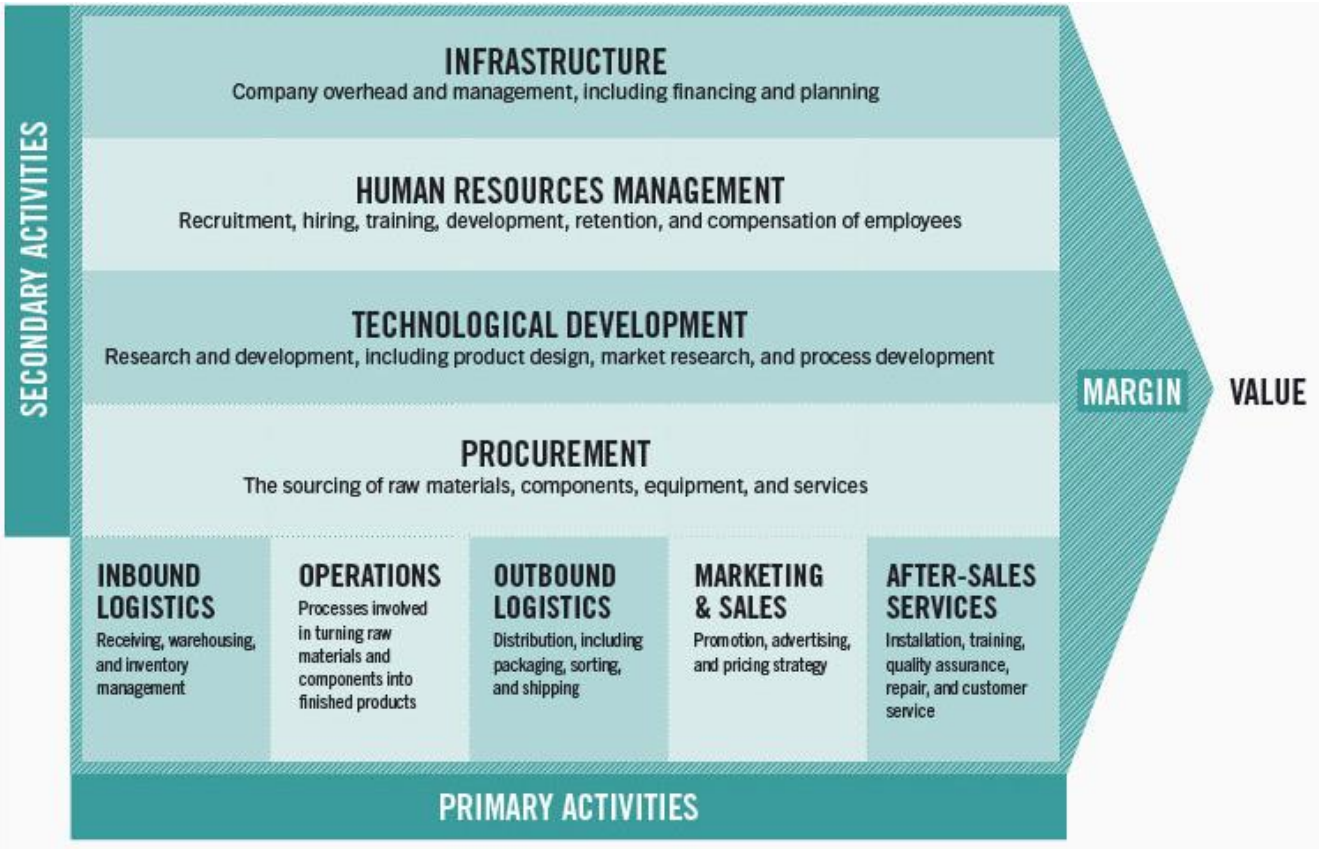
Information systems support and work within the automated portions of an organizational process.

Value Chain

- **Value Chain**: A series (chain) of activities that an organization performs to create products or services -- from the initial reception of raw materials all the way through their delivering to market.
- The more value an organization creates, the more profitable it is likely to be. And when you provide more value to your customers, you build competitive advantage.
- An organization may have many value chains, and different organizations in different industries will have different value chains.

Supply Chain

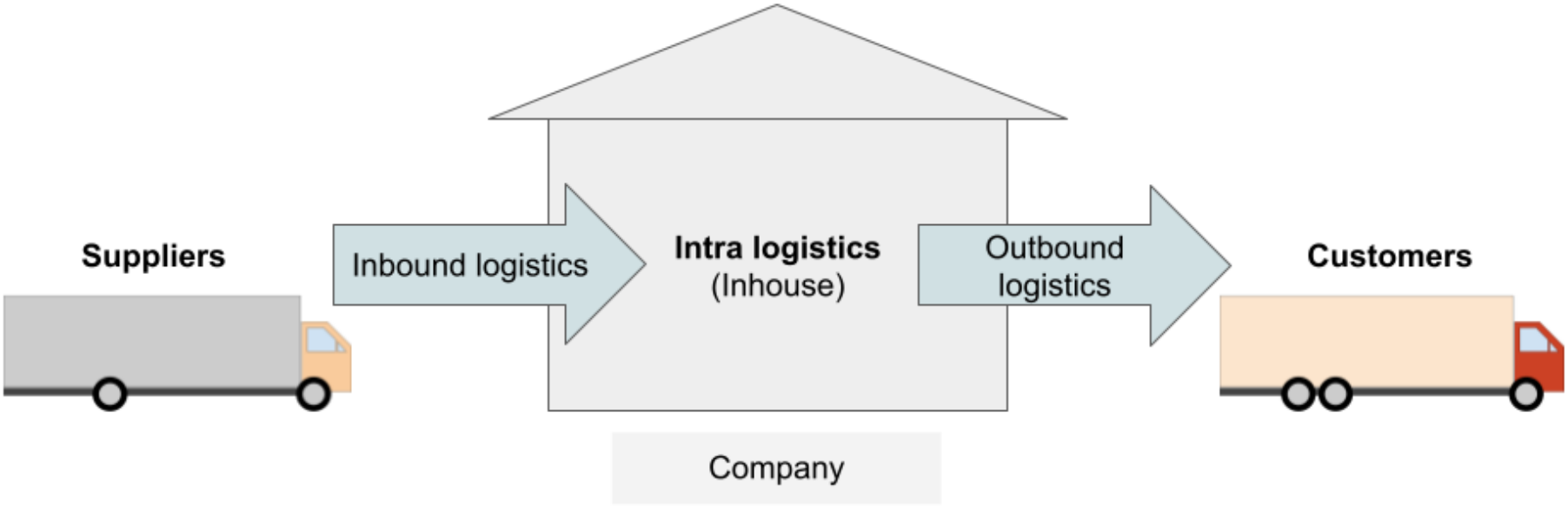
- In a manufacturing organization, the **supply chain** is a key value chain.

