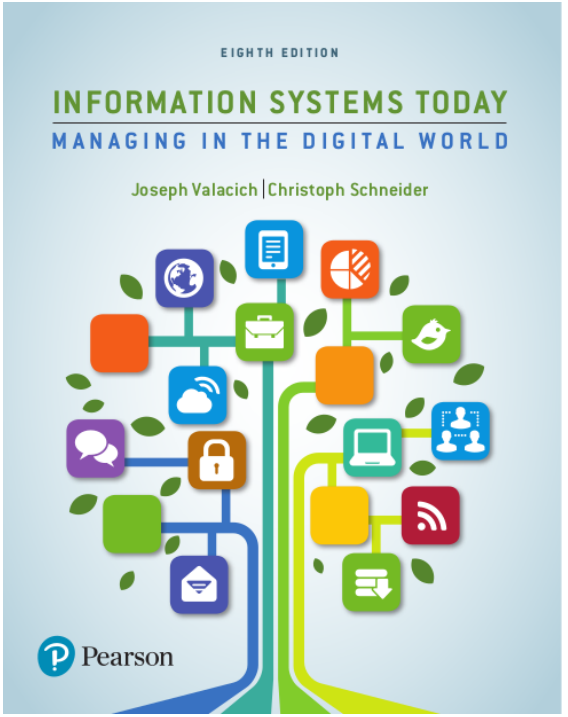
Competitive Advantage and Information Systems

Dr Tomo Popović

Managing Information Technology
L2-FIST3UIT

Textbook

- Information systems today: managing in the digital world by J. Velacich and C. Schneider, 8 th ed., Pearson, 2017



Additional Literature

- Information technology for managers by G.W. Reynolds, 2nd ed., Cengage Learning, 2015
- Menagement information systems: managing the digital firm by K.C. Laudon and J.P. Laudon, Pearson, 2017
- Information technology for management: advancing sustainable, profitable business growth by E. Turban, L. Volonino, and G. Wood, Wiley, 2013

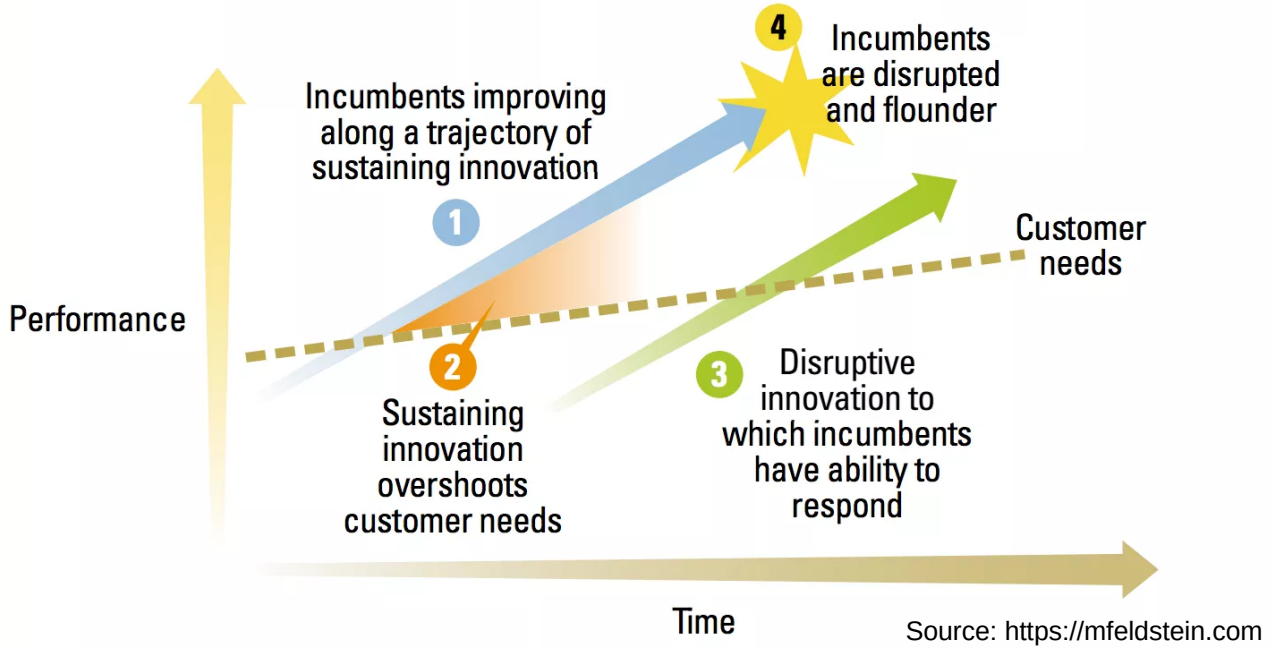
IT as an Enabler

- Enables new **products** and **services**
- Also, enables new **business models**:
  - Refinements of existing approaches
  - Some can be highly **disruptive**
- **Disruptive innovation**

Disruptive Innovation

FOUR ELEMENTS OF THE THEORY OF DISRUPTIVE INNOVATION

This illustration shows four important elements of the theory of disruptive innovation: (1) sustaining innovation, (2) overshoot of customer needs, (3) the emergence of a disruptive innovation to which incumbents have the ability to respond, and (4) incumbent firms floundering as they are disrupted. Following Christensen and Raynor, we collapse the multiple value dimensions of existing products to just one dimension labeled "performance." We also show customer needs as a line, although in fact there is a distribution of needs.



Source: https://mfeldstein.com

Startups and New Business Models

FIGURE 2.1

Technology enables new business models, such as cutting out the middleman and bypassing traditional retail channels to interact directly with customers.

Organizational Strategy and IS

- Organizational decision making level

FIGURE 2.2

Organizations are composed of different decision-making levels.

Operational Level

FIGURE 2.3

Information systems at the operational level of an organization help to improve efficiency by automating routine and repetitive activities.

Managerial Level

FIGURE 2.4

Information systems at the managerial level of an organization help to improve effectiveness by automating the monitoring and controlling of operational activities.

Executive Level

FIGURE 2.5

Information systems at the executive level of an organization help to improve strategy and planning by providing summaries of past data and projections of the future.

