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Information

Systems Today Managing in the Digital World

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Information

FIFTH

EDITION

Systems Today Managing in the Digital World

Joe Valacich

Washington State University

Christoph Schneider

City University of Hong Kong

**Prentice Hall**

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Dedication

To Jackie, Jordan, and James for your sacrifices, love, and support. **—Joe**

To Birgit for your love and support.

**—Christoph**

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Systems Development.

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**Preface**

Approach

The world is *flat*. Companies are focusing on the *long tails*. New business models based on con cepts of *freeconomics* are flourishing. Change is the norm in the digital world. Globalization, downsizing, outsourcing, and offshoring are a way of life for today’s organizations and tomorrow’s managers. What does all this mean? What are the catalysts of these concepts and of all this change? More important, how can organizations thrive in this dynamic and highly competitive market place? The answer to these and many similar questions is that information systems and related information technologies are driving globalization, new business models, and hypercompetition. It is little wonder that teaching an introductory course on information systems has never been more crucial—or more challenging.

One of the greatest challenges that we face in teaching information systems courses is how to keep pace in the class with what is happening out in the real world. Being relevant to students while at the same time providing the necessary foundation for understanding the breadth, depth, and complexity of information systems has never been more difficult. We wrote *Information Systems Today,* Fifth Edition, with this overarching goal in mind, to be both rigorous *and* rele vant. To accomplish this, we want students not only to learn about information systems but also to clearly understand the importance of information systems for individuals, organizations, and society. Additionally, we do not want to simply spoon-feed students with technical terms and the history of information systems. Instead, students must understand exactly what innovative or ganizations are doing with contemporary information systems and, more important, where things are heading. Finally, we want to empower students with the essential knowledge needed to be successful in the use and understanding of information technology in their careers.

To this end, we wrote *Information Systems Today,* Fifth Edition, so that it is contemporary, fun to read, and useful, focusing on what business students need to know about information systems to survive and thrive in the digital world.

Audience

*Information Systems Today,* Fifth Edition, is primarily for the undergraduate introductory infor mation systems course required of all business students. The introductory information systems course typically has a diverse audience of students majoring in many different areas, such as ac counting, economics, finance, marketing, general management, human resource management, production and operations, international business, entrepreneurship, and information systems. This book also was written for students studying topics outside of business, especially in the growing and broad area of information sciences. Given the range of students taking this type of course, we have written this book so that it is a valuable guide to all students and provides them with the essential information they need to know. Therefore, this book has been written to appeal to a diverse audience.

*Information Systems Today,* Fifth Edition, can also be used for the introductory course of fered at the graduate level—for example, in the first year of an MBA program. Such usage would be especially appropriate if the course heavily focused on the diverse set of cases provided in each chapter.

What’s New to the Fifth Edition

Our primary goal for *Information Systems Today,* Fifth Edition, was to emphasize the impor tance of information systems to all business students as the role of information technology and systems continues to expand within organizations and society. Most notably, we extensively

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examine how information systems are fueling globalization—making the world smaller and

more competitive—in virtually every industry and at an ever-increasing pace. Given this clear

focus, we are better able to identify those topics most critical to students and future business

professionals. Consequently, we have made substantial revisions to the basic content of the chap

ters and pedagogical elements that we believe achieve this goal. New or expanded chapter topics

include the following:

An extensively revised chapter—Chapter 1, “Managing in the Digital World”—focuses on

defining not only what an information system consists of but also the role of technology as

a catalyst for tremendous change, as evidenced by the rise of globalization and emerging

ethical issues.

An updated chapter—Chapter 3, “Managing the Information Systems Infrastructure and

Services”—continues to cover essential infrastructure concepts related to hardware,

software, networking and the Internet, and databases but also extends this discussion by

examining the growth in various technology services, such as utility, cloud, grid, edge, and

green computing, which help organizations better manage the rapid obsolescence, ongoing

maintenance, energy usage, and demand fluctuations when deploying a modern technology

infrastructure.

In Chapter 6, “Enhancing Business Intelligence Using Information Systems,” we sharpen

our focus on various topics related to business intelligence by discussing how databases

serve as a foundation for gaining business intelligence and examining three components

of business intelligence: information and knowledge discovery, business analytics, and

information visualization.

In Chapter 7, “Enhancing Business Processes Using Enterprise Information Systems,” we

greatly expand our coverage on the core business processes of most organizations in order to

better inform students of the complexities of modern organizations. Using this foundation,

enterprise systems are introduced as a powerful mechanism to improve business processes.

In Chapter 8, “Improving Supply Chains and Strengthening Customer Relationships Using

Enterprise Information Systems,” we greatly expand our coverage of supply chain manage

ment and customer relationship management, focusing on both upstream and downstream

business relationships.

In Chapter 10, “Securing Information Systems,” we consolidate content that was spread

over two chapters, providing content on both computer crime, cyberwar, and cyberterror

ism as well as issues related to information systems security, control, auditing, and disaster

recovery planning.

An updated and expanded Technology Briefing covers foundational concepts related to

various information technologies. The Technology Briefing provides the groundwork for a

deeper understanding of the topics introduced in Chapter 3 and is intended for use in more

technically oriented courses. Each section of this briefing was designed to be stand-alone—

it can be read with or without the other sections.

Beyond the chapter content and features, we have also made substantial changes and refine

ments to the end of each chapter. First, we carefully revised the end-of-chapter problems and ex

ercises to reflect content change and new material. Second, we have carefully revised the

end-of-chapter cases about real, contemporary organizations and issues to illustrate the complex

ities of the digital world. Each case mirrors the primary content of its chapter to better emphasize

its relevancy within the context of a real organization. All these elements are discussed more thor

oughly next.

Our goal has always been to provide only the information that is relevant to all business stu

dents, nothing more and nothing less. We believe that we have again achieved this goal with

*Information Systems Today,* Fifth Edition. We hope you agree.

Key Features

As authors, teachers, developers, and managers of information systems, we understand that in

order for students to best learn about information systems with this book, they must be moti

vated to learn. To this end, we have included a number of unique features to help students

quickly and easily assess the true value of information systems and their impact on everyday

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life. We show how today’s professionals are using information systems to help modern orga

nizations become more efficient and competitive. Our focus is on the application of technology

to real-world, contemporary situations. Next, we describe each of the features that contribute

to that focus.

A Multitiered Approach

Each chapter utilizes cases in a variety of ways to emphasize and highlight how contemporary

organizations are utilizing information systems to gain competitive advantage, streamline orga

nizational processes, or improve customer relationships.

Opening Case—Managing in the Digital World All chapters begin with an opening case

describing a real-world company, technology, and/or issue to spark students’ interest in the

chapter topic. We have chosen engaging cases that relate to students’ interests and concerns by

highlighting why information systems have become central for managing in the digital world.

Each opening case includes a series of associated questions the students will be able to answer

after reading the chapter contents. The organizations, technologies, or issues highlighted in these

cases include the following:

Apple Computer’s rise, fall, and reemergence as a global technology giant

How TiVo, Sling Media, and other innovative technologies are transforming the television

and movie industries

Google’s meteoric rise and the challenges associated with maintaining its success

How social media sites like Twitter and YouTube are being used by business to connect and

provide services to customers

How Facebook has emerged as one of the most successful and powerful Web 2.0 sites

eBay’s use of business intelligence to battle its ongoing struggles with counterfeit products

and fraudulent buyers and sellers

Amazon.com’s use of its sophisticated infrastructure to automate the supply chain for both

large and small customers

How a recent volcanic eruption in Iceland disrupted the global supply chains of countless

organizations throughout the world

How the Nintendo Wii created tremendous demand by purposefully being different than

the Sony PlayStation or Microsoft Xbox

The vulnerability of your information systems and networks to hacker attacks via wireless

networks

Brief Case Each chapter also includes a brief case that discusses important issues related to

companies, technologies, or society. These are embedded in the text of the chapter and highlight

concepts from the surrounding chapter material. Discussion questions are provided to seed criti

cal thinking assignments or class discussions. The organizations, trends, and products highlighted

in these cases include the following:

How some are sharing their Internet connection to help others

How domainers—those who buy and sell lucrative domain names on the Internet—have

grown into a multi-billion-dollar industry.

How the ongoing battle between Microsoft and Apple is fueling rapid innovation in the

computing industry

How the human-powered search engine ChaCha makes any mobile phone smarter

How organizations can best utilize instant messaging to aid the collaboration of an

increasingly distributed workforce

How the Internet Movie Database (IMDb) provides comprehensive information on

films, television, and video games to enhance and change the entertainment industry

How the complexity of modern manufacturing creates innovative but also highly

vulnerable products

How McDonald’s is outsourcing drive-through order placement

How Microsoft aids hackers by releasing security update patches

How it may now be possible to hack into airplanes that rely more and more on internal

computers and networks

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End-of-Chapter Case To test and reinforce chapter content, we present two current real

world cases at the end of each chapter. Sources for these cases include *InformationWeek,*

*BusinessWeek, CIO* magazine, and various Web sites. Like the Brief Cases within the chapter,

these are taken from the news and are contemporary. However, these are longer and more

substantive than the Brief Cases. They too are followed by discussion questions that help the

student apply and master the chapter content. The organizations and products highlighted in

these cases include the following:

How the One Laptop per Child program is attempting to bridge the digital divide

How PayPal created a global currency to enable worldwide collaboration and commerce

How NetFlix is transforming the movie industry

How LinkedIn, a social networking site for professionals, can help people find jobs, useful

business contacts, and business opportunities

How broadband Internet access in airplanes has evolved and will soon become common

How Facebook’s infrastructure has evolved to support social games like FarmVille

and Mafia Wars

How the picture exchange site Flickr aids in the globalization movement

How YouTube has grown into a mainstream Web marvel

How Wikipedia has become both a useful and a sometimes controversial Web resource

How Digg.com is changing how news is delivered to consumers

How Netflix is utilizing crowdsourcing to improve its ability to make movie recommendations

to customers

How online mapping services like Google maps are enabling many innovative products and

services

How enterprise resource planning systems transform business processes but often do not

satisfy the needs of the users and the organization

How organizations are managing their computing applications, costs, and delivery using

service-oriented architectures

How customer relationship management is evolving to include social media capabilities

How the automobile industry is expanding their supply chains as cars become more reliant

on information technologies for information services, navigation, and communication

How the advent of open source software systems, such as the Linux operating system,

Apache Web server, and Firefox Web browser, are transforming the software industry

How the FBI is developing a comprehensive database of biometric information to better

track and apprehend criminals

How and why cybercriminals target eBay, PayPal, and other popular Web sites and

resources

How China limits information exchange within its society through its “great firewall”

Common Chapter Features

Throughout every chapter, a variety of short pedagogical elements are presented to highlight key

information systems issues and concepts in a variety of contexts. These elements help to show

students the broader organizational and societal implications of various topics.

Industry Analysis

Every industry is being transformed by the Internet and the increasing use of information systems

by individuals and organizations. To give you a feel for just how pervasive and profound these

changes are, each chapter presents an analysis of a specific industry to highlight the new rules for

operating in the digital world. Given that no industry or profession is immune from these changes,

each Industry Analysis highlights the importance of understanding information systems for *every*

business student, not only for information systems majors. Discussion questions help students

better understand the rapidly changing opportunities and risks of operating in the digital world.