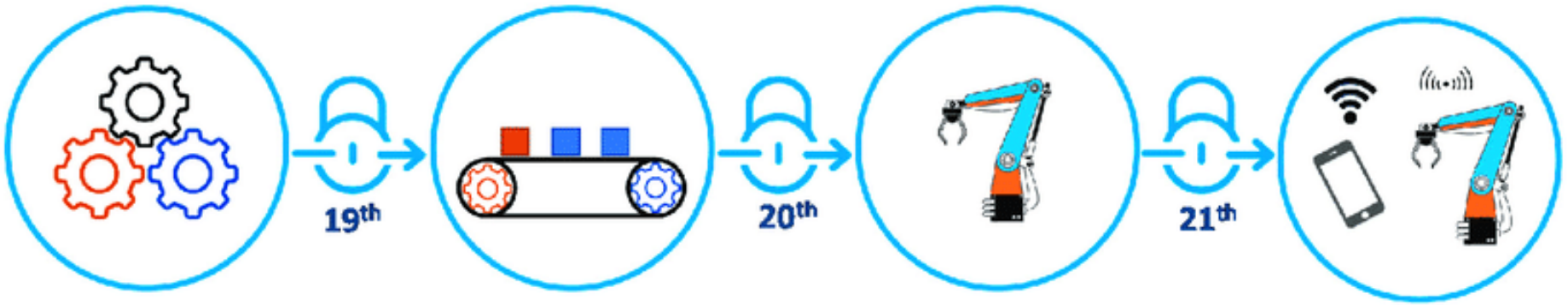


Primary Activities

- **Inbound Logistics**: all activities associated with the receiving, distributing and storing of incoming materials
- **Operations**: converting inputs (raw materials, energy and labor) into outputs (the final product/service)
- **Outbound Logistics**: all activities associated with the storage and movement of the final product to the end user
- **Marketing and Sales**: all activities involved in the assessment and encouragement of customers to purchase and the activities associated in providing a mean to purchase the product.
- **Service** refers to **After-Sales Service**, activities related to maintenance and enhancement of value to the end user after the product is sold.

Inbound and Outbound Logistics





Industry 1.0	Industry 2.0	Industry 3.0	Industry 4.0
Mechanization Steam powered machines	Mass production Electric power	Automatization and robotics	Smart, autonomous system

Secondary Activities

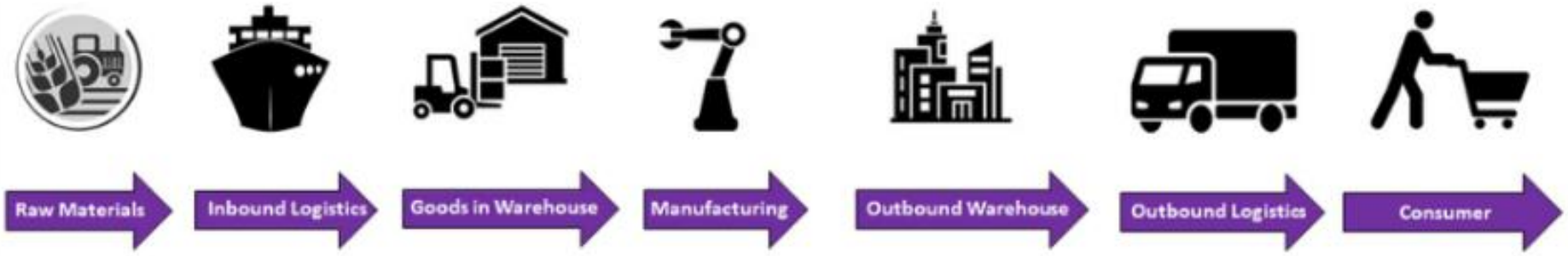
- **Procurement**: the acquisition of goods or services from an external source.
- **Human Resource Management**: all activities associated with the management of people as per the requirements.
- **Technology Development**: all activities related to the equipment, hardware, software, technical knowledge and procedures to transform the inputs into outputs.
- **Infrastructure**: all other activities including legal, finance, accounting, public relations and quality assurance.

Margin

- **Margin** refers to the profit margin the company makes out of the activities of its value chain.
- A high margin means the company is able to sell a product or a service for a much higher price than the cost of all the activities of the value chain.

Supply Chain Management

- **Supply Chain Management (SCM)** is the management of the flow of goods and services and includes all activities required to get the right product and service into the right consumer's hands in the right quantity at the right time and at the right cost.



Supply Chain Management

- The goal of SCM is to look holistically at the entire supply chain from supplier through to the consumer, and review people, process and systems in order to maximize value from all activities.

Case Study: Ford Motor Company

FIGURE **2.3**

Ford Motor Company assembly line

Ford Motor Company's use of information systems is a critical support activity of its supply chain. The company gives suppliers access to its inventory system so that the suppliers can monitor the database and automatically send another shipment of parts, such as engine parts or bumpers, eliminating the need for purchase orders. This procedure speeds delivery and assembly time and lowers Ford's inventory-carrying costs.

Supply Chain Management

- Organizations are constantly adjusting their supply chain in order to achieve the best or a desired result.
- For example, many companies are increasing their use of free shipping to customers in hopes of increasing sales and profits.

Supply Chain Management

- Many organizations are also outsourcing much of their outbound distribution activities, including the storage and shipping of finished products to customers and the return of items from customers.

Role of Information Systems in SCM and Organizations

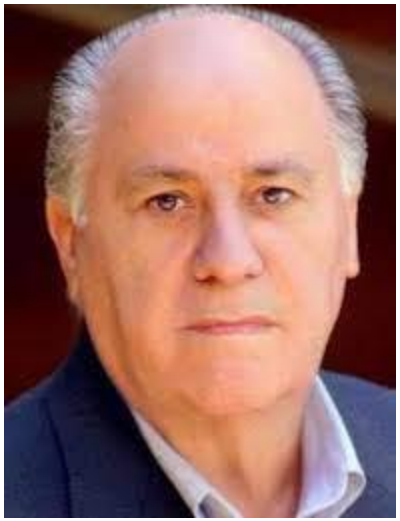
- The improvement on the supply chain management process also majorly depends on the factor of enabling multiple stores rather than relying on one single depot, which can speed up the delivery process.
- Technology is the critical solution in enabling this process.
- Organizations use information systems to control and monitor processes and to ensure effectiveness and efficiency.

Case Study: Zara

- For example, Zara is world's largest fashion clothing retailers with 2,000 stores spread across 88 countries.

Case Study: Zara

- Zara's founder, Amancio Ortega, had humble origins, but today is one of the richest men in the world.



The World's Billionaires

Case Study: Zara

- Consumer clothing trends are constantly changing, creating a highly competitive environment in which companies compete not only on price but also on their ability to deliver products that are new and stimulating to their customers.

Case Study: Zara

- To meet this challenge, Zara has developed an extremely responsive supply chain that enables it to go from design stage to sales floor in a maximum of three weeks rather than the six-month industry average. Zara can deliver new products twice a week to its stores around the world.