Business Processes Support

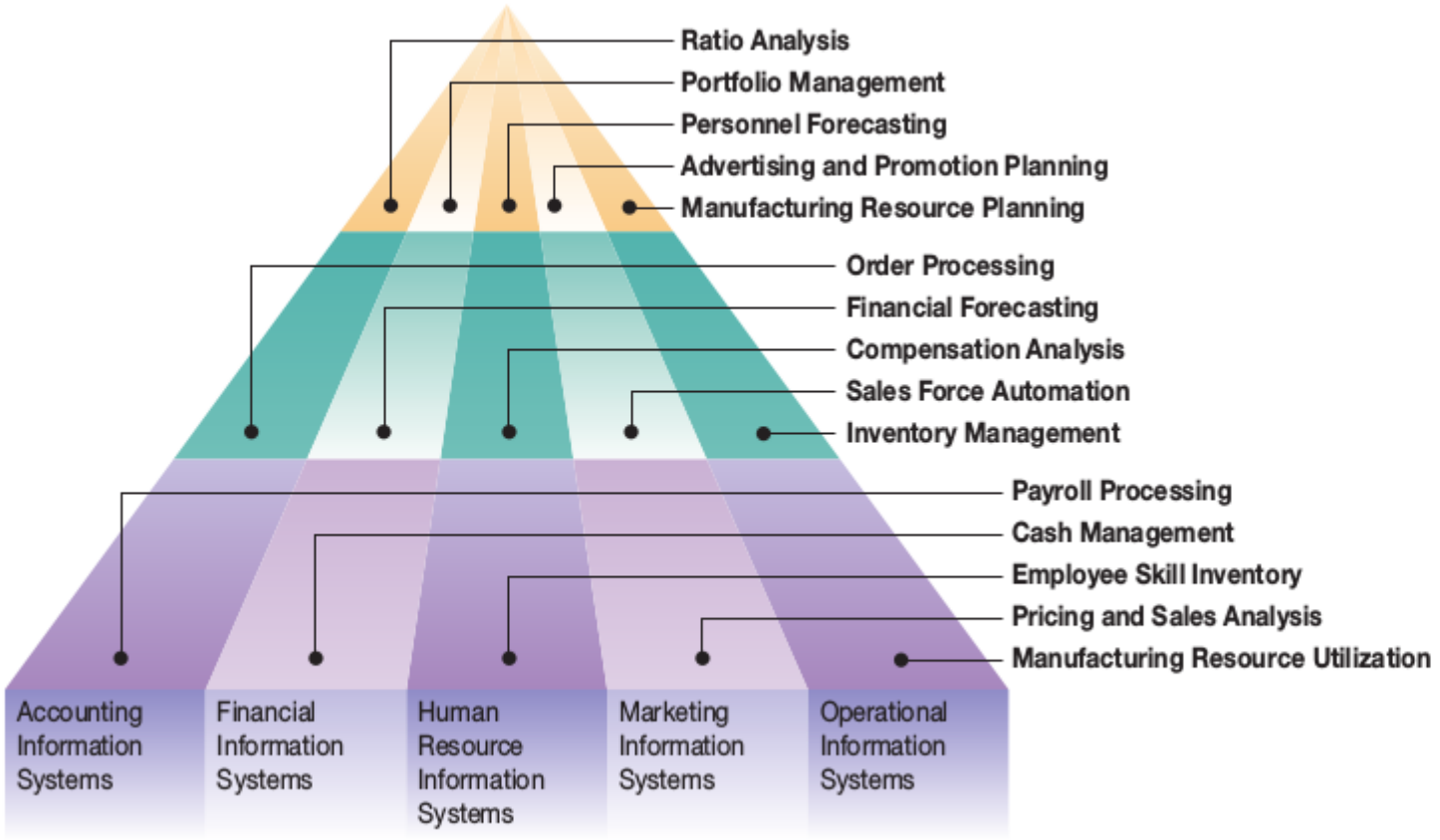


FIGURE 2.6

Business processes supported by various functional area information systems.

Information Systems Support

- **Automating**: doing things **faster**
- **Learning**: doing things **better**
- **Strategy**: doing things **smarter**

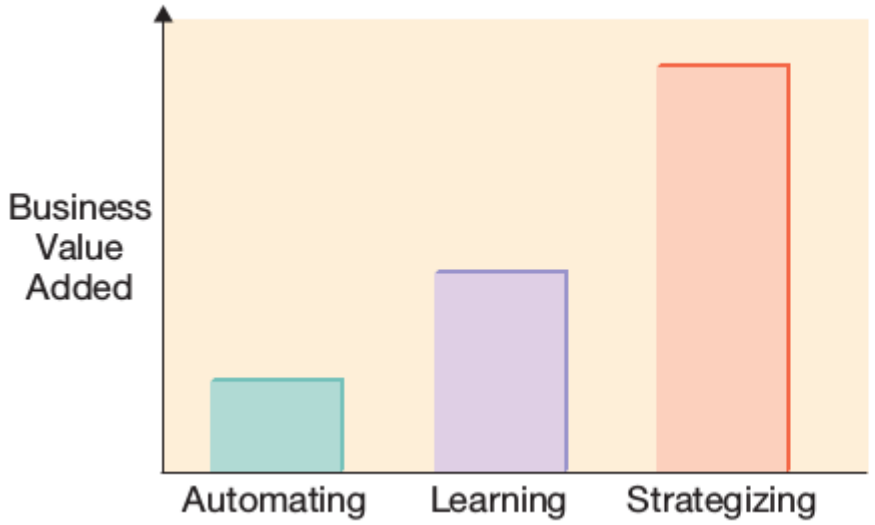


FIGURE 2.7

The business value added from automating, learning, and strategizing with information systems.

IS and Organizational Functions

TABLE 2.1 Organizational Functions and Representative Information Systems

Functional Area	Information System	Sample Applications
Accounting and finance	Systems used for managing, controlling, and auditing the financial resources of the organization	■ Accounts payable ■ Expense accounts ■ Cash management ■ Payroll processing
Human resources	Systems used for managing, controlling, and auditing the human resources of the organization	■ Recruiting and hiring ■ Education and training ■ Benefits management ■ Employee termination ■ Workforce planning
Marketing	Systems used for managing new product development, distribution, pricing, promotional effectiveness, and sales forecasting of the products and services offered by the organization	■ Market research and analysis ■ New product development ■ Promotion and advertising ■ Pricing and sales analysis ■ Product location analysis
Production and operations	Systems used for managing, controlling, and auditing the production and operations resources of the organization	■ Inventory management ■ Cost and quality tracking ■ Materials and resource planning ■ Job costing ■ Resource utilization

Loan Application Example

TABLE 2.2 Activities Involved Under Three Different Loan Application Processes and the Average Time for Each Activity

Primary Activity	Manual Loan Process (Time)	Technology-Supported Process (Time)	Fully Automated Process (Time)
1. Complete and submit loan application	Customer takes the application home, completes it, and returns it (1.5 days)	Customer takes the application home, completes it, and returns it (1.5 days)	Customer fills out application from home via the web (15 minutes)
2. Check application for errors	Employee does this in batches (2.5 days)	Employee does this in batches (2.5 days)	Computer does this as it is being completed (1 second)
3. Input data from application into the information system	Applications are kept in paper form, although there is handling time involved (1 hour)	Employee does this in batches (2.5 days)	Done as part of the online application process (no extra time needed)
4. Assess loan applications under $250,000 to determine whether to fund them	Employee does this completely by hand (15 days)	Employee does this with the help of the computer (1 hour)	Computer does this automatically (1 second)
5. Committee decides on any loan over $250,000	(15 days)	(15 days)	(15 days)
6. Applicant notified	Employee generates letters manually in batches (1 week)	Employee generates letters with the help of a computer (1 day)	System notifies applicant via e-mail (1 second)
Total time	Anywhere from 25–40 days, depending on size of loan	Anywhere from 5–20 days, depending on size of loan	Anywhere from 15 minutes to 15 days, depending on size of loan