Chapter 1 examines how the digital world is transforming the opportunities for virtually all busi

ness professions. Subsequent chapters examine how globalization and the digital world have

eliminated or forever transformed various industries, including banking, movie, retail, travel,

health care, automobile, manufacturing, broadcasting, and law enforcement. Clearly, we are in a

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time of tremendous change, and understanding this evolution will better equip students to not only

survive but also thrive in the digital world.

Coming Attractions

We worked to ensure that this book is contemporary. We cover literally hundreds of different

current and emerging technologies throughout the book. This feature, however, focuses on an

innovation that is likely to soon have an impact on organizations or society. Topics include the

following:

Real-time language translation

Television for the visually impaired

Autonomic computing

Very smart phones and services of the future

Future of TV

Medical records of the future

Swarm intelligence learned from ants, bees, termites, and wasps

Simplifying the recharging of gadgets

Microsoft’s Surface computerized table

Brain sensors to improve market research

When Things Go Wrong

Textbooks don’t usually describe what not to do, but this can be very helpful to students. This

feature enables students to learn about a real-world situation in which information systems did

not work or were not built or used well. Topics include the following:

Apple Computer’s numerous product and strategy failures

eWaste and what to do with all our old computers and gadgets

Google Buzz, a privacy fiasco for the search giant

Apple Computers’ resistance to Adobe’s Flash in its browsers and devices

Nestlé’s social media fiasco after blocking a YouTube video posted by Greenpeace

How the Internet can quickly disseminate false information with unforeseen consequences

How the failure of the Federal Aviation Administration’s computer system grounded

hundreds of flights

How Apple mismanaged initial complaints about the iPhone 4 antenna

How spam and spyware are creating traffic jams on the information superhighway

Unusual cyberthreats, such as accidentally (or purposely) digging up largely unprotected

fiber-optic networks

Net Stats

The Internet is now a significant part of every organization as well as our personal lives. Net Stats

provide interesting, important trends and forecasts related to Internet usage within a variety of

contexts. These insights help students better understand the Internet’s role in fueling globaliza

tion and transforming the digital world. Topics include the following:

Global Internet usage

Online search market share

Broadband access

Top Internet advertisers

Most popular Facebook fan pages

Demise of broadcast television

Changing value of social media in the workplace

Growth of radio-frequency identification

Lagging information technology adopters

Top cyberthreats

Ethical Dilemma

Ethical business practices are now a predominant part of contemporary management education

and practice. This feature examines contemporary dilemmas related to the chapter content and

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highlights the implications of these dilemmas for managers, organizations, and society. Topics

include the following:

Differences in online rights throughout the world

An underground gaming industry selling virtual goods for “real” money

The collection and easy dissemination of public information over the Web

Monitoring productive employees

Virtual reality people

Stealing WiFi

Privacy of radio-frequency identification

Using customer relationship management systems to target or discriminate

Genetic testing and discrimination

Ethical hacking

Powerful Partnerships

A variety of key collaborations have shaped the information technology industry. While there are

countless people who have contributed to today’s digital world, this feature presents some of the

more prominent teams that have significantly advanced technologies or lead important compa

nies. These partnerships include the following:

Apple’s Steve Jobs and Steve Wozniak

Skype’s Niklas Zennström and Janus Friis

Google’s Sergey Brin and Larry Page

YouTube’s Steve Chen and Chad Hurley

Digg’s Kevin Rose and Jay Adelson

Adobe’s John Warnock and Chuck Geschke

SAP’s Dietmar Hopp, Hans-Werner Hector, Hasso Plattner, Klaus Tschira, and Claus

Wellenreuther

Flickr’s Caterina Fake and Stewart Butterfield

Microsoft’s Bill Gates and Paul Allen

Netscape’s James H. Clark and Marc Andreessen

End-of-Chapter Material

Our end-of-chapter material is designed to accommodate various teaching and learning styles. It

promotes learning beyond the book and the classroom. Elements include the following:

***Key Terms***—Highlight key concepts within the chapter.

***Review Questions***—Test students’ understanding of basic content.

***Self-Study Questions***—Enable students to assess whether they are ready for a test.

***Matching Questions***—Check quickly to see if students understand basic terms.

***Problems and Exercises***—Push students deeper into the material and encourage them to

synthesize and apply it.

***Application Exercises***—Challenge students to solve two real-world management problems

using spreadsheet and database applications from a running case centered on a university

travel agency. Student data files referenced within the exercises are available on the book’s

Web site: www.pearsonhighered.com/valacich.

***Team Work Exercise***—Enable students to work in teams to solve a problem and/or address

an issue related to the chapter material.

We have extensively updated these elements to reflect new chapter content and the natural evo

lution of the material.

Pedagogy

In addition to the features described above, we provide a list of learning objectives to lay the foun

dation for each chapter. At the end of the chapter, the Key Points Review repeats these learning

objectives and describes how each objective was achieved. A list of references is located at the

end of the text, organized by chapter.

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Organization

The content and organization of this book are based on our own teaching as well as on feedback

from reviewers and colleagues throughout the field. Each chapter builds on the others to reinforce

key concepts and allow for a seamless learning experience. Essentially, the book has been struc

tured to answer three fundamental questions:

**1.** What are contemporary information systems, and how are they being used in innovative

ways?

**2.** Why are information systems so important and interesting?

**3.** How best can we build, acquire, manage, and safeguard information systems?

The ordering and content of our chapters was also significantly influenced by a recent arti

cle, “What Every Business Student Needs to Know About Information Systems.”1 This article was

written by forty prominent information systems scholars to define the information systems core

body of knowledge for all business students. By design, the content of *Information Systems*

*Today,* Fifth Edition, carefully follows the guidance of this article. We are, therefore, very confi

dent that our book provides a solid and widely agreed-on foundation for any introductory infor

mation systems course.

The chapters are organized as follows:

***Chapter 1: Managing in the Digital World***—This chapter helps the student understand

what information systems are and how they have become a vital part of modern organiza

tions. We walk the student through the technology, people, and organizational components

of an information system, and we lay out types of jobs and career opportunities in informa

tion systems and in related fields. We also focus on how technology is driving globalization

and creating countless ethical concerns. We use a number of cases and examples, such as

that of Apple Computers, to show the student the types of systems being used and to point

out common “best practices” in systems use and management.

***Chapter 2: Gaining Competitive Advantage Through Information Systems***—Here, we dis

cuss how companies, such as TiVo, can use information systems for automation, organiza

tional learning, and strategic advantage. Given the rapid advancement of new technologies,

we also explain why and how companies are continually looking for innovative ways to use

information systems for competitive advantage.

***Chapter 3: Managing the Information Systems Infrastructure and Services***—In this

chapter, we provide an overview of the essential information systems infrastructure compo

nents and describe why they are necessary for satisfying an organization’s informational

needs. With the ever-increasing complexity of maintaining a solid information systems in

frastructure, it becomes increasingly important for organizations, such as Google, to design

a reliable, robust, and secure infrastructure. We also examine the rapid evolution toward the

delivery of infrastructure capabilities through a variety of technology services.

***Chapter 4: Enabling Commerce Using the Internet***—Perhaps nothing has changed the

landscape of business more than the use of the Internet for electronic commerce. In this

extensively updated chapter, we describe how a number of firms, such as Alaska Air,

Timbuk2, or the Boeing Company, use the Internet to conduct commerce in cyberspace.

Further, we explain how organizations build intranets to support internal processes and build

extranets to interact with other firms. We then describe the stages of business-to-consumer

electronic commerce and discuss emerging trends in consumer-to-consumer e-commerce,

mobile commerce, and Internet marketing. Finally, we explain different forms of e-government

and show how governmental regulations can become a threat to e-commerce.

1Ives, B., Valacich, J., Watson, R., Zmud, R. (2002). What every business student needs to know about information systems.

*Communications of the Association for Information Systems,* 9(30). Other contributing scholars to this article include Maryam

Alavi, Richard Baskerville, Jack J. Baroudi, Cynthia Beath, Thomas Clark, Eric K. Clemons, Gordon B. Davis, Fred Davis,

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***Chapter 5: Enhancing Collaboration Using Web 2.0***—Web 2.0 has given rise to various

different social media, which have forever changed how people interact. In addition to en

abling various business opportunities, Web 2.0 technologies have also enabled companies

to better harness the power and creativity of their workforce. In this chapter, we examine

how different social media can enhance communication, collaboration, cooperation, and

connection within organizations but also between organizations and their customers. Fur

ther, we discuss the importance of carefully managing an Enterprise 2.0 strategy. Finally,

using examples such as Twitter and Facebook, we describe how companies can deal with

potential pitfalls associated with Web 2.0.

***Chapter 6: Enhancing Business Intelligence Using Information Systems***—Given how

many different types of information systems organizations use to run their business and

gain business intelligence, in this chapter we use examples from eBay.com and other

firms to describe the various types of systems. In this extensively updated chapter, we

describe key business intelligence concepts and explain how databases serve as a founda

tion for gaining business intelligence. Further, we discuss three components of business

intelligence: information and knowledge discovery, business analytics, and information

visualization.

***Chapter 7: Building Organizational Partnerships Using Enterprise Information***

***Systems***—In this chapter, we focus on enterprise systems, which are a popular type

of information system used to integrate information and span organizations’ boundaries

to better connect a firm with customers, suppliers, and other partners. We walk students

through various core business processes and then examine how enterprise resource plan

ning systems can be applied to improve these processes and organizational

performance.

***Chapter 8: Improving Supply Chains and Strengthening Customer Relationships Using***

***Enterprise Information Systems***—In this chapter, we continue our focus on enterprise

systems by examining the complexities of supply networks and how they can be managed

more effectively using supply chain management systems. Additionally, customer relation

ship management systems and their role in the attraction and retention of customers are

examined.

***Chapter 9: Developing and Acquiring Information Systems***—In this chapter, we begin by

describing how to formulate and present the business case to build or acquire a new infor

mation system. We then walk the student through the traditional systems development

approach and explain that numerous other approaches, such as prototyping, rapid applica

tion development, and object-oriented analysis and design, can be utilized depending on

the situation. Finally, we examine the steps followed to request and acquire an information

system from an outside vendor.

***Chapter 10: Securing Information Systems***—With the pervasive use of information sys

tems, new dangers have arisen for organizations, and information security has become a

paramount issue within the context of global information management. In this chapter, we

define computer crime and contrast several types of computer crime. Next, given its grow

ing relevance to managing and living in the digital world, we examine the growing signifi

cance of cyberwar and cyberterrorism. This is followed by an examination of the primary

threats to information systems security and how systems can be compromised. Using real

world examples, we show how companies can implement both technological and human

based safeguards to better manage information systems, The chapter concludes with a

discussion of the role of auditing, information systems controls, and the

Sarbanes-Oxley Act.

In addition to these ten chapters, we include a Technology Briefing that focuses on foun

dational concepts regarding hardware, software, networking and the Internet, and databases.