Case Study: Zara

- At Zara, Information systems are used to capture and review data from stores on an hourly basis to spot new trends as early as possible. This data includes sales, inventory data and information obtained by sales assistants as they chat with customers and as the sales assistants gather unsold items that customers tried on, but left in fitting rooms.

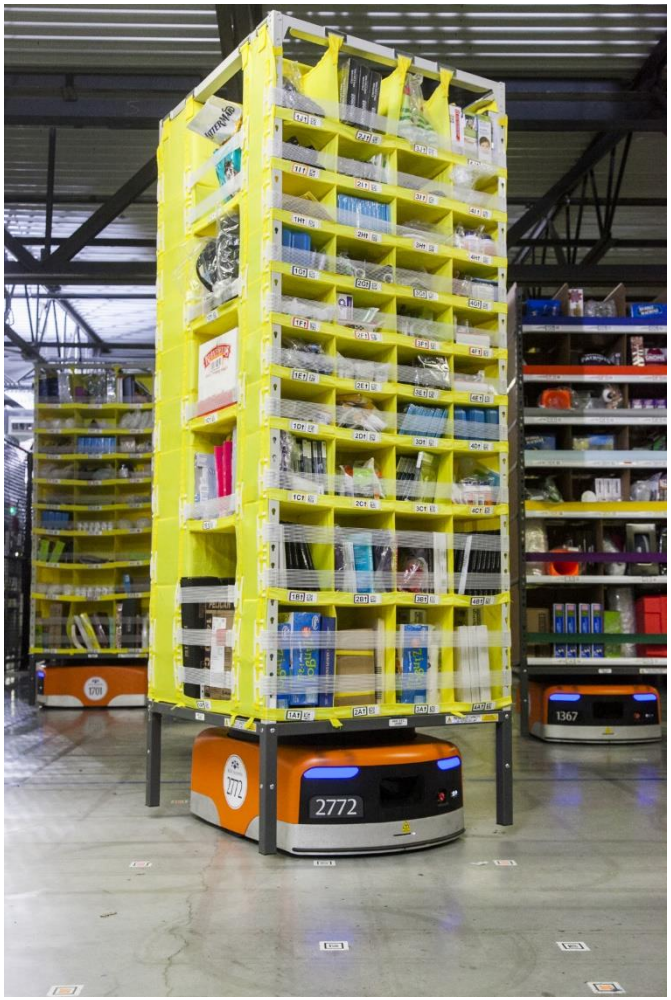
Case Study: Zara

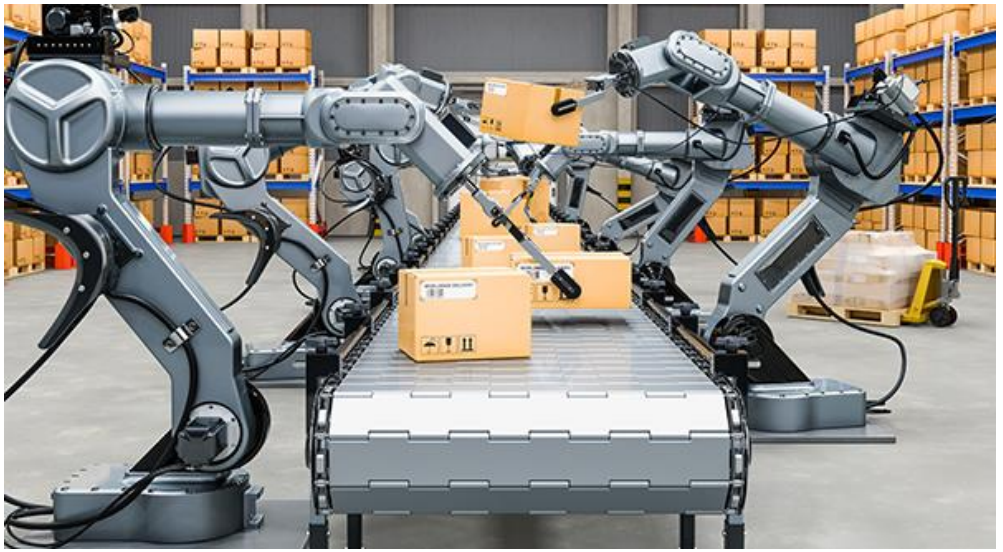
- All the data is sent to Zara's headquarters where it is carefully analyzed by design teams who decide what new designs will be prototyped and produced in small quantities to see what sells. In addition, inventory optimization models help the company determine the quantities and sizes of existing items that should be delivered to each store.

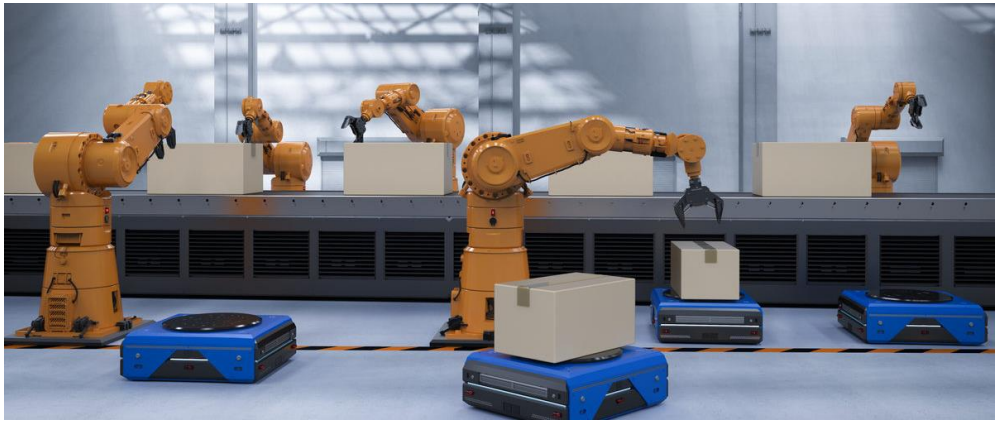
Case Study: Zara

- Zara's outstanding supply chain (which includes information systems as an integral component) has led to improved customer satisfaction, decreased risks of overstocking the wrong items, reduced total costs, and increased sales.

Robotics In Supply Chain Management







Robotics In Supply Chain Management

Technologies for Supply Chain Industry

- Data Analysis
- IoT
- Cloud Computing
- Information Security
- App
- 3D printing
- Robotics
- Drone
- …

Virtual Teams and Collaborative Work

- A virtual team is a group of individuals whose members are distributed geographically, but who collaborate and complete work through the use of information systems.
- The virtual team may be composed of individuals from a single organization or from multiple organizations.

FIGURE **2.4**

Group videoconference

A virtual organizational structure allows collaborative work in which managers and employees can effectively work in groups, even those composed of members from around the world.

Virtual Teams and Collaborative Work

- One benefit of virtual teams is that they enable organizations to enlist the best people in different geographical regions to solve important organizational problems.
- Another benefit is that they provide the ability to staff a team with people who have a range of experience and knowledge that stems from a variety of professional experiences and cultural backgrounds.