Loan Example – Data Analytics

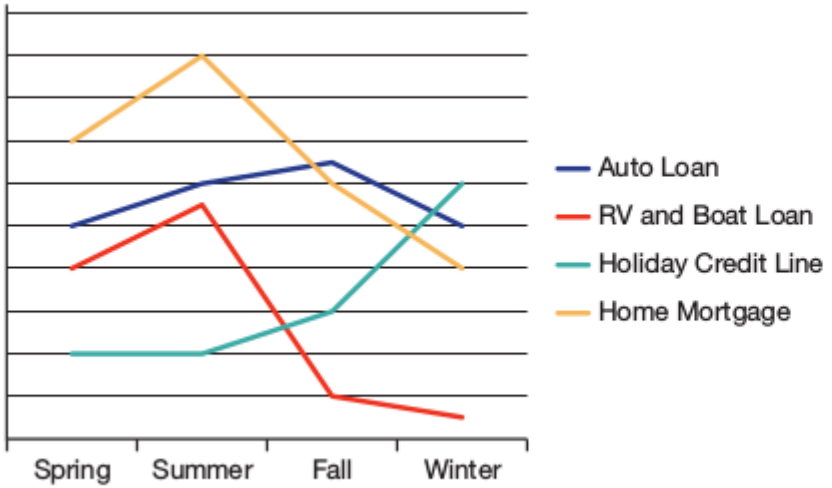


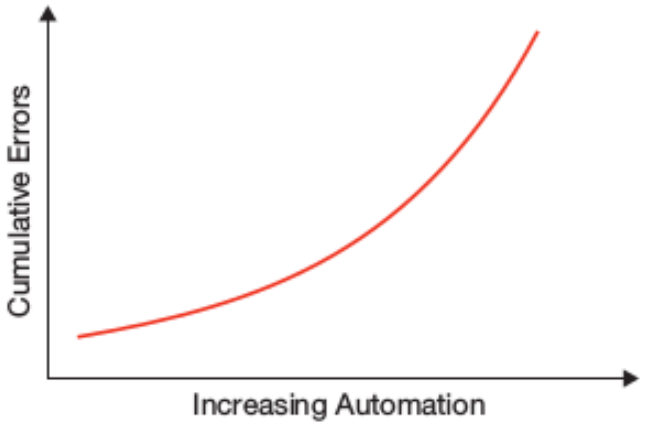
FIGURE 2.8

A computer-based loan processing system enables the bank manager to identify trends in loan applications.

Loan Example – Do it right!

FIGURE 2.9

Automating a loan processing system requires sound underlying business processes, or errors will rapidly increase.



Analyzing Competitive Forces

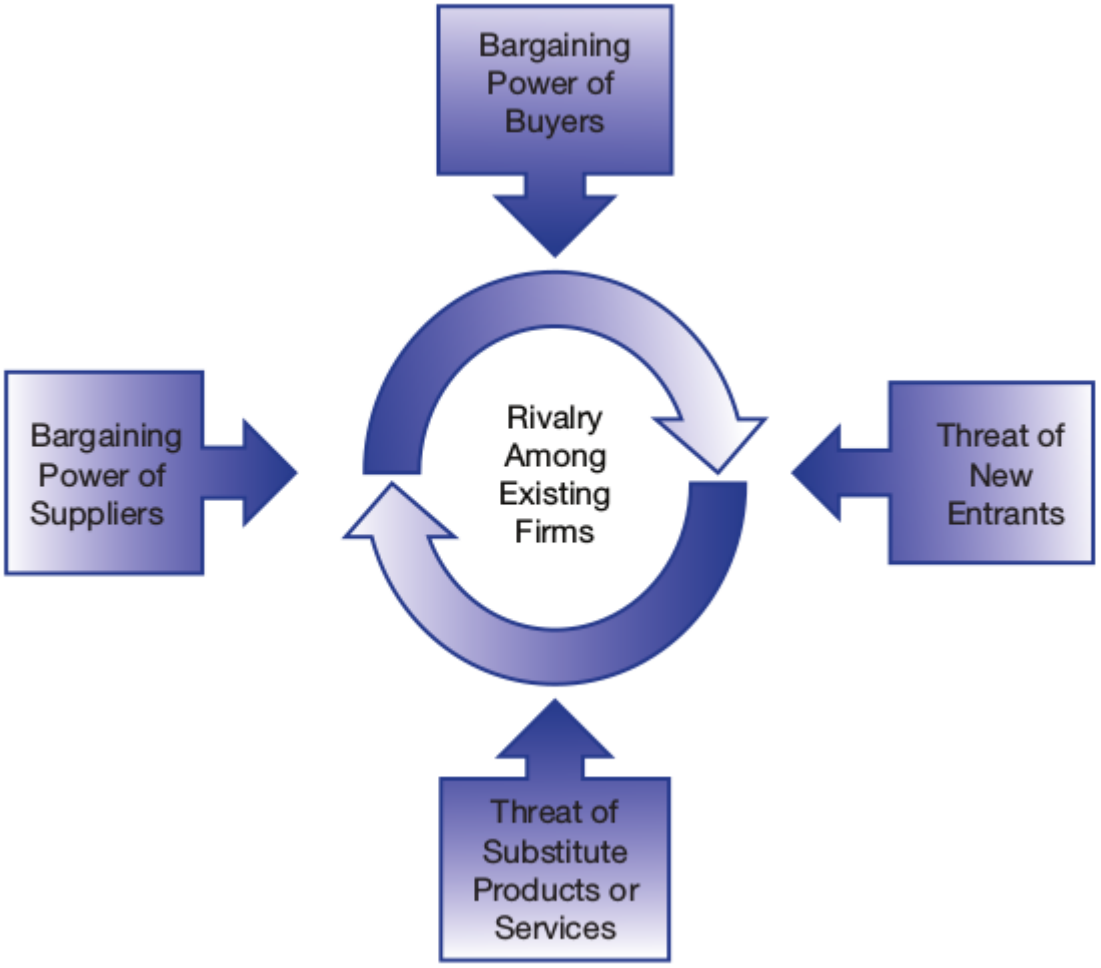


FIGURE 2.10

Five forces influence the profit potential of an industry.

Internet and Competitive Forces

TABLE 2.3 The Influence of the Internet on the Competitive Forces

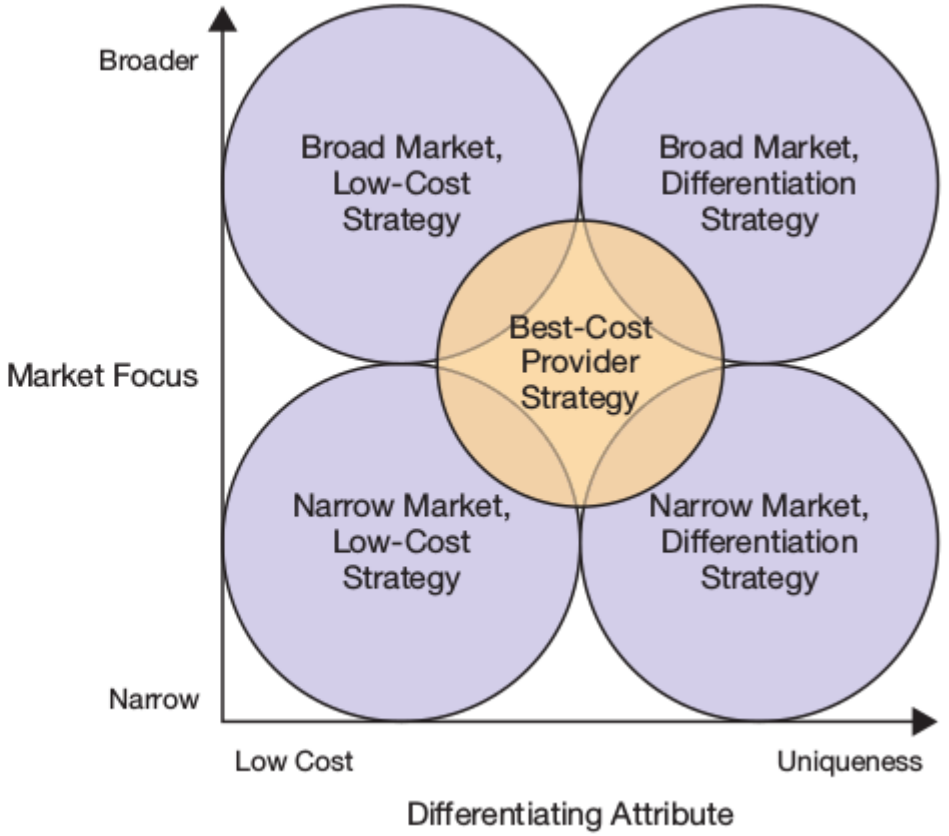
Competitive Force	Implication for Firm	Influence of the Internet
Traditional rivals within your industry	Competition in price, product distribution, and service	Increase of competitors due to wider geographic reach; customers can more easily compare products, so competition focuses more on price.
Threat of new entrants into your market	Increased capacity in the industry, reduced prices, and decreased market share	Reduced barriers to entry, as the Internet reduces the difficulty of obtaining critical resources or entering new markets.
Customers' bargaining power	Reduced prices, need for increased quality, and demand for more services	Wider choices for customers lead to lower switching costs and higher bargaining power of customers.
Suppliers' bargaining power	Increased costs and reduced quality	Companies have equal access to suppliers; easier to find new suppliers; suppliers have access to more potential buyers.
Threat of substitute products or services from other industries	Product returns from customers, decreased market share, and losing customers for life	New substitutes are created by the Internet and other information technologies.