While Chapter 3, “Managing the Information Systems Infrastructure and Services,” provides

a more managerial focus to these enabling technologies, this foundational material is intended

to provide a more in-depth examination of these topics. By delivering this material as a Tech

nology Briefing, we provide instructors the greatest flexibility in how and when they can

apply it.

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Supplement Support

Online Instructor’s Resource Center

The convenient Online Instructor’s Resource Center is accessible from www.pearsonhighered

.com/valacich by choosing the “Instructor Resources” link from the catalog page. The online

center includes the following supplements: Instructor’s Manual, Test Item File, PowerPoint

presentations, and Image Library (text art). The online center also contains TestGen and TestGen

conversions in WebCT and BlackBoard-ready files.

The Instructor’s Manual includes answers to all review and discussion questions, exercises,

and case questions. The Test Item File (Test Bank) includes multiple-choice, true-or-false, and

essay questions for each chapter. The Test Bank is delivered in Microsoft Word as well as in the

form of TestGen. The PowerPoint presentations highlight text learning objectives and key topics.

Finally, the Image Library is a collection of the figures and tables from the text for instructor use

in PowerPoint slides and class lectures.

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purchasing the print textbook, students can purchase an electronic version of the same content.

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In addition to our colleagues at Prentice Hall, several individuals have been particularly instrumental in making the fifth edition the best ever. First, Karen Judson did an outstanding job on drafting several of our case elements; Tracy Hess from the University of Massachussetts and Mauricio Featherman from Washington State University provided valuable inputs into our revi sion of Chapters 7 and 8. Likewise, Ryan Wright from the University of San Francisco provided many ideas that shaped the current edition. Also, two Washington State University PhD students, Nathan Johnson and Fengchun Tang, provided many ideas for updating various cases throughout the book. Thanks, team! We could not have done it without you.

Most important, we thank our families for their patience and assistance in helping us to complete this book. Joe’s wife Jackie, daughter Jordan, and son James were a constant inspira tion, as was Christoph’s wife Birgit. This one is for all of you.

Information

Systems Today Managing in the Digital World

CHAPTER

one Managing in the Digital World

After reading this chapter, you will be able to do the following:

Describe the character istics of the digital world

and the advent of the in formation age.

Define globalization, de scribe how it evolved

over time, and describe

the key drivers of

globalization.

Explain what an informa tion system is, contrast

ing its data, technology,

people, and organiza

tional components.

Describe the dual nature of information systems in the success and failure

of modern organizations. Describe how computer ethics impact the use of

information systems and discuss the ethical

concerns associated

with information privacy,

accuracy, property, and

accessibility.

2

2

Preview

Today, organizations from Apple Computer to Zales Jewelers use computer-based in formation systems (IS) to better manage their operations in the digital world. These organizations use information systems to provide high-quality goods and services as well as to gain or sustain competitive advantage over rivals. In addition to helping or ganizations to be competitive, information systems have contributed to tremendous societal changes. Our objective for Chapter 1 is to help you understand the role of in formation systems as we move into the digital world and how they have helped fuel globalization. We then highlight what information systems are, how they have evolved to become a vital part of modern organizations, and why this understanding is neces sary for you to become an effective manager in the digital world. We conclude by dis cussing ethical issues associated with the use of information systems.

Managing in the Digital World: Apple Computer

It happened on April Fools’ Day 1976, but history has shown it was no joke. On that date, Stephen “Woz” Wozniak and Steven Paul Jobs officially formed the Apple Computer Company. The two friends had been fascinated with computers since their days as students at Homestead High School in Cupertino, California. Wozniak graduated first, in 1967, be cause he is five years older than Jobs, but their shared interest in anything digital kept bringing the two together, both before Jobs graduated from high school and then after he graduated in 1972.

The two Steves both dropped out of college to work on building computers—first in Jobs’s bed room, then in his garage when the bedroom got too crowded. (Wozniak later returned to school at the University of California in Berkeley and graduated with a degree in engineering in 1986.) At first, they were interested just in building circuit boards, but later decided to build entire computers and sell them to home users.

The Apple I debuted shortly after the company was formed and sold for $666.66, paving the way for profound changes in the way everyday people would use computers. Shortly after the introduction of the Apple I, the Apple II debuted with a keyboard, a floppy disk drive, and color graphics. Because of its jazzy appearance and ease of use (which can’t be compared with today’s personal computers [PCs]), consumers liked the Apple II, and the company eventually sold 50,000 units. It continued to be Apple’s dominant product until 1993. To date, the Apple II’s 17-year life span is a record within the computer industry.

The working relationship between Wozniak and Jobs was key to Apple’s success. Wozniak, the engineer, was concerned primarily with a com puter’s function, while Jobs focused on ease of use and design. Thanks to the two-Steves team, the Apple II was an attractive and functional addition to a family’s living room. Apple continues to offer products that are a blend of engineering and aes thetics, and many consumers are devoted to its products. The history of Apple Computers, how ever, includes a series of high highs and low lows. For example, the Lisa, introduced in 1983, was a commercial disaster; and the Apple III, introduced shortly after the Apple II, was discontinued after only a year on the market when it failed to entice consumers. In 1984, Apple once again had a hit when it introduced the popular Macintosh 128K, featuring the AppleMouse II (the first computer mouse introduced to the mass market) and the first true graphical user interface. When Apple introduced the Macintosh Portable (an early lap top), it had only limited success, but after it was

redesigned and renamed, the PowerBook proved a marketplace success. Other near failures for Apple included the Apple Newton (an early personal dig ital assistant [PDA]) and the G3 enterprise server computer (for more on Apple’s failures, see When Things Go Wrong later in this chapter).

Jobs left Apple in 1985 amid employee complaints that he was an erratic and tempestuous manager; Wozniak left Apple for good in 1986. Jobs was so disgruntled when he left Apple that he sold all but one share of his stock in the company. Jobs then started another computer company, NeXT Computer,

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FIGURE 1.1

The iPad is Apple’s latest gadget.

which designed and marketed a technologically advanced computer that did not sell well because of its high price. Apple’s leadership foundered for a while, but the company purchased NeXT for $402 million in 1996, and Jobs again took over the helm. Jobs brought Apple back to profitability by revamping its product line. The iMac, a PowerBook featuring a 14-inch display, and Mac OS X—a new operating system—were the most successful units in the 1998 product line.

In late 2001, Apple introduced the iPod, the now universally familiar MP3 music player. Selling for $250 and offering 4 GB of hard drive storage for

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music files, the player went mainstream in 2003. The simple user interface and small size made the iPod one of the most sought after digital music players. Apple soon began offering the device in a range of sizes and colors, including the iPod mini, iPod color, iPod shuffle, and iPod nano. Although competitors have released their own digital music players, none have achieved Apple’s market share.

To build on the iPod’s success, Apple created an online music store called iTunes, where users could download digital music for 99 cents per track. iTunes soon expanded into the video market, providing portable movies and television shows to media hungry users. The combination of product (the iPod) and service (online iTunes store) resulted in massive profits for Apple.

Apple continued its success with new products in 2007 when it introduced the iPhone—a smart phone with Internet access and a touch-screen in terface. The iPhone sold 1.4 million units the first 90 days after its introduction. Not only could iPhone users make phone calls and surf the Internet, they could do a large variety of other things via software downloaded from the “App Store,” a new wing of iTunes. Users could download both pay and free applications—or “apps”—to enhance the utility and entertainment value of their iPhones. As the App Store grew in popularity, users could find something for almost any occasion, from games to grocery list generators. The diversity and range of apps avail able to users spawned Apple’s famous “There’s An App for That” marketing campaign. Building on this success, Apple released the iPod touch, which of fered most of the iPhone’s capabilities, minus the phone. Two years after its initial launch, the third iteration of the iPhone went on sale. Not to be out done by its predecessors, the iPhone 3GS sold over 1 million units in its first *weekend* on sale. In 2010, iPhone 4G was released. Although many consumers complained about problems with the phone’s an tenna, the iPhone 4 was another sales hit for Apple. The iPhone has continued to outsell other smart phones on the market, while analysts and fans alike look to the horizon to see what Apple’s next gener ation handset will bring to the world of smart phones.

Barely as thick as your index finger and weighing a mere three pounds, the MacBook Air, introduced in 2008, also proved popular with consumers. The lightweight laptop boasted 2 GB of built-in RAM, an 80-GB hard drive, and a 1.6- to 1.8-GHz Intel Core 2 dual processor. Apple continued wowing computer enthusiasts in 2010 with the release of one of its lat est gadgets, the tablet-like iPad (see Figure 1.1). Touted by Jobs as a “third-category” device between smart phones and laptops, the iPad measured just under 8.5 by 11 inches and half an inch thick. Sport ing Wi-Fi, Bluetooth, and optional cellular network connectivity, the 1.5-pound iPad shipped with a specially designed 1-GHz processor and up to 64 GB

of internal storage. In addition, the iPad utilized a touch-screen keyboard similar to those found on the iPhone and iPod touch. Integration with iTunes and the App Store allowed users to download music, e-books, and games into the ultraportable and light weight computer.

While Apple Computers was enjoying a long list of successful products, in 2005 environmentalists criticized the company for its lack of an e-waste recy cling policy. Jobs was at first defiant, dismissing such complaints as trivial. However, shortly after Apple’s annual meeting in April 2005, he announced that Apple would take back used iPods for free. In 2006, he further expanded Apple’s recycling programs to any customer who buys a new Mac. This program in cludes shipping and “environmentally friendly dis posal” of customers’ old systems. In late 2007, Apple once again came under scrutiny from Greenpeace, this time for the use of toxic chemicals in the iPhone. Only a few days later, Apple announced that in addi tion to recycling its old products, toxic chemicals would be removed from new products.

Environmental issues haven’t been Apple’s only concern. In 2004, Jobs underwent surgery for pan creatic cancer. A few years later, public speculation spread over the status of Jobs’s health, as he began to experience severe weight loss from a hormone imbalance. In early 2009, Jobs took an extended leave of absence as Apple’s chief executive officer (CEO) because of his health. During this time, Ap ple’s stock began to drop as uncertainty surrounded the future direction of the company. After receiving a liver transplant and successfully recovering, Jobs returned to actively steering the company and mar keting new products.

Thanks to innovative product design, clever marketing tactics, and a swift response to environ mental concerns, Apple Computer’s profits have consistently risen over the past several years, and financial analysts see more of the same in the com pany’s future.

After reading this chapter, you will be able to answer the following:

**1.** Given the pace at which technology is converg ing (e.g., phones, music players, cameras, and so on), what do you think is next for Apple?

**2.** Apple has had many “near-death” experiences throughout its history. Is Apple now here to stay?

**3.** Jobs has been the catalyst for many of Apple’s successes (and failures). Can Apple survive without Jobs?

Based on:

Anonymous. (n.d.). Apple-history.com: Recent changes. Re trieved May 17, 2010, from http://www.apple-history.com.

Anonymous. (2009, April 12). WSJ: Apple’s Jobs still closely tied to company. *PCMag.com*. Retrieved May 20, 2010, from http://www.pcmag.com/article2/0,2817,2345154,00.asp.

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Anonymous. (2010, February 1). Apple iPad: Welcome to the new world of computing! *MacDailyNews.* Retrieved May 20, 2010, from http://macdailynews.com/index.php/ weblog/comments/23880.