Virtual Teams and Collaborative Work

- Often, it is difficult for members of a large virtual organization to meet at a time that is convenient for everyone on the team due to the time zone differences in their various geographic locations.

Innovation

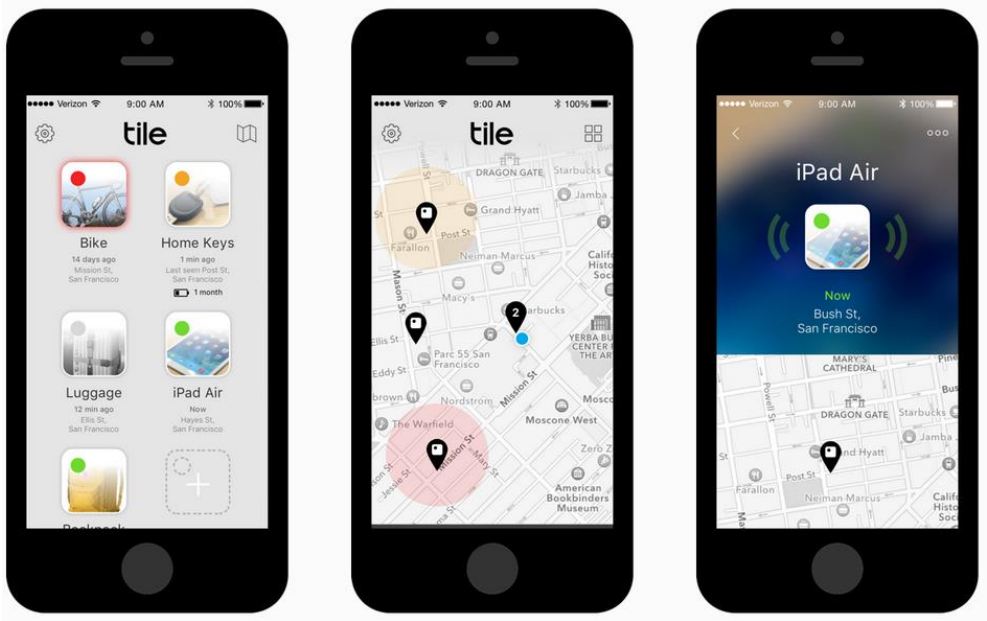
- **Innovation** is the application of new ideas to the products, processes, and activities of a firm, leading to increased value.
- Innovation is the catalyst for the growth and success of any organization. It can rise profits, create new challenges for the competition, and provide added value for customers.

Innovation

- Innovation and change are absolutely required in today's highly competitive global environment; without both, the organization is at risk of losing its competiveness and becoming obsolete.

Innovation

- **Tile** is a smartphone app combined with small devices (tiles) that consumers can stick on their keys, TV remote controls, purses, and wallets.



Innovation

- Healthcare technology company, iHealth, has introduced several different sensors that can measure and report on a wide array of biometric data.
- Example: Automatic blood pressure monitor - BP5

Innovation

Butterfleye, an economical home security product, has a megapixel camera smart enough to recognize you, members of your family, and even your pets. If a stranger is caught inside your home within view of the camera, Butterfleye uses your home Wi-Fi system to alert you via an app.

Innovation

- Innovations are important because they enable an organization to continually increase profits, lower costs, and gain market share.

Reengineering and Continuous Improvement

- To stay competitive, organizations must occasionally make changes in the way they do business; they must innovate and change the activities, tasks, or processes they use.

Reengineering and Continuous Improvement

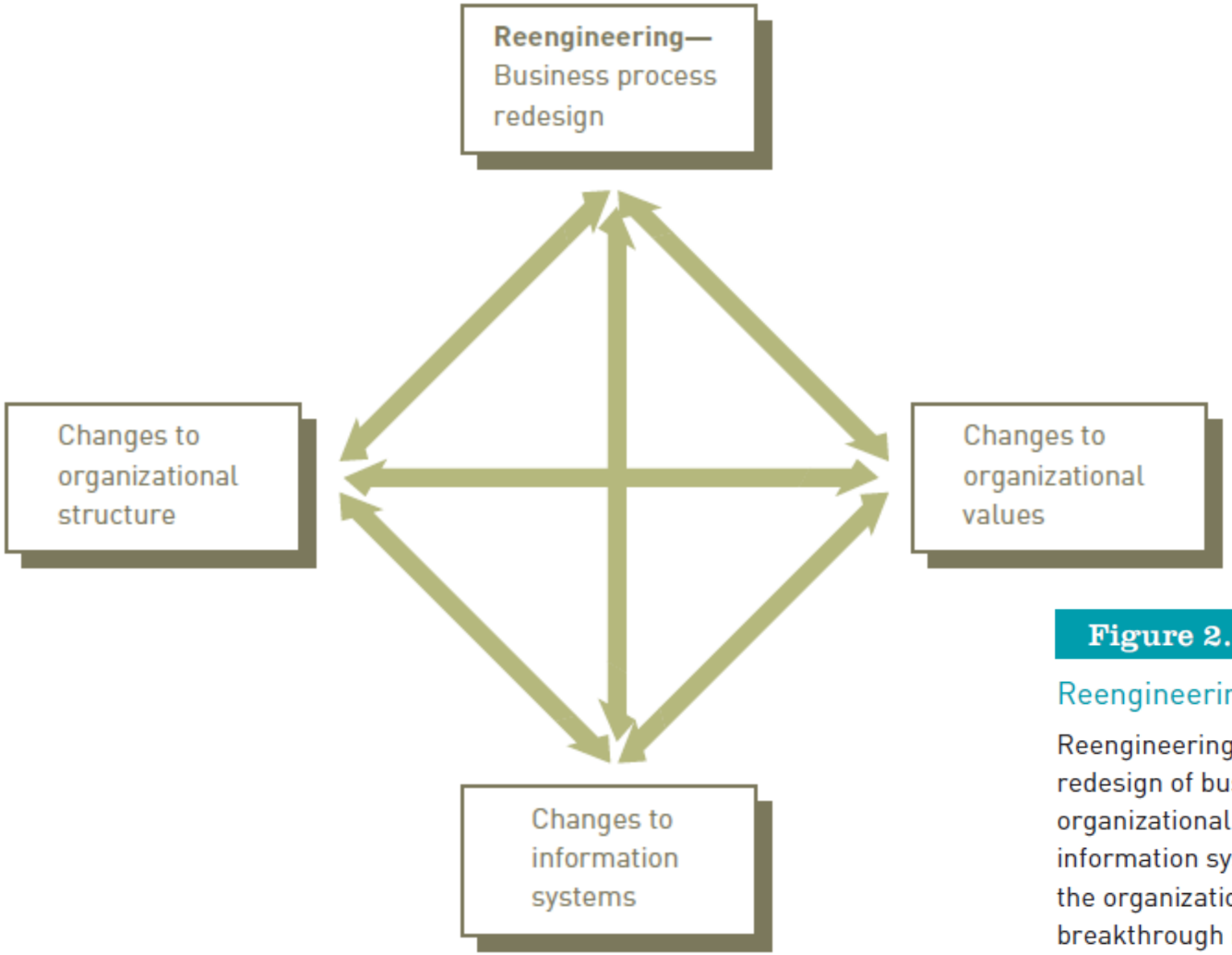


Figure 2.8

Reengineering

Reengineering involves the radical redesign of business processes, organizational structure, information systems, and values of the organization to achieve a breakthrough in business results.