Source: Based on *Corporate Information Strategy and Management*, 8e by Lynda Applegate, Robert Austin, F. Warren McFarlan, published by McGraw-Hill, 2008.

Choosing a Strategy

FIGURE 2.11

Five general types of organizational strategy: broad differentiation, focused differentiation, focused low-cost leadership, overall low-cost leadership, and best-cost provider.

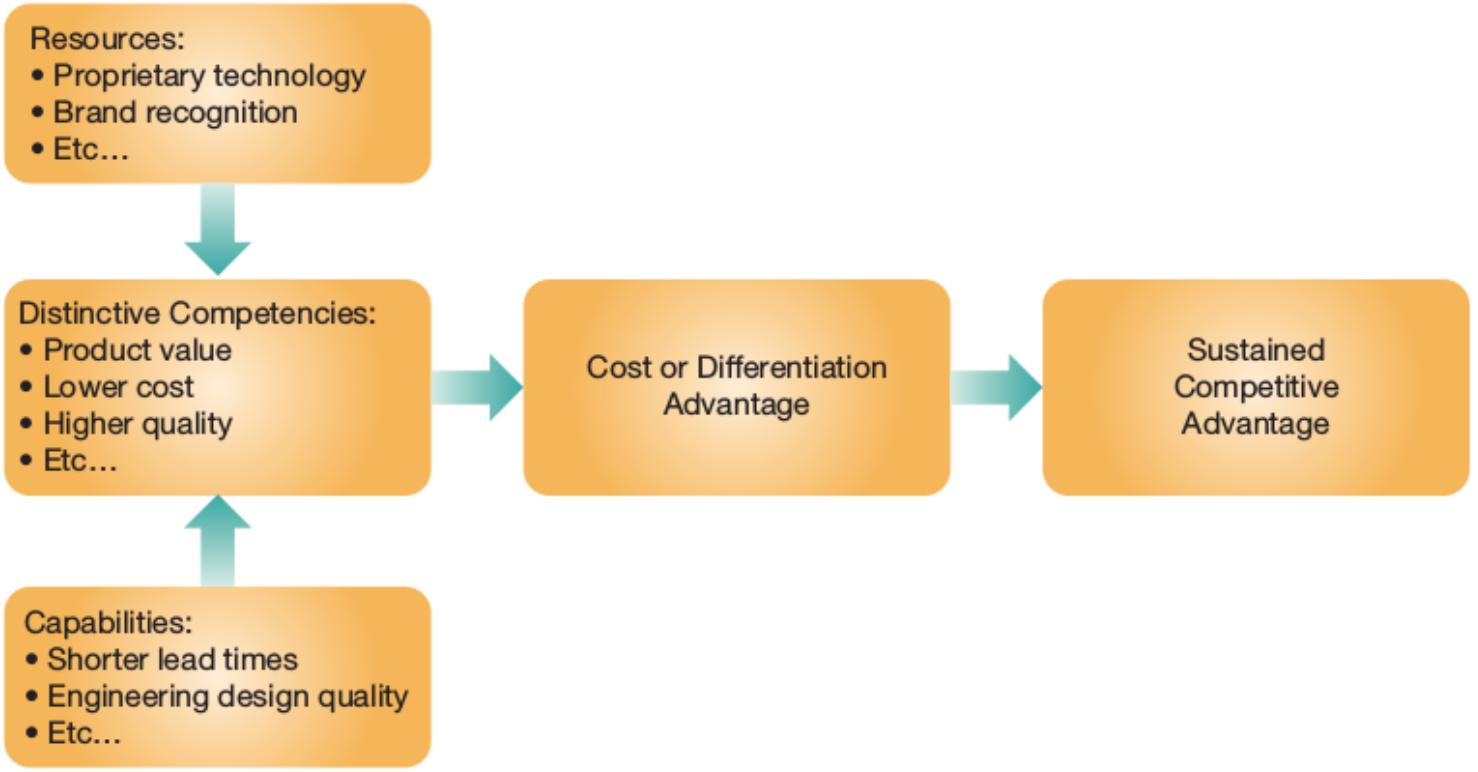


How to Compete?
Resources and Capabilities

FIGURE 2.12

Distinctive competencies lead to value creation and a sustained competitive advantage.

Source: Based on Competitive Advantage, published by Quick MBA.com.