Carew, S. (2009, June 22). Apple sells more than 1 million iPhone 3GS. *Reuters.* Retrieved May 20, 2010, from http:// www.reuters.com/article/idUSTRE55I2FK20090622.

Flynn, L. J. (2003, April 17). Profits at Apple computer are down 65% in quarter. *New York Times.* Retrieved May 17, 2010, from

Information Systems Today

http://query.nytimes.com/gst/fullpage.html?res 9A05E3DD16 3AF934A25757C0A9659C8B63.

Keizer, G. (2010, May 20). 1-in-5 U.S. consumers plan to buy Apple’s iPad. *SFGate.* Retrieved May 20, 2010, from http://www.sfgate.com/cgi-bin/article.cgi?f /g/a/2010/05/20/ urnidgns852573C40069388000257729005E6546.DTL.

Weyhrich, S. (2008, April 8). Apple II history chap 1. Retrieved May 17, 2010, from http://apple2history.org/history/ah01.html.

In 1959, Peter Drucker predicted that information and of information technology (IT) would become increasingly important, and at that point, over four decades ago, he coined the term **knowledge worker.** Knowledge workers are typically professionals who are relatively well edu cated and who create, modify, and/or synthesize knowledge as a fundamental part of their jobs.

Drucker’s predictions about knowledge workers were very accurate. As he predicted, they are generally paid better than their prior agricultural and industrial counterparts; they rely on and are empowered by formal education, yet they often also possess valuable real-world skills; they are con tinually learning how to do their jobs better; they have much better career opportunities and far more bargaining power than workers ever had before; they make up about a quarter of the workforce in the United States and in other developed nations; and their numbers are rising quickly.

Drucker also predicted that, with the growth in the number of knowledge workers and with their rise in importance and leadership, a **knowledge society** would emerge. He reasoned that, given the importance of education and learning to knowledge workers and the firms that need them, education would become the cornerstone of the knowledge society. Possessing knowledge, he argued, would be as important as possessing land, labor, or capital (if not more so) (see Figure 1.2). Indeed, research shows that people equipped to prosper in the knowledge society, such as those with a college education, earn far more on average than people without a college education, and that gap is increasing. In fact, the most recent information from the U.S. Census Bureau (2008 data) reinforces the value of a college education: workers 18 and over with a bach elor’s degree earn an average of $57,181 a year, while those with a high school diploma earn $31,286. Workers with a master’s degree make an average of $70,186, and those without a high school diploma average $21,484. Additionally, getting a college degree will qualify you for many jobs that would not be available to you otherwise and will distinguish you from other job candi dates. Finally, a college degree is often a requirement to qualify for career advancement and promotion opportunities once you do get that job.

People generally agree that Drucker was accurate about knowledge workers and the evolu tion of society. While people have settled on Drucker’s term “knowledge worker,” there are many alternatives to the term “knowledge society.” Others have referred to this phenomenon as the knowledge economy, new economy, the digital society, the network era, the Internet era, and other names. We simply refer to this as the *digital world*. All these ideas have in common the premise that information and related technologies and systems have become very important to us and that knowledge workers are vital.

Some have argued, however, that there is a downside to being a knowledge worker and to liv ing in the digital world. For example, some have argued that knowledge workers will be the first to be replaced by automation with information technology. Others have argued that in the new economy there is a *digital divide,* where those with access to information technology have great advantages over those without access to information technology (discussed later in this chapter).

To be sure, there is a downside to overreliance on information technology, but one thing is for certain: Knowledge workers and information technologies are now critical to the success of

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FIGURE 1.2

In the knowledge society,

information has become as

important as—and many feel

more important than—land,

labor, and capital resources.







Information



**Items of Value in the Knowledge Society**

Land Capital











Labor

modern organizations, economies, and societies. What are some of the characteristics of the digital world? This is examined next.

Characteristics of the Digital World

Computers are the core component of information systems. Over the past decade, the advent of pow erful, relatively inexpensive, easy-to-use computers has had a major impact on business. To see this impact, look around your school or place of work. At your school, you may register for classes on line, use e-mail to communicate with fellow students and your instructors, and complete or submit assignments on networked PCs. At work, you may use a PC for e-mail and many other tasks. Your paychecks are probably generated by computer and automatically deposited in your checking account via high-speed networks. Even in your spare time, information technology is ubiquitous: you use so cial networking sites like Facebook to stay connected with your friends and family, you watch videos on YouTube, you upload pictures taken with your cell phone or digital camera to picture sharing sites like Flickr, and you use your smart phone for playing games, sending e-mails, or even reading books. Chances are that each year you see more information technology than you did the year before, and this technology is a more fundamental and important part of your learning and work than ever before.

When you stop and think about it, it is easy to see why information technology is important. Increasing global competitiveness has forced companies to find ways to be better and to do things less expensively. The answer for many firms continues to be to use information systems to do things better, faster, and cheaper. Using global telecommunications networks, companies can more easily integrate their operations to access new markets for their products and services as well as access a large pool of talented labor in countries with lower wages. In the next section, we will discuss how information technologies became pervasive throughout our lives and throughout society.

In his book *The Third Wave,* futurist Alvin Toffler describes three distinct phases, or “waves of change,” that have taken place in the past or are presently taking place within the world’s civilizations (see Figure 1.3). The first wave—a civilization based on agriculture and handwork— was a comparatively primitive stage that replaced hunter-gatherer cultures and lasted for thou sands of years. The second wave of change—the industrial revolution—overlapped with the first wave. The industrial revolution began in Great Britain toward the end of the eighteenth century and continued over the next 150 years, moving society from a predominantly agrarian culture to the urbanized machine age. Where once families supported themselves by working the land or handcrafting items for sale or trade, now mothers, fathers, and children left home to work in fac tories. Steel mills, textile factories, and eventually automobile assembly lines replaced farming and handwork as the principal source of family income.

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FIGURE 1.3

The Information Agewave of change.

The information age is the biggest

Industrial Revolution

Agriculture and Handwork

As the industrial revolution progressed, not only did occupations change to accommodate the

mechanized society, but so did educational, business, social, and religious institutions. On an

individual level, punctuality, obedience, and the ability to perform repetitive tasks became

qualities to be instilled and valued in children in public schools and, ultimately, in workers.

Although industrialization has brought about many positive changes, technology introduced

challenges for individuals, societies, and the environment. Many felt threatened by these changes,

and some—called **Luddites**—resorted to protesting against the technology; some others even re

sorted to destroying the technology that they felt threatened their livelihoods.

The Information Age Arrives

In a much shorter period of time than it took for civilization to progress past the first wave, soci

eties worldwide moved from the machine age into the **information age**—a period of change

Toffler has dubbed the “third wave.” As the third wave gained speed, information became the cur

rency of the realm. For thousands of years, from primitive times through the Middle Ages, infor

mation, or the body of knowledge known to that point, was limited. It was transmitted verbally

within families, clans, and villages, from person to person and generation to generation. Then

came Johannes Gutenberg’s invention of the printing press with movable type in the middle of

the fifteenth century, and a tremendous acceleration occurred in the amount and kinds of infor

mation available to populations (see Figure 1.4). Now knowledge could be imparted in written

form and sometimes came from distant locations. Information could be saved, absorbed, debated,

and written about in publications, thus adding to the exploding data pool.

FIGURE 1.4 

The printing press gave birth to

the information age.

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WHEN THINGS GO WRONG 

Failure: The Path to Success?

**M**anagement consultant Tom Peters, author or coauthor of 10 international best-sellers, including *In Search of Excel*

overpriced and needed a separate monitor (as opposed to the popular iMac series).

*lence*, *Thriving on Chaos*, *The Pursuit of Wow!*, and his latest, *Re-Imagine! Business Excellence in a Disruptive Age*, often tells business managers that a company’s survival may depend on those employees who fail over and over again as they try new ideas. There’s little that is more important to tomorrow’s managers than failure, Peters maintains.

Apparently Apple Computers lives by Peters’s philosophy. In January 2008, to help celebrate 24 years of the Mac, first introduced to consumers in 1984, *Wired* magazine recalled some of Apple’s more infamous failures.

One of Apple’s most visible flops was the Newton, actu ally the name of a newly conceived operating system that stuck to the product as a whole. The Newton, which Apple promised would “reinvent personal computing,” fell far short of its hype when it was introduced in 1993 as a not so-revolutionary PDA. The Newton was on the market for six years—a relatively long time for an unsuccessful product— but one of Steve Jobs’s first acts when he returned to Ap ple’s helm in 1997 was to cut the Newton Systems Group.

Other Apple product failures include the following:

• The Pippin, introduced in 1993, an inexpensive game player/network computer that couldn’t compete with Nintendo’s N64 or the Sony PlayStation.

• The TAM (Twentieth Anniversary Macintosh), which de buted in 1997 and lasted only a year. The sleek design was contemporary and attractive, but the machine was panned as overpriced and underpowered.

• The Macintosh television, of which only 10,000 units were produced, from 1993 to 1994. It tanked because it was incapable of showing television feeds in a desk top window.

• The PowerMac G4 Cube, an eight- by eight- by eight inch designer machine. It failed because it was seen as

• The Apple IIc (the “c” is for “compact”), which was meant to be the world’s first portable computer and came complete with carrying case. It lacked internal expansion slots and direct access to the motherboard, however, and thus was less popular than other Apple II models that al lowed users to upgrade.

• The puck mouse that came with the iMac G3. Apple made the mouse popular but miscued when it expected consumers to adapt to this too-small, awkward-to-control device that users often mistakenly used upside down. The puck was soon replaced with the Mighty Mouse—a consumer favorite.

• The Lisa, introduced in 1983, was intended for business use; but its whopping $9,995 price tag (more than $20,000 in current dollars) made it too rich for most businesses, which could buy IBM PCs at much lower prices. The Lisa was retired in 1986 after the Mac had captured consumers’ attention.

Apple continues to produce innovative products that con sumers stand in line to get. In the spring of 2010, many watched the launch of the Apple iPad to see if it would be the next suc cess or if it would flop for the company. Like the other products in the list, time will tell if the iPad survives. Although Apple’s fail ures are often cited by its competitors, the company has proved Peters right time and time again: Any company without an in teresting list of failures probably isn’t trying hard enough.

Based on:

Claburn, T. (2010, April 8). Can 300,000 iPads equal failure? *Information Week*. Retrieved April 20, 2010, from

http://www.informationweek.com/news/security/management/ showArticle.jhtml?articleID 224202035.

Gardiner, B. (2008, January 24). Learning from failure: Apple’s most notorious flops. *Wired.* Retrieved April 20, 2010, from http://www .wired.com/gadgets/mac/multimedia/2008/01/gallery\_apple\_flops.

Most modern-day high school and university students have grown up in a computerized world. If by some chance they do not know how to operate a computer by the time they graduate from high school, they soon acquire computer skills, because in today’s work world, knowing how to use a computer—called **computer literacy** (or information literacy)—can mean the dif ference between being employed and being unemployed. Knowing how to use a computer can also open up myriad sources of information to those who have learned how to use the computer as a device to gather, store, organize, and otherwise process information. In fact, some fear that the information age will not provide the same advantages to “information haves”—those computer-literate individuals who have unlimited access to information—and “information have-nots”—those with limited or no computer access or skills.