Continuous Improvement

- **Continuous improvement** is a form of innovation that constantly seeks ways to improve business processes and add value to products and services regularly.
- This continual change will increase customer satisfaction and loyalty and ensure long-term profitability.

Outsourcing, Offshoring, and Downsizing

- A significant portion of expenses for most organizations goes toward hiring, training, and compensating employees.
- Naturally, organizations try to control costs by determining the number of employees they need to maintain high-quality goods and services without being overstaffed.

Outsourcing, Offshoring, and Downsizing

Strategies to contain these personnel costs include:

- **Outsourcing**:
  - Contracting with outside professional services
- **Offshoring**:
  - Offshoring is the relocation of a business process from one country to another.
- **Downsizing:**
  - Reducing number of employees to cut costs.

Outsourcing

- **Outsourcing –** in which a company contracts for services with an outside organization that has expertise in providing a specific function.
- Organizations often outsource a process so they can focus more closely on their core business—and target their limited resources to meet strategic goals.

Outsourcing

- Typically, the outsourcing firm has expertise and other resources that enable it to perform the service better, faster, and/or more cheaply.
- As a result, many companies now outsource jobs such as call center services, payroll activities, information system operations, computer support services, and security services.

Offshoring

- **Offshoring** (also called **Offshore outsourcing**) - in which the organization relocate some business processes or operations to a different geographical location.
- While it is unusual for companies to outsource their core activities, offshoring crucial operations are quite common.
- The organization still holds sole control over how something is done.

Offshoring

- Usually by companies from industrialized countries to less-developed countries.

Germany Factory

Offshoring

- Offshoring of tasks that require significant customer interaction has led to problems due to culture and language differences for some companies.
- As a result, many companies are reevaluating their decision to offshore their call center and customer support services.

Downsizing

- **Downsizing** involves reducing the number of employees to cut costs. The term “rightsizing” is sometimes also used.
- When downsizing, companies usually look to downsize across the entire company, rather than picking a specific business process to downsize.
- Downsizing clearly reduces total payroll costs, although the quality of products and services and employee morale can suffer.

Case Study: Kraft Heinz

- Shortly after Heinz merged with Kraft, in March 2015, the company announced that it would downsize its 46,000 employees in the United States and Canada by 2,500 people to save $1.5 billion in annual costs.

Kraft Heinz Company is the third-largest food and beverage company in North America.

Organizational Culture

- Culture:
  - Set of major understandings and assumptions shared by a group.
- Organizational culture:
  - Major understandings and assumptions shared by people with an organization.

Organizational Culture

- Also know as **company culture**. It is the personality of your organization and it plays a large part in your employees' overall satisfaction.
- For example:
  - Do employees feel valued?
  - Do we tell the truth to each other?
  - Do we give honest feedback?
  - Do we speak the truth to leaders?
  - Do leaders always "win" the conversation?
  - …

Organizational Change

- **Organizational change** refers to the actions in which an organization alters its culture, the underlying technologies or infrastructure it uses to operate, or its internal processes.
- Causes Organizational Change might include:
  - New leadership within the organization
  - The implementation of new technology
  - The adoption of new business models
  - …

Organizational Change

- Implementing change, such as a new information system introduces conflict, confusion, and disruption.
- People must stop doing things the way they are accustomed to and begin doing them differently.
- Successful implementation of change only happens when people accept the need for change and believe that the change will improve their productivity and enable them to better meet their customers' needs.

Case Study: California Department of Consumer Affairs

- The California Department of Consumer Affairs that regulate and license professional and vocational occupations that serve the people of California.
- The information system was intended to eliminate many paper-based processes and speed up the entire licensing process.
- Unfortunately, the project team failed to adequately involve the business users in the definition of the system requirements and instead made many erroneous decisions about how the system should work.

Case Study: California Department of Consumer Affairs

- The initial cost estimate for the system was $28 million; however, as of early 2015, project costs exceeded $37 million and less than half the licensing and regulatory boards were using the system.
- It is estimated that it will cost a total of $96 million to complete the project.
- Much of the delay and overspending could have been avoided had the project team work better with the business users to understand their needs

Lewin's Change Model

- Change model:
  - Represents change theories by identifying stages of change and the best way to implement them.
- A three-stage approach for implementing change that involves **unfreezing**, **moving**, and **refreezing**.

Lewin's Change Model

Unfreezing Preparing for change	**Moving** Making the change	**Refreezing** Institutionalizing
Key Tasks	**Key Tasks**	**Key Tasks**
Communicate what, why, when, who, how	Motivate individuals involved or affected	Monitor progress against success criteria
Draw on others, and seek input, ideas	Coach, train, lead, encourage, manage	Establish processes, systems to institutionalize change
Define objectives, success criteria, resources, schedule, budget	Provide appropriate resources	Establish controls to ensure change is occurring
Finalize work plans	Provide on-going feedback	Recognize and reward individuals for exhibiting new behavior
Assign leaders and implementation teams		Provide feedback, motivation, additional training to individuals not exhibiting new behavior