Competitive Advantage

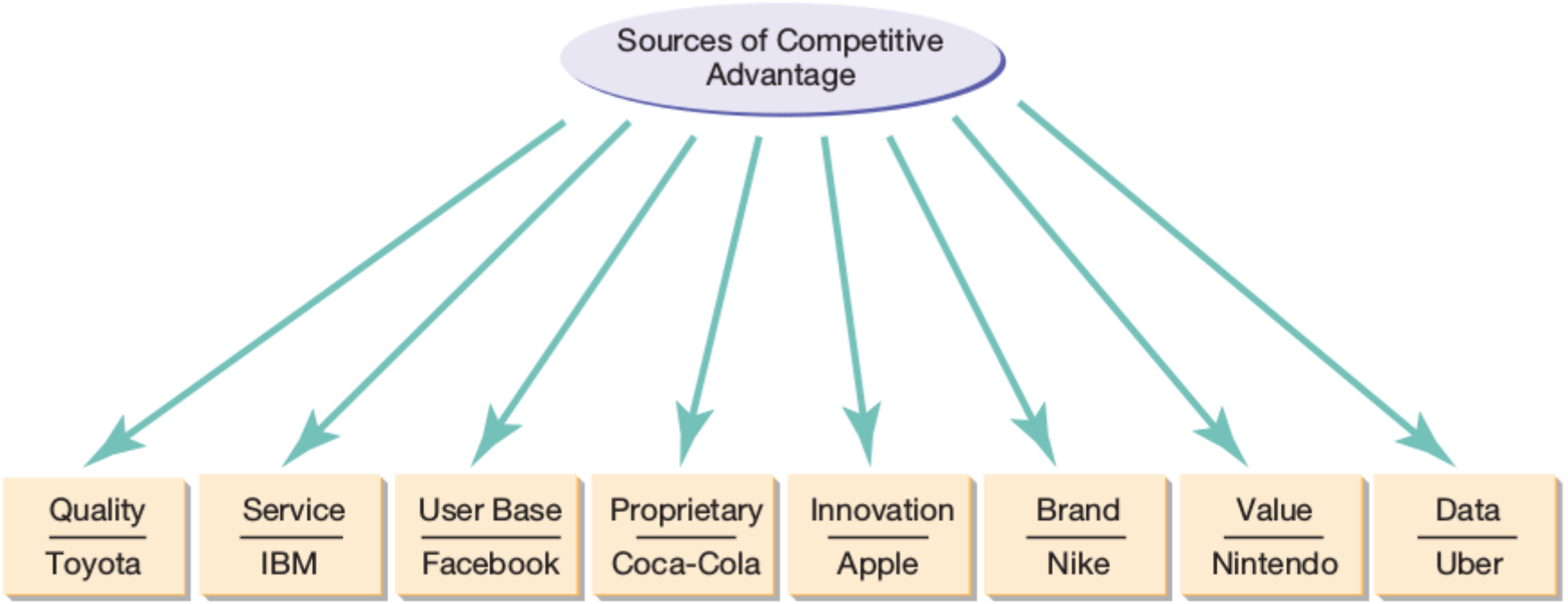


FIGURE 2.13

Sources of competitive advantage.

Value Chain and IS

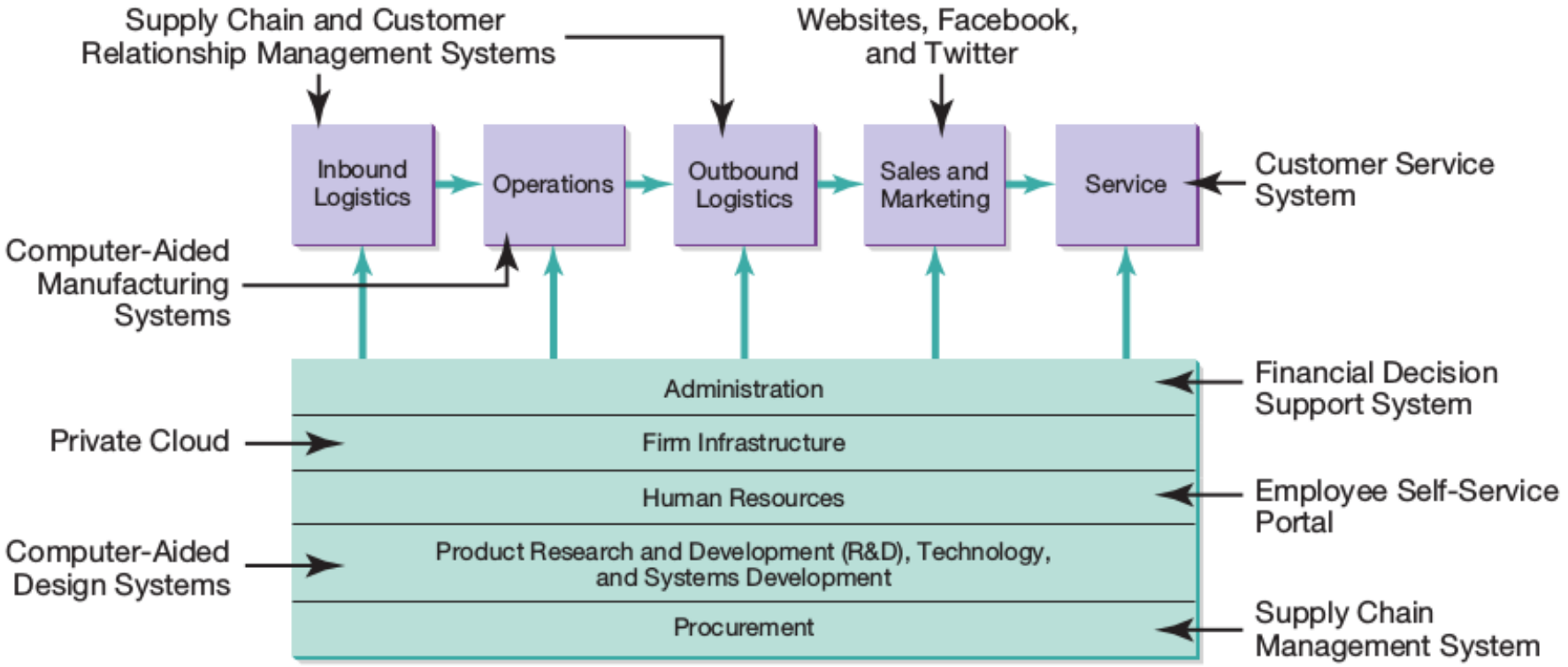


FIGURE 2.14

Information systems can improve an organization's value chain.

Digital Nomads

- Digital nomads?
  - Location free through technology
  - Lifestyle
  - Appealing locations, Montenegro?
  - Challenges: skill set, clients...
  - Being different and competitive...

Business Models in Digital World

- Discussion topic:
  - Digital nomads?

Business Models in Digital World

- What does company do?
- How does a company uniquely do it?
- In what ways does the company get paid?
- What are the key resources and activities?
- What are the costs involved?

Business Model Components

TABLE 2.4 Components of a Business Model

Component	Description	Questions to Ask
Customer segments	The customers targeted with the product/service offering	Who will be our target customers? Who are the most important customers?
Value proposition	The utility that the product/service has to offer to customers	Why do customers need our product/service? What problems will our product/service solve? Why would customers choose our product/service over our competitors' products/services?
Channels	The ways in which the product/service offerings reach the target customers	How will our customers be reached? Which channels are best in terms of cost and convenience for the customers?
Customer relationships	The relationships formed with the target customers	What types of relationships do we build with our customers (e.g., one-off vs. long-term)? How do we maintain these relationships?
Revenue streams	The way a firm generates income	How do we generate income? What are we selling? What are customers willing to pay for?
Key resources	The most important assets needed to make the business model work	What key resources are needed to enable our value proposition, channels, customer relationships, and revenue streams?
Key activities	The most important activities needed to make the business model work	What key activities are needed to enable our value proposition, channels, customer relationships, and revenue streams?
Key partners	The network of partners and suppliers needed to make the business model work	Who are our key partners and suppliers? What resources do they offer, and what activities do they perform?
Cost structure	The costs incurred when operating the business model	What are the costs incurred when operating the business model? Which resources and activities are most expensive?

Source: Based on *Business Model Generation* by Alexander Osterwalder, Yves Pigneur, published by Wiley, 2010.