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FIGURE 1.5 

Computers are used in countless

types of jobs and industries,

including the medical field.

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The first computer-related occupations have evolved as computers became more sophisticated

and more widely used. Where once we thought of computer workers as primarily programmers,

data entry clerks, systems analysts, or computer repairpersons, today many more job categories in

virtually all industries, from accounting to the medical field (see Figure 1.5), involve the use of

computers. In fact, today there are few occupations where computers are not somehow in use.

Computers manage air traffic, perform medical tests, monitor investment portfolios, control con

struction machinery, and more. Since they are especially adept at processing large amounts of data,

they are used extensively by universities and public schools, in businesses of all sizes, and in all

levels and departments of government. Engineers, architects, interior designers, and artists use spe

cial purpose computer-aided design programs. Musicians play computerized instruments, and they

write and record songs with the help of computers. Not only do we use computers at work, we also

use them in our personal lives. We teach our children on them, manage our finances, do our taxes,

compose letters and term papers, create greeting cards, send and receive electronic mail, surf the

Internet, purchase products, and play games on them. With the increasing use of computers in all

areas of society, many argue that being computer literate—knowing how to use a computer and

use certain applications—is not sufficient in today’s world; rather, **computer fluency**—the ability

to independently learn new technologies as they emerge and assess their impact on your work and

life—is what will set you apart in the future.

Today, in most developed societies, information technologies have become pervasive—

information technologies are in fact used throughout society (see the end of this chapter for a dis

cussion of issues surrounding the digital divide). The development of sophisticated Web

technologies has brought about a fundamental shift in types of information technologies that are

being used; whereas traditionally each user would install applications for various tasks—from

composing documents to listening to music—on his or her computer, Web technologies enable

using the Internet as the platform for applications, a phenomenon termed Web 2.0. Now, much of

the functionality previously offered by applications installed on a computer is offered by appli

cations “in the cloud,” accessed via your Web browser. In fact, many regard **cloud computing** as

the beginning of the “fourth wave,” where not only the applications but also the data reside in the

cloud, to be accessed anytime from anywhere. A good example of cloud computing are various

services offered by Google, such as Gmail (e-mail), Google docs (word processing), or Google

Calendar, all of which are accessed via a Web browser, freeing users from the task of installing

or updating traditional desktop applications or worrying about storing or backing up data.

In addition to changing the way people work and interact, information technology has also

enabled *globalization,* the integration of economies throughout the world, fundamentally chang

ing how not only people but also organizations and countries interact. In the next section, we

examine the evolution of globalization and the effects on our daily lives.

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FIGURE 1.6

Visible economic, cultural, and technological changes are fueled by globalization.

Economic Changes Technological Changes **Globalization **

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~~Cultural Changes~~

Evolution of Globalization

You can see the effects of globalization in many ways, such as the greater international movement of commodities, money, information, and labor, as well as the development of technologies, standards, and processes to facilitate this movement (see Figure 1.6). Specifically, a more global and competi tive world includes visible economic, cultural, and technological changes, including the following:

***Economic Changes.*** Increases in international trade, in the development of global financial systems and currency, and in the outsourcing of labor

***Cultural Changes.*** Increases in the availability of multiculturalism through television and movies; the frequency of international travel and tourism, and immigration; the availability of ethnic foods and restaurants; and the frequency of worldwide fads and phenomena such as Facebook, FarmVille, Twitter, and YouTube

***Technological Changes.*** The development of low-cost computing platforms and communi cation technologies; the availability of low-cost communication systems such as e-mail, Skype, and instant messaging; the ubiquitous nature of a low-cost global telecommunications infrastructure like the Internet; and the enforcement of global patent and copyright laws to spur further innovation

Through the convergence of economics and culture, fueled by a robust global technology in frastructure, the world has forever changed.

Over the past centuries, **globalization**—the integration of economies throughout the world, enabled by innovation and technological progress (International Monetary Fund, 2002)—has come a long way, from separate nation-states on different continents to what we see today, a world where people and companies can enjoy worldwide communication and collaboration, with fewer and fewer barriers. In his book *The World Is Flat*, *New York Times* foreign affairs columnist Thomas L. Friedman has characterized the evolution of globalization as having three distinct phases (see Figure 1.7), differing in the focal point and primary drivers of this evolution (see Table 1.1 for an overview of each phase). While it had taken humankind thousands of years to discover that the world is round, Friedman argues that forces of globalization are now creating a “flat,” level playing field such that competitors in many areas of the world now have equal opportunities to access the global marketplace. As technologies have evolved and diffused broadly throughout the world, the pace and scope of globalization have accelerated. Next, we examine this evolution.

Globalization 1.0

The first stage, termed **Globalization 1.0** by Friedman, began in the late fifteenth century and ended about 1800. During those times, for example, India was famous for its wealth of spices and other goods; however, getting there by traveling east was very cumbersome and dangerous, as no sea route had been discovered until the end of the fifteenth century. Even then, sailing to India going east included circumnavigating the entire continent of Africa, including a dangerous passage around the Cape of Good Hope (South Africa). When Christopher Columbus set sail in

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**Globalization 1.0 Globalization 2.0 Globalization 3.0 **

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**1492 1800 2000**

Medium-Sized World Small-Sized World Tiny-Sized World

August 1492 to discover a westward route to India, he was convinced, contrary to popular belief at that time, that the earth was round. However, instead of discovering a new route to India, he discovered the Americas, opening up new areas for discovery and new sources for resources.

During Globalization 1.0, mainly European countries were globalizing, attempting to extend their territories into the New World. Power—from domesticated horses (for transportation and agriculture), wind (for grinding grain and sailing), and, in the late stages, steam (then used pri marily for mining)—was the primary driver of this stage of globalization. Collectively, this evo lution brought continents closer together, shrinking the world “from size large to size medium.” During those times, industries changed slowly, and any change took generations. While many in dustries (such as the apparel industry) changed, most people didn’t notice how it affected their lives because of the slow pace of change.

Globalization 2.0

In 1800, **Globalization 2.0** started, lasting until 2000 (being interrupted only by the Great Depression and the two world wars). During Globalization 2.0, the world shrunk from “size medium to size small,” as companies (rather than just countries) started to globalize. While peo ple were constantly innovating, changes still took quite some time. For example, it took more than a generation before people felt the effects of the industrial revolution. In the early stages of Globalization 2.0, the steam engine led to falling costs for the transportation of goods, both on land using railroads and on sea using steamships. Technological innovations such as the telegraph and, later, telephones, PCs, satellites, and early forms of the Internet tremendously reduced telecommunication costs. The reduction of transportation and telecommunication costs spurred a growing market for products and labor. However, it was still mainly Americans and Europeans driving globalization.

TABLE 1.1 **Phases of Globalization**

FIGURE 1.7

Evolution of globalization.

Globalization

Phase Time

Primary Entities

Globalizing Regions Globalizing

1.0 1492–1800 Countries Europe and America 2.0 1800–2000 Companies Europe and America 3.0 2000–now Individuals and small groups Worldwide

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NET STATS 

Worldwide Internet Usage

**I**n January 2010, 14.4 percent of the world’s active Internet users were located in North America. As the rest of the world is getting online, this is about half of the nearly 30 percent share of 2004. Overall, it was estimated that there were over 1.8 billion active Internet users worldwide in early 2010: over 764 million users in Asia, 425 million in Europe, and 259 million in North America (about 220 million active users in the United States alone) (see Table 1.2). The Internet is most heavily used in North America, with 76.2 percent of the total population going online; Africa has the lowest penetration

TABLE 1.2 **World Internet Usage Estimates**

(percentage of a region’s population using the Internet) with 8.7 percent. China has the most users with 384 million, fol lowed by the United States. As the world continues to embrace the Internet, it is inevitable that the U.S. proportion will con tinue to get smaller. What do you think these statistics will look like in 10 years? In 20 years?

Based on:

Anonymous. (n.d.). World Internet usage statistics. Retrieved May 20, 2010, from http://www.internetworldstats.com/stats.htm.

World Regions

Population

(2009 estimates)

Internet Usage, Estimate

% Population

(penetration) Usage (% of world)

Africa/Middle East 1.1 billion 144 million 13.1% 8.0% Asia 3.8 billion 764 million 20.1% 42.4% Europe 800 million 426 million 53.2% 23.6% North America 341 million 260 million 76.2% 14.4% Latin America/Caribbean 587 million 187 million 31.8% 10.4% Oceania/Australia 35 million 21 million 60.0% 1.2% World total 6.7 billion 1.8 billion 26.9% 100.0%

Note: Internet usage and world population statistics were updated for December 31, 2009.

Source: Based on http://www.internetworldstats.com/stats.htm.

Globalization 3.0

Around 2000, **Globalization 3.0** began, with individuals and small groups from virtually every nation joining the globalization movement, shrinking the world from “size small to size tiny.” Not only did the world shrink, but this shrinking brought with it an even faster pace of change. Peo

ple now feel the effects of industry changes within decades, and new industries have emerged that no one would have imagined only a few decades ago. For example, Google, the company that now dominates the search engine market and is one of the world’s largest companies, was only incorporated in 1998. In the next sections, we discuss the factors enabling Globalization 3.0 and how these factors have forever transformed the world.

Key Factors Enabling Globalization 3.0 In the last decade of the twentieth century, a num

ber of technological and societal changes took place, ushering in Globalization 3.0. In his book, Friedman provides a list of 10 forces enabling the transition from Globalization 2.0 to Globaliza tion 3.0. While the list of enablers could be extended almost endlessly (or be debated as to their ultimate significance), we focus on those discussed by Friedman given their broad popularity.

*Enabler 1: November 9, 1989—The Fall of the Berlin Wall.* The fall of the Berlin Wall marked the end of the Cold War between communist and capitalist countries and the breakup of the Eastern bloc, freeing millions of people. At once, people in many former communist coun tries could enjoy greater freedoms. For many companies, this meant a tremendous increase in po tential customers as well as access to a huge, talented labor pool in the former Eastern bloc countries. Around the same time, Microsoft released the first version of the Windows operating

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FIGURE 1.8 

The Netscape browser was a

cornerstone in giving individuals

easy access to the Internet.

Source: © Netscape Communications

Corporation. Used with permissions.

system, which over time became the de facto world standard in PC operating systems, enabling

people from all over the world to use a common computing platform.

*Enabler 2: August 9, 1995—The Release of the Netscape Web Browser.* The second big

flattener was the Internet browser—the “killer app” that enabled everyone who had a computer

and a modem to view Web pages (see Figure 1.8). A company called Netscape released the first

mainstream Web browser in 1994 and went public on August 9, 1995. In addition to opening up

the possibilities of the Internet for the general public, Netscape helped set a standard for the

transport and display of data that other companies and individuals could build on, making the

Internet even easier to use and more powerful than ever.