Lewin's Change Model

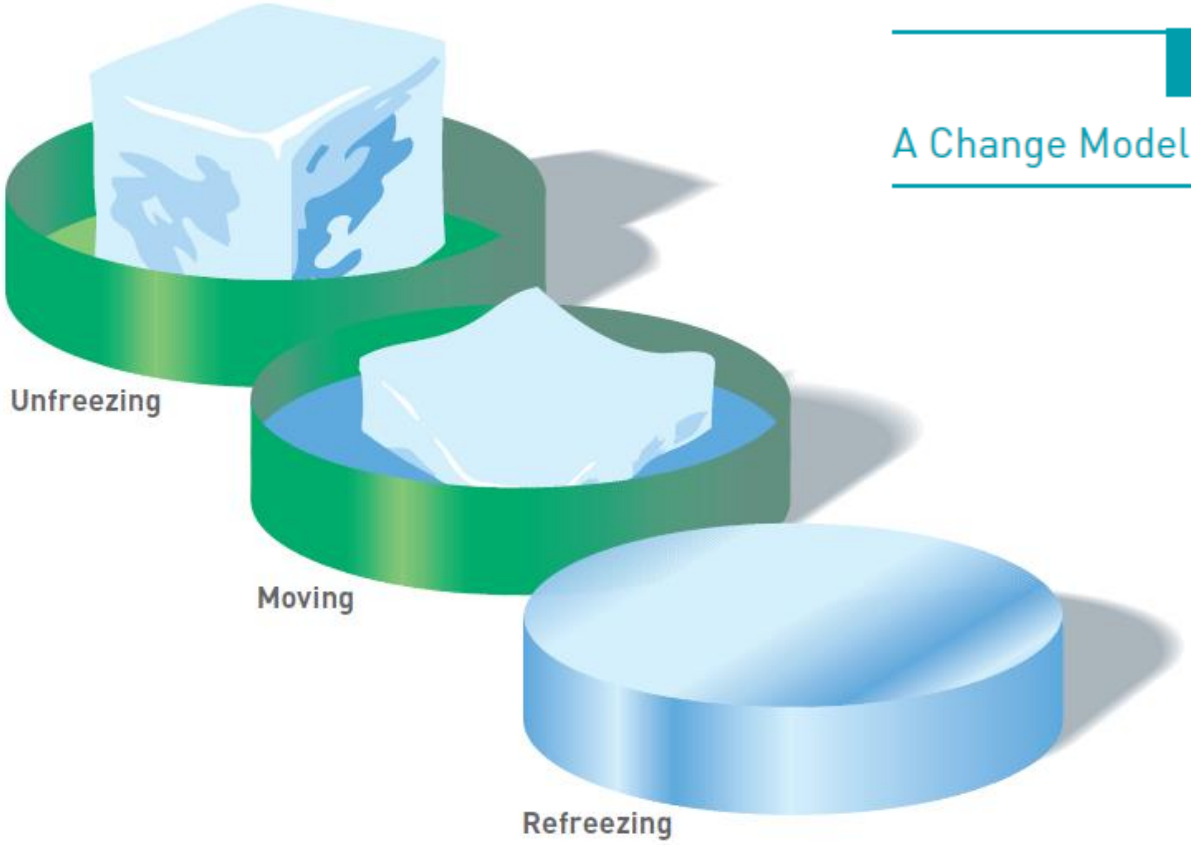


Figure 2.7

A Change Model

User Satisfaction and Technology Acceptance

- Reengineering and continuous improvement efforts must be adopted and used to achieve the defined business objectives by targeted users.

User Satisfaction and Technology Acceptance

- Perceived usefulness:
  - is defined as the degree to which individuals believe that use of the system will improve their performance.
- Perceived ease of use:
  - is the degree to which individuals believe that the system will be easy to learn and use.

User Satisfaction and Technology Acceptance

- Both the **perceived usefulness** and **ease of use** can be strongly influenced by:
  - the expressed opinions of others who have used the system and
  - the degree to which the organization supports use of the system (e.g., providing incentives and offering training and coaching from key users).

User Satisfaction and Technology Acceptance

- **Perceived usefulness** and **ease of use** strongly influence whether someone will use an information system.
- Management can improve that perception by demonstrating that others have used the system effectively and by providing user training and support.

Case Study: Avon Products

- Avon Products is an international manufacturer and direct seller of beauty, household, and personal care products.
- Avon products are sold through six million independent and mostly part-time sales representatives worldwide who sell direct to family, friends, and personal contacts.

Case Study: Avon Products

- In 2013, Avon piloted a new sales system in Canada. The system was intended to streamline the ordering process through the use of iPads, which would allow the sales rep to display products to customers and then check inventory and place orders online.
- It was estimated that the project would generate some $40 million per year in cost savings and increased sales.

Case Study: Avon Products

- Unfortunately, the system did not meet the sales rep's expectations in terms usefulness and ease of use.
- As a result, one Avon executive sales manager estimates that as many as 16,000 Canadian sales reps quit in large part out of frustration with the new system.
- Avon dismissed the project at a cost of nearly $125 million.

Diffusion of Innovation Theory

- The diffusion of innovation theory explains how a new idea or product gains acceptance and diffuses (or spreads) through a specific population or subset of an organization.
- A key point of this theory is that adoption of any innovation does not happen all at once for all members of the targeted population; rather, it is a drawn-out process, with some people quicker to adopt the innovation than others.

Diffusion of Innovation Theory

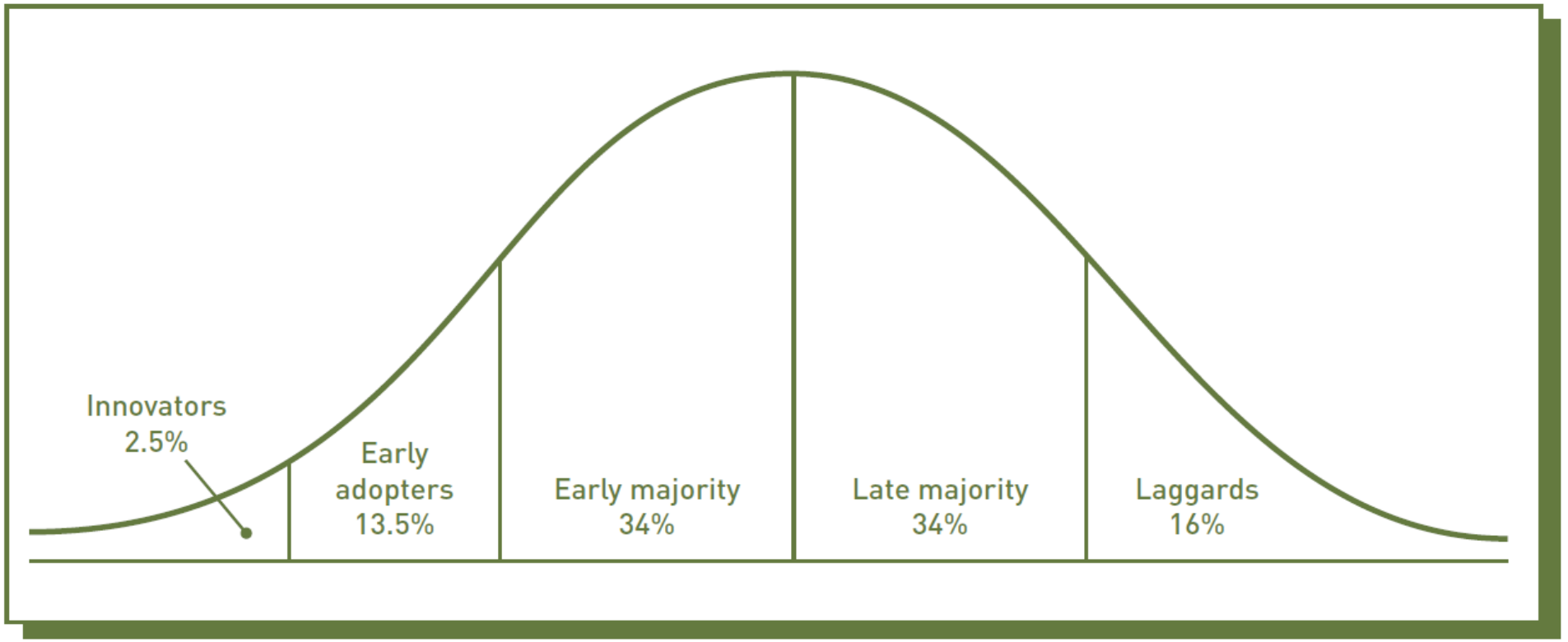


FIGURE 2.11

Innovation diffusion

Adoption of any innovation does not happen all at once for all members of the targeted population; rather, it is a drawn-out process, with some people quicker to adopt the innovation than others.