Revenue Models

TABLE 2.5 Typical Revenue Models in the Digital World

Revenue Type	Description	Who Is Doing This?
Affiliate marketing	Paying businesses that bring or refer customers to another business. Revenue sharing is typically used.	Amazon's Associates program
Advertising	Free services are provided to customers and paid for by a third party.	Yahoo!, Google, Facebook, Twitter
Subscription	Users pay a monthly or yearly recurring fee for the use of the product/service.	Netflix, World of Warcraft, Spotify
Licensing	Users pay a fee for using protected intellectual property (e.g., software).	Symantec, Norton
Transaction fees/ Brokerage	A commission is paid to the business for aiding in the transaction.	PayPal, eBay, Groupon, Scottrade, Airbnb, Uber
Traditional sales	A consumer buys a product/service from the website.	Amazon, Zappos, Nordstrom .com, iTunes
Freemium	Basic services are offered for free, but a premium is charged for special features.	Flickr, Skype, Dropbox.com

Freemium

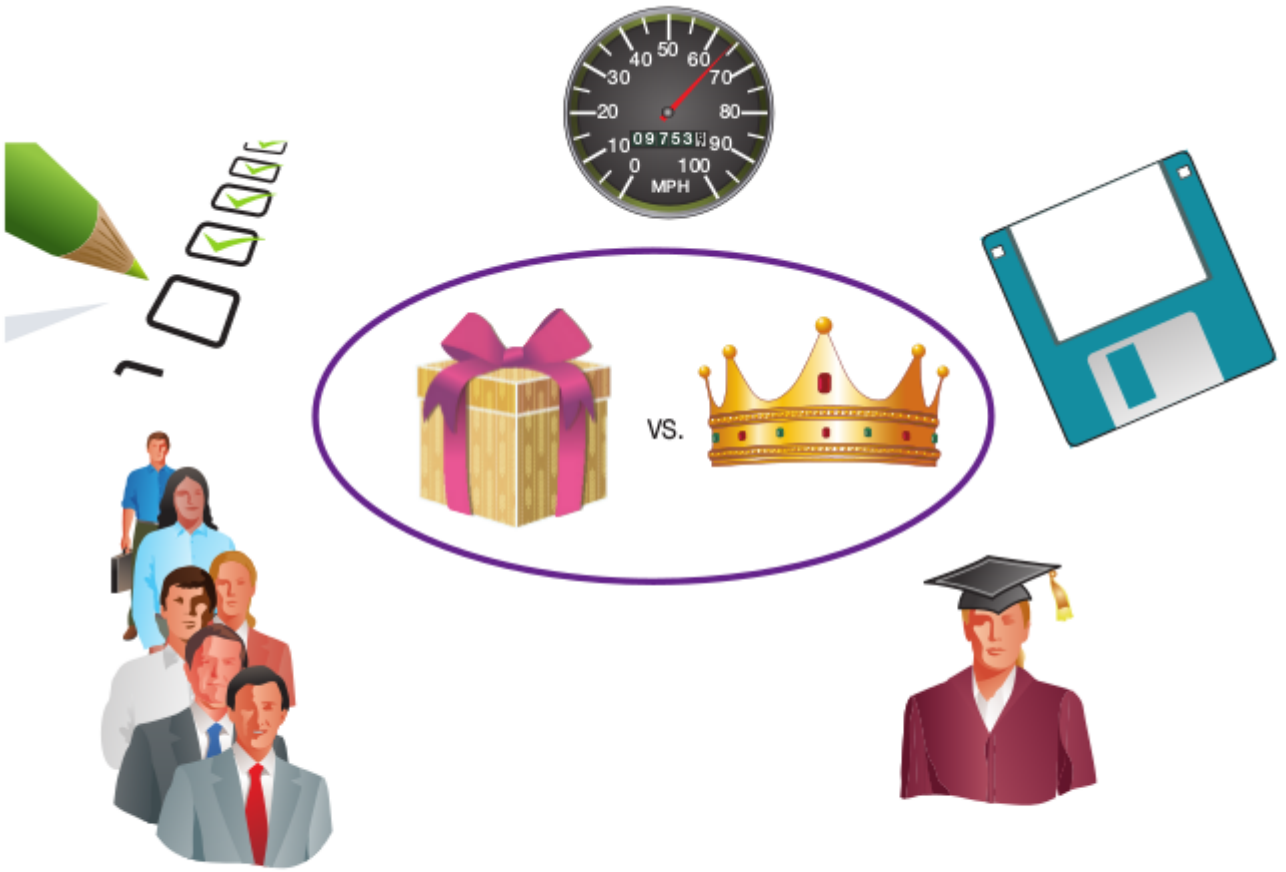


FIGURE 2.15

Under the freemium approach, typical restrictions of free versions include limitations of features, bandwidth, storage, type of user, or number of users.

Platform-based

TABLE 2.6 Examples of Platform-Based Business Models

Value Created/Exchanged	Examples
Products	Amazon Marketplace, eBay
Services	Airbnb, Uber
Payments	Square, PayPal
Investments and funding	Kickstarter, Lending Club
Content	Wikipedia, Twitter, YouTube
Communication	WhatsApp, Skype
Collaboration	Dropbox
Social relationships	Facebook, LinkedIn

Source: Based on *What is a Platform?* by Alex Moazed, May 1, 2016, http://www.applicoinc.com/blog/what-is-a-platform-business-model/. Published by APPLICO INC.

Sharing Economy Approach

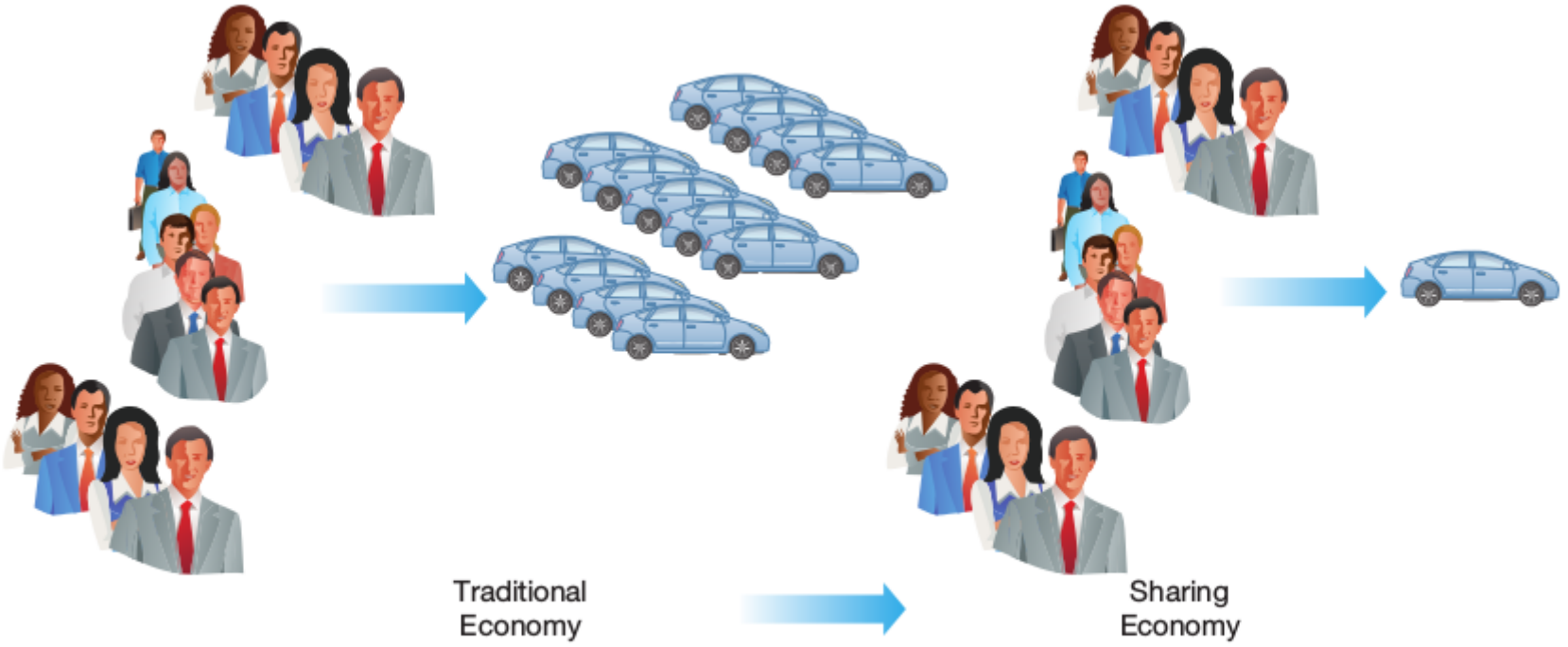


FIGURE 2.16

In the sharing economy, shared ownership reduces the need for individual ownership of cars and other goods.