In the final years of Globalization 2.0, companies supplying the network infrastructure saw

the need to provide more and faster connections, leading to a tremendous *overinvestment* in

telecommunications infrastructure, such as fiber-optic cable, which is used to transmit very large

amounts of data at the speed of light. With the bursting of the dot-com bubble, the plummeting

demand for telecommunications infrastructure (that had been installed just a few years before)

led to an oversupply, causing infrastructure providers to fail; and much of the infrastructure had

to be sold for a fraction of the cost. The most notable long-term consequence was falling telecom

munications costs, enabling the collaboration of individuals and small groups that we see today.

*Enabler 3: Work Flow Software.* What Friedman broadly calls **work flow software** is a variety

of software applications that allow for software-to-software interaction. Whereas the Netscape

browser enabled people to access the Internet, other standards allowed different companies all over

the world to communicate seamlessly. For example, eXtensible Markup Language (see Chapter 8,

“Improving Supply Chains and Strengthening Customer Relationships Using Enterprise Information

Systems”) enabled computer programs to “talk” to other programs so that, for example, a computer

in an automobile manufacturing plant could automatically order a new shipment of windshield wipers

from a supplier once the inventory fell to a certain level. This and a variety of other transactions could

be handled without human intervention, thanks to standards allowing different computers from dif

ferent computer manufacturers to communicate even though running different operating systems.

*Enabler 4: Uploading.* The fourth enabler of Globalization 3.0 Friedman calls **uploading,** or

the ability of individuals and companies to actively participate in content generation on the Web,

enabling everyone to be a producer of information instead of merely a consumer. This enabler en

compasses open source software, wikis, and blogs (see Chapter 5, “Enhancing Collaboration

Using Web 2.0,” for a more detailed discussion of these Web 2.0 tools).

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TABLE 1.3 **Outsourcing, Offshoring, and Offshore Outsourcing**

Concept Description Example

Outsourcing Business processes performed by another company Payroll processing by a specialized provider, such as ADP

Offshoring Business processes performed in-house but in a different country

Boeing having aircraft design work performed at a Boeing design center in Moscow, Russia

Offshore

outsourcing

Business processes performed by another company in a different country

A U.S. company having software developed by an Indian software firm such as Wipro

The ability to upload has been a catalyst for the growing popularity of open source software

products such as the Linux operating system, the Firefox Web browser, or the OpenOffice.org Pro

ductivity Suite. Another example of uploading is the successful online encyclopedia *Wikipedia,* the

content of which can be created and updated by anyone with an Internet connection. The term **wiki**

refers to Web sites allowing users to add, remove, or edit content and is now often used synony

mously with open source dictionaries. Within a wiki community like Wikipedia, there is a huge

number of people throughout the world reviewing all recent additions and edits; flaws in the con

tent are usually quickly detected and fixed.

*Enabler 5: Outsourcing.* **Outsourcing** is the moving of business processes or tasks (such as

accounting or security) to another company (outsourcing is discussed in detail shortly). The

tremendous decrease in communication costs has added another dimension to outsourcing, as

now companies can outsource business processes on a global scale (also referred to as **offshore**

**outsourcing**). For example, companies commonly outsource customer service functions (such as

call centers) or accounting to companies specializing in that service. Often, companies located in

countries such as India can provide these services much cheaper because of lower labor costs.

*Enabler 6: Offshoring.* As opposed to outsourcing, **offshoring** refers to having certain functions

performed by the same company but in a different country (see Table 1.3). For example, aircraft

manufacturer Boeing offshored design work (such as computational fluid dynamics) for its new 787

Dreamliner aircraft to Russia, making use of the availability of highly skilled aeronautical engineers.

When China officially joined the World Trade Organization in 2001, it agreed to follow cer

tain accepted standards of trade and fair business practices. Now, instead of just offshoring pro

duction to Mexico or Canada, companies set up entire factories in emerging countries in order to

mass-produce goods at a fraction of the price it would cost to produce these goods in the United

States, Canada, or even in Mexico (see Figure 1.9).

FIGURE 1.9 

Companies are offshoring

production to overseas countries

(such as China) to utilize talented

workers or reduce costs.

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*Enabler 7: Supply Chaining.* Supply chaining refers to the use of information systems to

tightly integrate retailers, their suppliers, and their customers. One of the best-known exam

ples is the supply chain of the giant retailer Walmart. Walmart leverages the other enablers to

create a seamless supply chain (see Chapter 7) to get the goods from the manufacturers to the

customers. Not only does Walmart receive the information about its stores’ sales, but it also

transmits this vital data to the manufacturers so that they can anticipate when the next

shipment is needed, how their products sell, and what products may need improvement to

increase sales.

*Enabler 8: In-Sourcing.* The eighth major enabler is **in-sourcing,** which refers to the delega

tion of a company’s logistics operations to a subcontractor that specializes in that operation, or to

transferring a previously outsourced function to an in-house department. For example, United

Parcel Service (UPS) is becoming a leading in-sourcing provider. In addition to providing their

traditional service offering of delivering packages to worldwide destinations, UPS started offer

ing complete supply chain solutions to companies. Traditionally, online retailers, such as Nike

.com, would handle all online customer orders themselves. However, through an in-sourcing

arrangement, UPS manages Nike’s warehouse and handles product packing and shipping as well

as payment collection from customers so that Nike can concentrate on its core competencies, such

as the design of new athletic shoes.

*Enabler 9: In-Forming.* For the individual, **in-forming** allows individuals to utilize powerful

search engines on the Internet, such as Google, Yahoo!, or Bing, to build their “own personal sup

ply chain of information, knowledge, and entertainment” (Friedman, 2007, p. 178).

*Enabler 10: The Steroids.* The last group of enablers, which Friedman (2007) calls

“the steroids,” are technologies that make different forms of collaboration “digital, mobile,

virtual, and personal” (p. 187). This group of technologies amplifies all the enablers discussed

previously. By digitizing content—books, music, photographs, or virtually any business

document—people can collaborate easier than ever before, benefiting from lightning-fast

transmission of information. Similarly, the collaboration becomes virtual in that people using

these technologies never have to think about the underlying standards or technologies en

abling the collaboration; greater mobility enables collaboration from a wide variety of loca

tions without being tied to one’s office or desk. Finally, certain enablers, such as in-forming,

are available to everyone with an Internet connection, making the new forms of collaboration

very personal.

Triple Convergence Although any one of these enablers may be powerful alone, it’s their

*convergence* that makes Globalization 3.0 possible; Friedman refers to this as a “triple conver

gence.” First, between 2000 and 2003, the enablers started working together, making new forms

of collaboration possible, such as the sharing of knowledge and work without regard to distance

or geography and soon even language. Second, this convergence enabled the move from vertical

to horizontal collaboration, facilitating value creation and innovation. For example, employees

of a global organization represent a vast global pool of specialists that can be assembled (and

disassembled) as needed. Finally, people from countries such as China, India, or the former

Soviet Union could enter the playing field and connect and collaborate with others all over the

world, enabling more people than ever to participate in new forms of collaboration. However, dif

ferent countries and regions are at various stages of participation in the global village, so clearly

we are only at the *beginning* of Globalization 3.0—the deep and pervasive impacts of this phase

are in their infancy.

The Rise of Outsourcing

Many organizations that are **downsizing**, or rightsizing as some call it, are looking for ways to

streamline business functions and, in some cases, to slash costs and replace people. Often, these

organizations try to use the IS function and technology as the lever for simultaneously shrinking

the organization by reducing personnel head count and making the organization more produc

tive (i.e., doing more with less). Although this approach may not be fair for the people who lose

their jobs, many firms are forced to do this to remain competitive and, in some cases, to continue

to exist.

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COMING ATTRACTIONS 

Real-Time Language Translation

**I**f you ever watched *Star Trek*, you may have wished for a uni versal language translator as used in the movie. In reality, such a universal language translator maybe is not so far away from us. In July 2009, Sakhr Software and Dial Directions intro duced a new iPhone app designed to translate Arabic speech into English and vice versa. This application promises to be extremely useful for diplomats, aid workers, and troops who don’t speak Arabic.

The application works just like Google’s iPhone app. You simply hold down a button and speak aloud a sentence in English or Arabic. The software then beams a resulting voice sample to an online application, where voice recognition al gorithms parse digital data into raw text. The online applica tion then returns the translation, which can be read or played back on your device.

More recently, the search giant Google told the British daily *The Times* that they are working on a new translation technology that can convert spoken words into a different language in real time. The idea behind this application is to allow users to easily communicate in other languages using a

smart phone. Using Google Translate technology, along with the voice recognition system used within Android smart phones, the system will “listen” to the speaker until it under stands the full meaning of the words/phrases being spoken. Once translated by Google’s servers, the system sends a voice translation to the person at the other end of the line. According to Google, the technology could be ready within a few years.

Despite “huge progress recently,” it’s still difficult to rec ognize various accents, explained Franz Och, Google’s head of translation services. Google aims to solve this problem by having the software learn the users’ style of talking.

Based on:

Ionescu, D. (2010, February 8). Google’s next venture: Universal transla tor. *PC World.* Retrieved March 20, 2010, from http://www.pcworld .com/article/188777/googles\_next\_venture\_universal\_translator.html.

Zibreg, C. (2009, July 2). The future is now: Star Trek-like language translator debuts on the iPhone. *geek.com*. Retrieved March 20, 2010, from http://www.geek.com/articles/mobile/the-future-is-now-star-trek like-language-translator-debuts-on-the-iphone-2009072.

Similarly, as discussed previously, one phenomenon that has seen a huge increase because of the decrease in telecommunication costs is *outsourcing,* both onshore (domestically) and off shore. Traditionally, organizations (domestically) outsourced many of the more routine jobs or entire business functions, such as accounting, to other companies. In 2008, the global market for outsourcing was $326 billion, and was projected to be worth more than $412 billion by the end of 2010. Companies are choosing to outsource business activities for a variety of reasons; the most important reasons include the following (King, 2003):

To reduce or control costs

To free up internal resources

To gain access to world-class capabilities

To increase revenue potential of the organization

To reduce time to market

To increase process efficiencies

To be able to focus on core activities

To compensate for a lack of specific capabilities or skills

Early examples of offshore outsourcing included the manufacturing of goods in countries such as Mexico to take advantage of lower wages and less stringent regulations. Then, in the years leading to Globalization 3.0, companies started to introduce offshore outsourcing of *services,* starting with the development of computer software and the staffing of customer support and tele marketing call centers. Today, a wide variety of services—ranging from telephone support to tax returns—are candidates for offshore outsourcing to different countries, be it Ireland, China, or India. Even highly specialized services, such as reading X-rays by skilled radiologists, are out sourced by U.S. hospitals to doctors around the globe, often while doctors in the United States are sleeping. However, companies operating in the digital world have to carefully choose offshore

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outsourcing locations, considering factors such as English proficiency, salaries, or geopolitical

risk. While countries such as India remain popular for offshore outsourcing, other formerly pop

ular countries (such as Singapore, Canada, or Ireland) are declining because of rising salaries.

With these shifts, outsourcers are constantly looking at nascent and emerging countries such as

Bulgaria, Egypt, Ghana, or Vietnam, each of which has some particular benefits to offer (see

Table 1.4). Obviously, organizations have to weigh the potential benefits (e.g., cost savings)

and drawbacks (e.g., higher geopolitical risk or less experience) of offshore outsourcing to a

particular country.