Source: Everett Rogers, *Diffusion of Innovations*.

Five Categories Of Innovation Adopters

Adopter Category	Characteristics	Strategy to Use
Innovator	Risk takers; always the first to try new products and ideas	Simply provide them with access to the new system and get out of their way
Early adopter	Opinion leaders whom others listen to and follow; aware of the need for change	Provide them assistance getting started
Early majority	Listen to and follow the opinion leaders	Provide them with evidence of the system's effectiveness and success stories
Late majority	Skeptical of change and new ideas	Provide them data on how many others have tried this and have used it successfully
Laggards	Very conservative and highly skeptical of change	Have their peers demonstrate how this change has helped them and bring pressure to bear from other adopters

Diffusion of Innovation Theory

- When promoting an innovation to a target population, it is important to understand the characteristics of the target population that will help or hinder adoption of the innovation and then to apply the appropriate strategy. This theory can be useful in planning the roll-out of a new information system.

Competitive Advantage

- **Competitive advantage** refers to factors makes the company's products or services more desirable to customers than that of any other rival.
- These factors includes higher-quality products, better customer service, and lower costs than its rivals.

Factors That Lead Firms to Seek Competitive Advantage

- The five forces model:
  - Rivalry among existing competitors
  - Threat of new entrants
  - Threat of substitute products and services
  - The bargaining power of buyers
  - The bargaining power of suppliers

Factors That Lead Firms to Seek Competitive Advantage

- Rivalry among existing competitors:
  - Industries with stronger rivalries tend to have more firms seeking competitive advantage
- Threat of new entrants:
  - Threat appears when:
    - Entry and exit costs to an industry are low
    - Technology needed to start and maintain a business is commonly available.

Factors That Lead Firms to Seek Competitive Advantage

- Threat of substitute products and services:
  - The more consumers can obtain similar products and services that satisfy their needs, the more likely firms are to try to establish competitive advantage.

Factors That Lead Firms to Seek Competitive Advantage

- Bargaining power of customers:
  - The following conditions indicate that customers are powerful:
    - Customers are able to get similar products/services from other suppliers.
    - Switching costs are low (little penalty for moving to another supplier).
    - Customers have full information (their knowledge of demand, market prices, and supplier costs.)
    - …
- When customers have a lot of bargaining power, companies increase their competitive advantage to retain their customers.

Factors That Lead Firms to Seek Competitive Advantage

- Bargaining power of suppliers:
  - The following conditions indicate that suppliers are powerful:
    - They can rise prices or reducing the quality without affecting demand.
    - There are few suppliers and many buyers.
    - Substitute products/services are unavailable.
    - …
- Powerful suppliers may affect the profitability and quality of products. It may force companies to raise prices.
- Powerful Suppliers increase competition within an industry.

Strategic Planning for Competitive Advantage

- Strategies:
  - Cost leadership
  - Differentiation
  - Creating new products and services
  - First to market
  - Customizing products and services
  - Hiring the best people
  - Innovation
  - …

Careers in Information Systems

- Today, most organizations cannot function or compete effectively without computer-based information systems.
- Indeed, organizations often attribute their productivity improvement, superior customer service, or competitive advantage in the marketplace to their information systems.
- The information system worker functions at the intersection of business and technology and designs and builds the solutions that allow organizations to effectively leverage information technology.

Careers in Information Systems

- Successful information system workers:
  - must enjoy working in a fast-paced, dynamic environment where the underlying technology changes all the time.
  - must be comfortable with meeting deadlines and solving unexpected challenges.
  - need good communication skills and often serve as translators between business needs and technology-based solutions.

Technical skills for IS Workers

Specific technical skills that some experts believe are important for IS workers to possess include the following:

- Capability to analyze large amounts of structured and unstructured data
- Traditional programming
- Ability to design and build applications for computers and mobile devices
- Technical support expertise
- Knowledge of networking and cloud computing
- Web design and development skills
- …

BLS projections of Computer-related Jobs, 2012 to 2022

- Technology is one of the fastest-growing areas of the U.S. economy, and information systems professionals are in high demand. The U.S. Bureau of Labor Statistics (BLS) forecasts an increase of 1.2 million new computing jobs in the time period 2012 to 2022, as shown in Table 2.3. This is an average of 124,000 new jobs per year.

BLS Projections of Computer-Related Jobs, 2012 to 2022

National Employment Matrix Title	Number		Change	Job Openings due to Growth and Replacements
	2012	2022		
Computer and math occupations (all numbers in thousands)				
Computer and information research scientists	26.7	30.8	4.1	8.3
Computer systems analysts	520.6	648.4	127.8	209.6
Information security analysts	75.1	102.5	27.4	39.2
Computer programmers	343.7	372.1	28.4	118.1
Software developers, applications	613.0	752.9	139.9	218.5
Software developers, system software	405.0	487.8	82.8	134.7
Web developers	141.4	169.9	28.5	50.7
Database administrators	118.7	136.6	17.9	40.3
Network and computer systems administrators	366.4	409.4	43.0	100.5
Computer network architects	143.4	164.3	20.9	43.5
Computer support specialists	722.3	845.3	123.0	236.5
Computer occupations, all other	205.8	213.6	7.8	40.2
Total	**3,682.1**	**4,333.6**	**651.5**	**1,240.1**
Yearly average				**124.0**

Source: "Employment by Detailed Occupation 2012–2022," Bureau of Labor Statistics, *www.bls.gov/emp/ep_table_102.htm,* accessed August 13, 2015.

Careers in Information Systems

- Degree programs:
  - Business information systems
  - Computer science
  - Management information systems
  - Information (including information systems, information science, information technology, and informatics)

Careers in Information Systems

- It appears that, United States, there will be a shortfall of about 33,900 workers per year.
- Opportunities in information systems are also available to people from foreign countries.
  - The U.S. L-1 and H-1B visa programs seek to allow skilled employees from foreign lands into the United States.