Service-based

- "X as a Service" or **XaaS**
- Sell engines vs. Continuous uptime

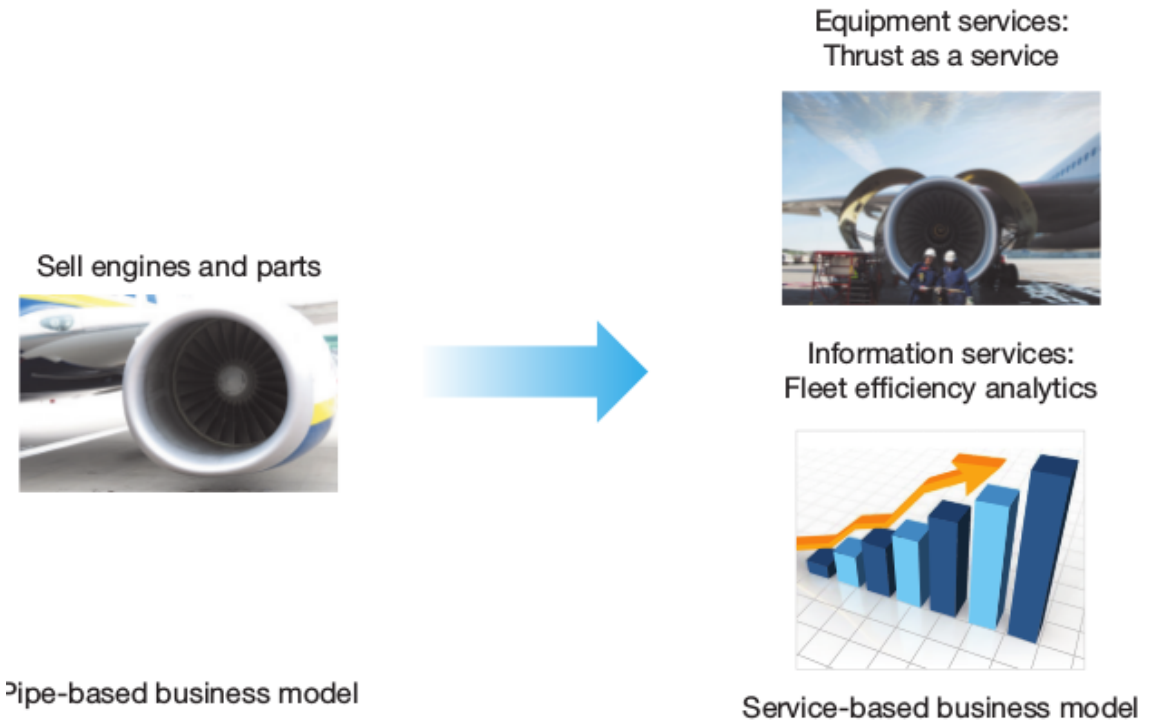


FIGURE 2.17

Under a service-based business model, a manufacturer can offer equipment services or information services.

Source: Sergioboccardo/Shutterstock; Christian42/Fotolia.

Valuing innovations

- New value proposition
- Disruptive?

Radical Innovations Examples

TABLE 2.7 Examples of Radical Innovations and Their Associated Displaced or Marginalized Technology

Radical Innovation	Displaced or Marginalized Technology
Digital photography	Chemical photography
Desktop publishing	Traditional publishing
Online stock brokerage	Full-service stock brokerage
Online retailing	Brick-and-mortar retailing
Free, downloadable greeting cards	Printed greeting cards
Distance education	Classroom education
Unmanned aircraft	Manned aircraft
Nurse practitioners	Medical doctors
Semiconductors	Vacuum tubes
Automobiles	Horses
Airplanes	Trains
Compact discs	Cassettes and records
MP3 players, music downloading, streaming	Compact discs and music stores
Smartphones	MP3 players, dedicated GPS navigation
Mobile telephony	Wire-line telephony
Tablets	Notebook computers
Xbox, PlayStation, smartphones	Desktop computers
3D printing	CNC milling
Camera drones	Helicopters for aerial filming/photography

Types of Innovation /w Examples

TABLE 2.8 Ten Types of Innovation

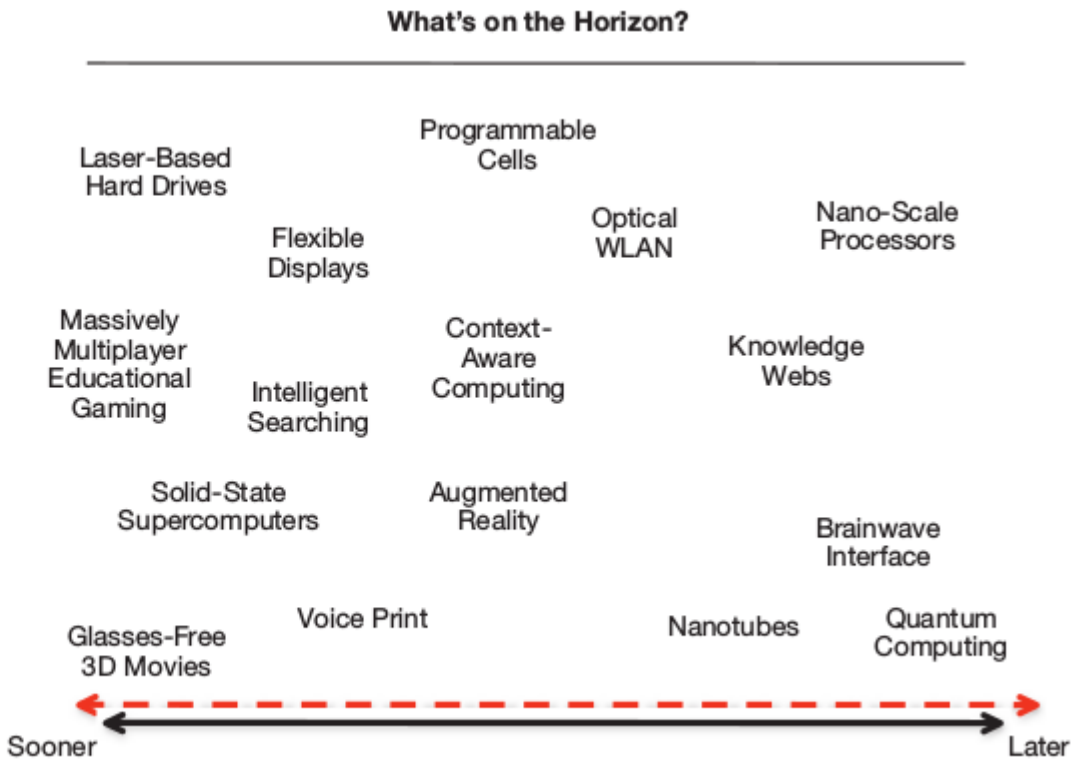
Innovation	Description	Examples
Profit model innovation	Finding novel ways of generating revenues from offerings	Dropbox using a freemium approach; Microsoft offering Office 365 on a subscription basis; GE selling "thrust as a service"
Network innovation	Harnessing the capabilities and strengths of others	GlaxoSmithKline or Marriott using open innovation for new product or service ideas; Netflix running contests for improving movie recommendation algorithm; luxury hotels partnering with fashion designers
Structure innovations	Using the company's talent and assets in innovative ways	Southwest Airlines focusing on one aircraft type; Google allowing employees to use of 20 percent of their time for own projects
Process innovations	Changing primary processes used to produce product or service	Toyota pioneering lean production; Zara moving fashion from initial design to stores in 3 weeks
Product performance innovations	Creating novel products or improving existing products through differentiation	Dyson's Airblade hand dryers; Corning's "unbreakable" Gorilla Glass; Coke's customizable Coke bottles
Product system innovations	Creating bundles of complementary offerings	Microsoft bundling individual office programs into Office suite; Apple offering developer tools and app store to enable developers to create novel apps; Marriott letting users test drive GoPro HERO action cams
Service innovations	Supporting and enhancing value of offering	Zappos's WOW philosophy of delivering excellent customer service; Men's Wearhouse offering its customers to purchase free lifetime pressing
Channel innovations	Using innovative ways to connect offerings with customers	Niketown offering immersive experiences; Nespresso partnering with hotels and airlines
Brand innovations	Positioning the brand in innovative ways	Virgin family of brands; German discount grocer Aldi's Trader Joe's markets
Customer engagement innovations	Developing meaningful connections with customers	Swarm encouraging users to frequently "check in" to places; Apple tying customers to its ecosystem