Fueled by Globalization 2.0 and 3.0, outsourcing is now a fact of life, and no matter which

industry you’re in, you will likely feel the effects of outsourcing (see Table 1.5). With Globaliza

tion 3.0, individuals will have to ask themselves how they can seize the global opportunities and

how they will be able to compete with individuals from all over the world who might be able to

do their job at the same quality but at a lower cost.

TABLE 1.4 **Popular Offshore Outsourcing Destinations**

Yearly

Entry-Level

Country Ranking Asia

English

Proficiency

Programmer Salary

(in U.S. $1,000)

Relative

Geopolitical Risk

India Leading Very good 5–10 Moderate China Up and coming Poor 5–10 Moderate Malaysia Up and coming Fair 10–15 Moderate Philippines Up and coming Very good 5–10 High

Vietnam Nascent Fair 5 Moderate Thailand Nascent Poor 5–10 Moderate Singapore Declining Fair 15–20 Low

Europe

Czech Republic Up and coming Good 10–15 Moderate Poland Up and coming Good 10–15 Moderate Hungary Up and coming Poor 10–15 Moderate Russia Up and coming Poor 10–15 Moderate Romania Emerging Good 5–10 Moderate Bulgaria Emerging Fair 5–10 Moderate Ukraine Emerging Poor 5–10 Moderate Ireland Declining Excellent 20 Low

Middle East

Egypt Emerging Very good 5 High Israel Declining Very good 15–20 Moderate

Africa

South Africa Challenging Very good 10–15 Moderate Ghana Nascent Very good 5–10 High

The Americas

Mexico Up and coming Poor 10–15 Moderate Costa Rica Emerging Very good 10–15 Moderate Brazil Emerging Poor 5–10 High Argentina Nascent Fair 5–10 Moderate Canada Declining Excellent 20 Low

Source: Based on Overby (2006).

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TABLE 1.5 **Examples of Offshoring and Offshore Outsourcing**

Industry Examples

Airlines British Airways moves customer relations and passenger revenue accounting to India.

Offshoring/Offshore Outsourcing

Offshoring

Delta outsources reservation functions to India. Offshore outsourcing

Airplane design Parts of Airbus and Boeing airplanes are designed and engineered in Moscow, Russia.

Offshoring

Consulting McKinsey moves global research division to India. Offshoring Ernst & Young moves part of its tax preparation to India. Offshoring Insurance British firm Prudential PLC moves call center operations to India. Offshoring Investment banking J.P. Morgan moves investment research to India. Offshoring Retail banking Worldwide banking group HSBC moves back-office operations to India. Offshoring Credit card operations American Express moves a variety of services to India. Offshoring

Government The Greater London Authority outsources the development of a road toll system to India.

Telecommunications T-mobile outsources part of its content development and portal configuration to India.

Source: Based on http://www.ebstrategy.com (2006).

Offshore outsourcing Offshore outsourcing

However, offshore outsourcing does not always prove to be the best approach for an organi zation. For example, only about a decade ago, German companies manufacturing highly special ized products such as large crankshafts, ship cranes, or road-paving equipment offshored parts of their operations to Eastern European countries in order to cut costs. However, the cost savings have turned out to be negligible because of added overhead, such as customs, shipping, or train ing, and quality problems ran rampant, leading to a reversal of this trend. Today, many compa nies are moving production back to Germany in order to better control production quality and costs. Similarly, *InformationWeek,* a leading publication targeting business IT users, found that 20 percent of the 500 most innovative companies in terms of using IT took back previously off shored projects. Another recent trend is **nearshoring**—the use of locations closer to the home country in terms of geographical, political, linguistic, economic, or cultural distance. Nearshoring is thus the reversal of offshoring, such that, for example, U.S. companies move work from India back to Mexico or British Columbia in order to address some of the challenges asso ciated with overseas offshoring destinations. Similarly, the noted technology author Nicholas Carr recently suggested that cloud computing may contribute to a decline in outsourcing; because much of an IT outsourcer’s business is built around managing complex internal systems, a shift to a simpler cloud-based IT infrastructure (see Chapter 3, “Managing the Information Systems Infrastructure and Services”) should reduce the need for outsourcers.

The next sections will outline some opportunities made possible by increasing globalization.

Opportunities of Operating in the Digital World

Clearly, globalization has opened up many opportunities, brought about by falling transpor tation and telecommunication costs. Today, shipping a bottle of wine from Australia to Europe merely costs a few cents, and using the Internet, people can make PC-to-PC phone calls around the globe for free. To a large extent fueled by television and other forms of media, the increas ing globalization has moved cultures closer together—to the point where people now talk about a “global village.” Customers in all corners of the world can receive television programming from other countries or watch movies produced in Hollywood, Munich, or Mumbai (sometimes called “Bollywood”), helping to create a shared understanding about forms of behavior or inter action, desirable goods or services, or even forms of government. Over the past decades, the world has seen a democratization of many nations, enabling millions of people to enjoy free doms they had never experienced before. All this makes operating in the digital world much easier than ever before.

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Opportunities for Reaching New Markets After the fall of communism, new markets

opened up for countless companies. The fall of communism in Eastern bloc countries such as

Poland, Romania, and the former Soviet Union enabled the sales of products to literally millions

of new customers.

Opportunities of a Global Workforce With the decrease in communication costs, compa

nies can now draw on a large pool of skilled professionals from all over the globe. Many coun

tries, such as Russia, China, and India, offer high-quality education, leading to an ample supply

of well-trained people at low cost. While enrollment in the sciences or engineering is dropping

in the United States, other countries are producing engineering graduates at an unprecedented

pace (Mallaby, 2006). In 2005, for example, 200,000 young engineers graduated from Indian

universities, while the United States produced only about a third as many; likewise, Europe

produced only about half the number of India. Some countries are actively building entire

industries around certain competencies, such as software development or tax preparation in

India and call centers in Ireland. For companies operating in the digital world, this can be a

huge opportunity, as they can “shop” for qualified, low-cost labor all over the world. On the

other hand, the consulting company McKinsey believes that out of the 2.5 million Indian

university graduates, only 10 to 25 percent (depending on the field of study) are considered

employable by multinational companies, mainly because of differences in the quality of the

education and the differences in language skills (Farrell, Kaka, & Stürze, 2005).

Challenges of Operating in the Digital World

The factors discussed in this section translate into a number of direct opportunities for compa

nies, including greater and larger markets to sell products and larger pools of qualified labor.

Nevertheless, while globalization has brought tremendous opportunities to companies, they also

face a number of daunting challenges when operating in the global marketplace.

Traditionally, companies acquired resources and produced and sold goods or services all

within the same country. Such domestic businesses did not have to deal with any challenges posed

by globalization but also could not leverage the host of opportunities. The challenges faced can

be broadly classified into governmental, geoeconomic, and cultural challenges. See Table 1.6 for

a summary of the challenges of operating in the digital world.

TABLE 1.6 **Challenges of Operating in the Digital World**

Broad Challenges Specific Challenges Examples

Governmental Political system Market versus planned economy; political instability Regulatory Taxes and tariffs; embargoes; import and export regulations Data sharing European Union Data Protection Directive

Standards Differences in measurement units, bar code standards, address conventions, academic degrees, and so on

Internet access and individual freedom Internet censorship in various countries

Geoeconomic Time zone differences Videoconferences across different time zones Infrastructure-related reliability Differences in network infrastructures throughout the world Differences in welfare Migration and political instability caused by welfare differences between rich and poor countries

Demographic Aging population in the United States and Western Europe; younger workforce in other countries

Expertise Availability of labor force and salary differences

Cultural Working with different cultures Differences in power distance, uncertainty avoidance, individualism/collectivism, masculinity/femininity, concept of

time, and life focus; differences in languages, perceptions of

aesthetics, beliefs, attitudes, religion, or social organizations

Challenges of offering products or services in different cultures

Naming and advertising for products; intellectual property

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ETHICAL DILEMMA 

Online Rights Not Always Universal

**A**merican Internet users have been fortunate in that online content is not censored, and U.S.-based bloggers, journalists, and e-mailers are generally not subject to government intru sion or harassment. As the world becomes flatter, however, and the Internet becomes available to users in diverse coun tries, the question of who owns and/or controls Web-published data becomes an issue.

China has often been in the news for alleged violations of human rights. Since American companies have provided soft ware and hardware for China’s Internet infrastructure, the question arises, When China restricts online rights for its citi zens, should U.S. companies providing services be coopera tive? Consider the following:

• U.S.-based Cisco built the entire Chinese Internet infra structure and allegedly agreed to supply equipment that allows the Chinese government to monitor Internet users.

• Chinese Internet users use Microsoft’s blog tool, Win dows Live Spaces. Microsoft censors the Chinese version of its software using a blacklist supplied by Beijing. Among words that will be automatically rejected by the Chinese system are “democracy” and “capitalism.”

• In order to do business in China, in 2004 Google agreed to censor “subversive” articles from Google News China or from their search results.

• In 2005, Yahoo! was said to have aided the conviction of a Chinese journalist, Shi Tao, when employees of Yahoo!’s China office supplied details about Shi’s e-mail address to local authorities. Mr. Shi, one of five journalists whose convictions for “revealing state secrets” Yahoo! allegedly aided, is currently serving a 10-year prison term in China.

• During the 2008 Olympic Games in Beijing, journalists were initially unable to access Web sites such as www .amnesty.org (the restrictions were later lessened after international protests).

• In 2009, to control news about an ethnic clash, China temporally blocked many social networking Web sites, such as Facebook, YouTube, and Twitter.

Similar to Mr. Shi’s situation, a Chinese journalist in Beijing recently posted content that, although probably factually cor rect, was deemed inappropriate by the Chinese government. The government then requested that Microsoft shut down the blog, and Microsoft complied. The Chinese government monitors all online activity, shutting down “dissident” Web sites and deleting “subversive” postings. Since Chinese bloggers

often write under pseudonyms, the Chinese government has recently asked Internet access provider firms to reveal the iden tities of bloggers who post “inappropriate” content. As a result, several Chinese bloggers have been arrested and sentenced to lengthy jail terms after their identities were revealed.

*Reporters Without Borders* and other critics have called such censorship agreements unethical. Cisco, Microsoft, Google, and Yahoo! have replied that they are simply follow ing local laws. Opponents argue, however, that online prod uct and service providers based outside of China should not assist the Chinese government in its campaign against Inter net users’ online rights.

In reference to the company’s involvement in Shi Tao’s con viction and sentencing, Yahoo! twice faced congressional hearings and was denounced by human rights organizations and others in support of Shi Tao. Consequently, in 2007 Yahoo! settled a legal complaint filed by Shi’s family for an undisclosed amount, and Yahoo! CEO Jerry Yang made a pub lic apology to Shi’s mother at a congressional hearing. In addi tion, Yahoo! established a Human Rights Fund to “provide humanitarian and legal assistance to persons in the People’s Republic of China who have been imprisoned or persecuted for expressing their views using the Internet.”

For human rights activists, the major issue is that Ameri can companies, such as Microsoft, Google, and Yahoo!, that profess to value free speech are acting unethically when they cooperate with governments that curtail Internet users’ rights to freedom of expression. The fact that Article 19 of the Universal Declaration of Human Rights supports freedom of expression lends legitimacy to this argument.