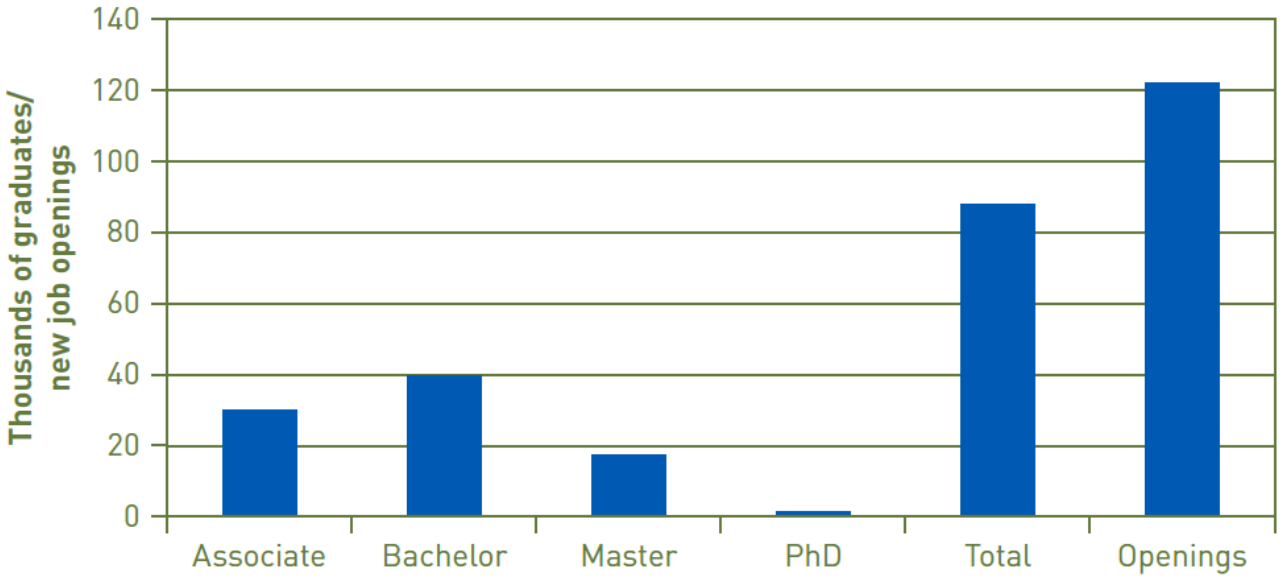
Careers in Information Systems

FIGURE 2.13

Supply versus demand for IS workers

The total number of IS-related job openings is expected to average about 124,000 per year between 2012 and 2022, while the number of IS-related graduates is expected to average about 88,100 per year—for a shortfall of 35,900 workers.

Source: "Computer Science Job Statistics", Exploring Computer Science, *www.exploringcs.org/resources/cs-statistics*, accessed August 19, 2015.



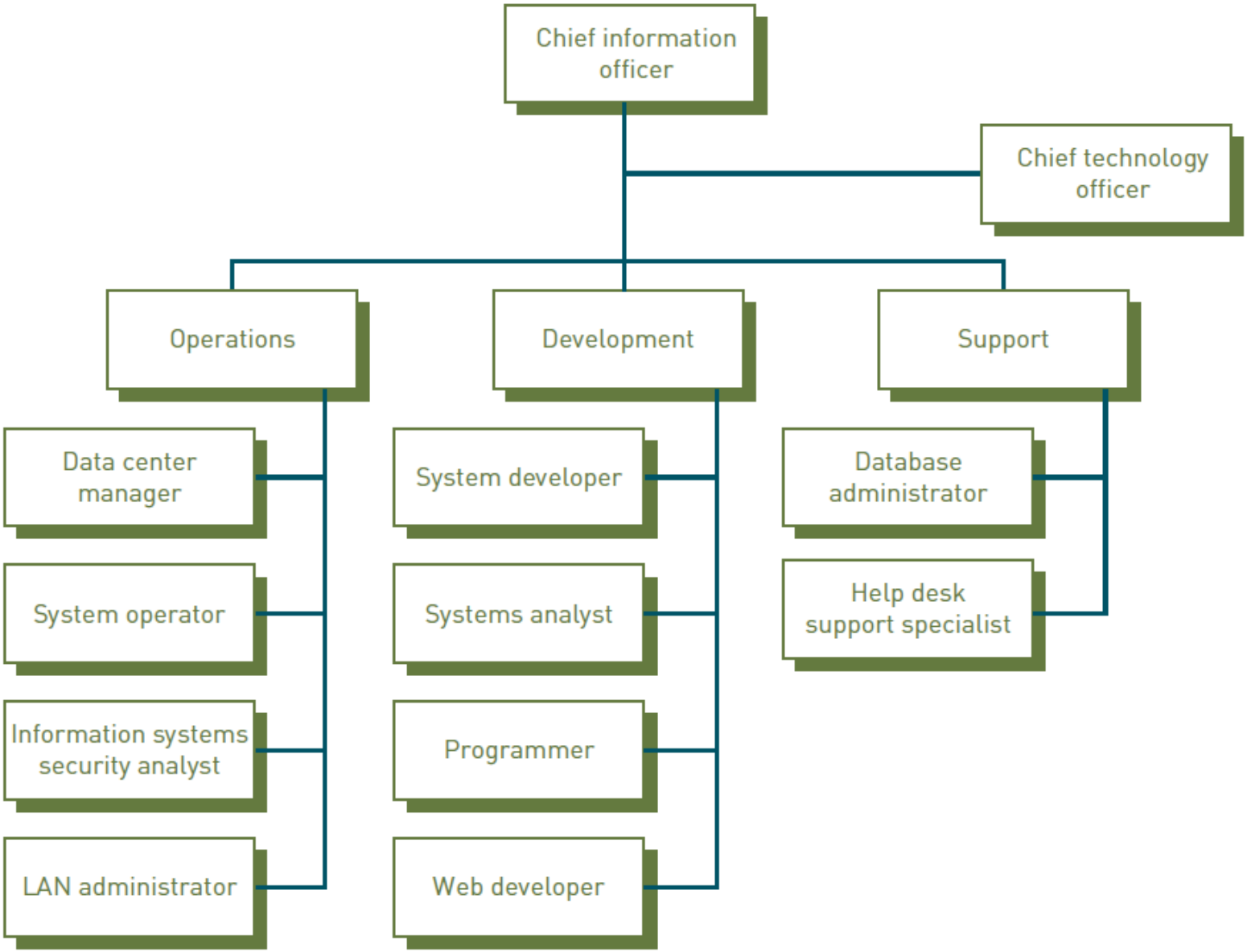


FIGURE 2.14

Three primary functions of the information systems organization

Each of these functions—operations, development, and support—encompasses several different IS roles.

IS-Related Roles Outside The IS Organization

- In addition to IS workers placed within the IS organization, some companies have people who take on IS-related roles but reside outside the IS organization.
- For example, data scientists, can be found in the marketing, sales, and supply chain management departments of large organizations.

Other IS Careers

- Related career opportunities include computer training, computer and computer-equipment sales, and computer equipment repair and maintenance.
- Other IS career opportunities include being employed by technology companies, such as Oracle, IBM, HP, Microsoft, Google, and Dell.

References

- **Reynolds, George Walter, Stair, Ralph M.** "Principles of information systems", 13e – 2017