Source: Based on *Ten Types of Innovation: The Discipline of Building Breakthroughs* by Larry Keeley, Helen Walters, Ryan Pikkel, Brian Quinn, published by John Wiley & Sons, 2013.

Enabling Technologies / Horizon

FIGURE 2.18

Some enabling technologies on the horizon.



Organizing Innovation Process

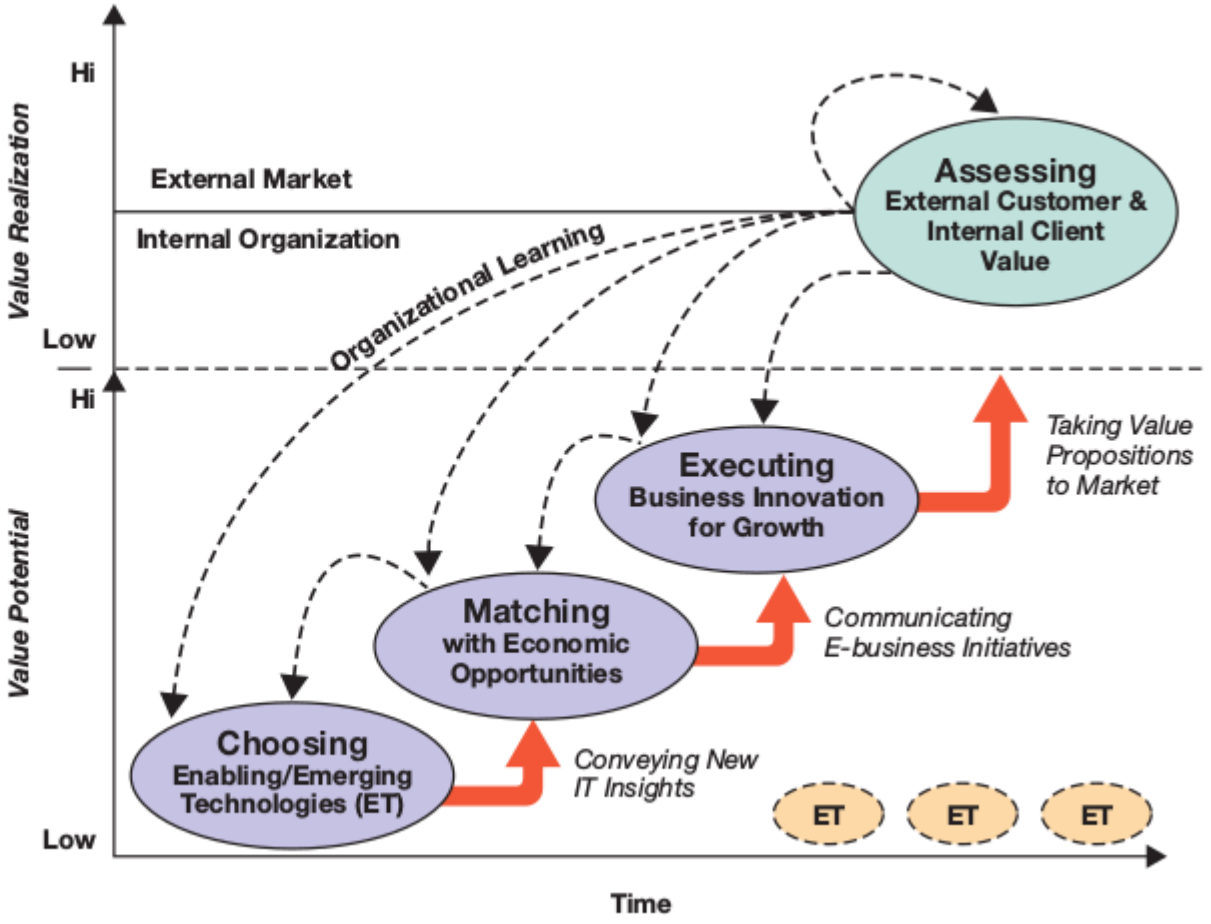
- Start **early**
- Display executive **leadership**
- Build a team of expert **innovators**
- **Educate** the organization
  - How to identify **radical innovations**

Implementing Innovation Process

FIGURE 2.20

The disruptive innovation cycle.

Source: Based on *Information Systems Research*, Vol. 13, No. 2, pp. 125–146, 2002.



Investing in Innovation

- Put **technology** ahead of strategy
- Put **technology** ahead of marketing
- Innovation is **continuous**
  - Innovation companies cannot and do not rest!

Startups

- Typically **technology-based**
- **New** ventures
- High **potential** for **growth** and **scalability**
- Typically co-founded by **entrepreneurs**, **developers** or others with promising ideas...

Startups and Crowdfunding

FIGURE 2.21

Inventors and startups can draw on many sources for support.

Reading Assignment(s)

- Education/MOOC (pg 80)

Project Assignment(s)

- Disruptive Innovation?
- Organizational level?
- Business model?

Key Points

- Information technology as an enabler
- Information systems in organizations
- New business models
- Innovation and competitive advantage

References/Acknowledgements

- Information systems today: managing in the digital world by J. Velacich and C. Schneider, 8th ed., Pearson, 2017
- Information technology for managers by G.W. Reynolds, 2nd ed., Cengage Learning, 2015
- Menagement information systems: managing the digital firm by K.C. Laudon and J.P. Laudon, Pearson, 2017
- Information technology for management: advancing sustainable, profitable business growth by E. Turban, L. Volonino, and G. Wood, Wiley, 2013