In 2010, Google decided to stop censoring its search results after it was hacked by people who tried to spy on Chinese dis sidents’ e-mail, eventually redirecting all Chinese-based searches through servers located in Hong Kong. However, Google’s de cision got mixed responses from other companies. For instance, Microsoft, which is also promoting its search engine Bing, said they’ll stay in China; domain registrar GoDaddy.com, in contrast, sided with Google and stopped registering domain names in China.

Another question that arises in such situations is, Who owns Web-posted data? Since the data is often not physically present in the local country supplying Internet access, do the local authorities have the right to censor the data? (Local authorities would probably argue that the impact of the content posted online is felt locally.) Do local authorities have

a right to regulate online content when Internet access is hosted by companies located outside a country? Most important, is the online environment independent of the digital world we live in, or is it subject to all the rules and regulations of countries the Internet passes through? Should the Internet adapt its own laws that all hosting com panies must follow?

These are questions that will need to be answered in the twenty-first century as the world gets smaller and the Inter net becomes an integral service in all countries.

Based on:

Barboza, D., & Zellar, T., Jr. (2006, January 8). Microsoft’s shutdown of Chinese blog is condemned. *International Herald Tribune.* April 10,

Information Systems Defined

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2010, from http://www.iht.com/articles/2006/01/06/technology/web .0107msft.php.

Cohen, R. (2010, March 30). Google’s lonely stand for human rights in China. *Washington Post.* Retrieved April 10, 2010, from http://www .washingtonpost.com/wp-dyn/content/article/2010/03/29/ AR2010032901890.html.

Jacobs, A. (2010, March 30). Journalists’ e-mails hacked in China. *New York Times.* Retrieved April 10, 2010, from http://www.nytimes.com/ 2010/03/31/world/asia/31china.html.

Johnson, B., Branigan, T., & Nasaw. D. (2010, March 25). We’re staying in China, says Microsoft, as free speech row with Google grows. *Guardian.* Retrieved April 10, 2010, from http://www.guardian .co.uk/technology/2010/mar/25/china-microsoft-free-speech-google.

McKinnon, R. (2008, April). Asia’s fight for web rights. *Far Eastern Economic Review.* Retrieved April 10, 2010, from http://feer.com/essays/ 2008/april/asias-fight-for-web-rights.

**Information systems** are combinations of **hardware, software,** and **telecommunications net works** that *people* build and use to collect, create, and distribute useful *data*, typically in organi zational settings. Hardware refers to physical computer equipment, such as the computer monitor, central processing unit, or keyboard. Software refers to a program or set of programs that tell the computer to perform certain tasks. Telecommunications networks refer to a group of two or more computer systems linked together with communications equipment. Although we discuss the de sign, implementation, use, and implications of hardware, software, and telecommunications throughout the chapters, the specifics on hardware, software, and telecommunications are dis cussed in detail in Chapter 3 and the Technology Briefing. Often, you will hear the term **information technology** used to refer to the hardware, software, and networking components of an information system; when looking at degree programs or job opportunities, you will find that IT programs or jobs are a bit more technical in nature, whereas IS programs have a stronger man agerial focus. However, the difference is shrinking, with many using the terms IS and IT synony mously. In Figure 1.10, we show the relationships among these IS components.

Telecommunications

People ~~Data~~



**Information**

**System**

****

****

Hardware Software

FIGURE 1.10

An information system is a combination of five key elements: people, hardware, software, data, and telecommunications networks.

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People in organizations use information systems to process sales transactions, manage loan

applications, or help financial analysts decide where, when, and how to invest. Product managers

also use them to help decide where, when, and how to market their products and related services,

and production managers use them to help decide when and how to manufacture products. Infor

mation systems also enable us to get cash from ATMs, communicate by live video with people in

other parts of the world, and buy concert or airline tickets. (Note that the term “information

systems” is also used to describe the field comprising people who develop, use, manage, and

study information systems in organizations.)

It is important to note that people use various terms to describe the field of information sys

tems, such as management information systems, business information systems, computer infor

mation systems, and simply “systems.” Next, we more thoroughly examine each of the key

components of the IS definition.

Data: The Root and Purpose of Information Systems

Earlier, we defined information systems as combinations of hardware, software, and telecommu

nications networks that people build and use to collect, create, and distribute useful data, typically

in organizational settings. We begin by talking about data, the most basic element of any infor

mation system.

Data Before you can understand how information systems work, it is important to distinguish

between data and information, terms that are often erroneously used interchangeably. **Data** is raw

material—recorded, unformatted information, such as words and numbers. Data has no meaning

in and of itself. For example, if we asked you what 465889727 meant or stood for, you could not

tell us (see Figure 1.11). However, if we presented the same data as 465-88-9727 and told you it

was located in a certain database, in John Doe’s file, in a field labeled “SSN,” you might rightly

surmise that the number was actually the Social Security number of someone named John Doe.

Information Data formatted with dashes or labels is more useful than unformatted data. By

adding context, it is transformed into **information,** which can be defined as a representation of

reality. In the previous example, 465-88-9727 was used to represent and identify an individual

person, John Doe (see Figure 1.11). Contextual cues, such as a label, are needed to turn data

into information that is familiar to the reader. Think about your experience with ATMs. A list

of all the transactions at a bank’s ATMs over the course of a month would be fairly useless data.

However, a table that divided ATM users into two categories, bank customers and non–bank

customers, and compared the two groups’ use of the machine—their purpose for using the

ATMs and the times and days on which they use them—would be incredibly useful informa

tion. A bank manager could use this information to create marketing mailings to attract new cus

tomers. Without information systems, it would be difficult to make data useful by turning it into

information.

Knowledge In addition to data and information, knowledge is also important. **Knowledge** is

the ability to understand information, form opinions, and make decisions or predictions based on

the information. For example, you must have knowledge to be aware that only one Social

FIGURE 1.11

Data, information, and knowledge.

**Data Information Knowledge**

465889727

465-88-9727 465-88-9727 John Doe

Unformatted Data

Meaning:

------------ ???

Formatted Data

Meaning: ------------ SSN

Data

Relationships

Meaning:

------------

SSN Unique Person

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Security number can uniquely identify each individual (see Figure 1.11). Knowledge is a body of

governing procedures, such as guidelines or rules, that are used to organize or manipulate data to

make it suitable for a given task.

Understanding the distinctions between data, information, and knowledge is important be

cause all are used in the study, development, and use of information systems.

Hardware, Software, and Telecommunications Networks:

The Components of Information Systems

When we use the term “information system,” we are talking about **computer-based informa**

**tion systems.** Remember that we defined an information system as a combination of hardware,

software, and telecommunications networks that people build and use to collect, create, and dis

tribute data. Ever since the dawn of mankind, there was a need to transform data into useful in

formation for people, and people have invented various calculating devices, such as the abacus

or the slide rule. Before the introduction of the first computers (which worked on a mechanical

basis using punch cards), almost all business and government information systems consisted of

file folders, filing cabinets, and document repositories. Computer hardware has replaced these

physical artifacts, providing the technologies to input and process data and output useful infor

mation; software enables organizations to utilize the hardware to execute their business

processes and competitive strategy by providing the computer hardware with instructions on

what processing functions to perform. Finally, the telecommunications networks allow comput

ers to share information and services, enabling the global collaboration, communication, and

commerce we see today.

People: The Builders and Managers of Information Systems

The IS field includes a vast collection of people who develop, maintain, manage, and study in

formation systems. The career opportunities for a person with IS training continue to be strong,

and they are expected to continue to improve over the next 10 years. For example, in 2008, the

U.S. Bureau of Labor Statistics predicted that employment for computer and IS managers will

grow faster than the average for all occupations through 2016. This boost in employment will

occur in nearly every industry, not just computer hardware and software companies, as more and

more organizations rely more heavily on IS professionals. Likewise, *Money* magazine (http://

money.cnn.com/magazines/moneymag/bestjobs) ranked “IT Project Manager” as one of its top

10 best jobs in America (see Table 1.7); also, *FastCompany* magazine (http://www.fastcompany

.com/articles/2009/01/top-jobs-2009.html) rated computer-related jobs as the second-best job,

stressing that the industry is looking for people who can balance business and technology.

TABLE 1.7 **Best Jobs in America**

Rank Career Job Growth (10-year forecast) Median Pay

1 Systems engineer 45% $87,100

2 Physician assistant 27% $90,900

3 College professor 23% $70,400

4 Nurse practitioner 23% $85,200

5 **IT project manager** 16% $98,700

6 Certified public accountant 18% $74,200

7 Physical therapist 27% $74,300

8 Computer/network security consultant

27% $99,700

9 Intelligence analyst 15% $82,500 10 Sales director 10% $140,000

Source: Based on http://money.cnn.com/magazines/moneymag/bestjobs.

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POWERFUL PARTNERSHIPS 

The Two Steves—Jobs and Wozniak

**S**teve Jobs, born in 1955, and Steve Wozniak, born in 1950—one of the most famous partnerships in the history of computing—combined their separate talents to form one of the most successful companies in information technology— Apple Computers (see Figure 1.12). The two actually knew each other in high school but renewed the friendship while Wozniak was working at Hewlett-Packard and Jobs took a summer job there. They visualized and designed the first marketable Apple computer (the Apple I), working first out of Jobs’s bedroom and then out of a garage, and founded a company to sell their invention in 1976. A third person, Ron Wayne, helped form the company. As Apple’s “adult-in chief,” Wayne’s role was to mediate disputes between the two Steves. However, not willing to take the risks of being involved in a startup, Wayne sold his 10% share and left the company after only 12 days, receiving a total of U.S.$2,300 in return. The partners realized early on that they could probably sell 1,000 computers a month, but as Wozniak recently wrote on his Web site, “That took a lot of money. We had none, so we went looking. We met Mark Markkula, and he launched us. I had to leave Hewlett Packard and that was tough.”

The infusion of much-needed capital came just in time for Jobs and Wozniak to enter their product in the first West

FIGURE 1.12

Steve Jobs (left) and Steve Wozniak (right) of Apple Computer in the 1980s.

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Coast Computer Faire. They rented a prime booth location and even managed to rent a video projector, a feat that Woz niak describes as follows: “This was such an early year that such projectors were virtually unknown. It was a BIG deal.” The partners’ professional business presentation at the Faire—far above other amateur efforts at the time—earned them several contracts for orders, and Apple Computers was off and running.

Both men left the company in 1985, less than 10 years after founding it. Wozniak left to return to college, where he finally received his engineering degree under the pseudonym Rocky Clark. Steve Jobs, who stayed with Apple, persuaded John Sculley, the former CEO of Pepsi, to come aboard as cap tain. Ironically, Jobs and Sculley did not get along, and Scul ley fired Jobs. Disillusioned, Jobs started his own company, called NeXT, which Apple eventually purchased, and in 1996 a wiser and less erratic Jobs again became Apple’s chief exec utive. (Jobs was also the CEO and major shareholder of Pixar Animation Studios until Walt Disney Studios acquired the company in 2006.)

While Jobs and Wozniak differed widely in personality type and management style, the partners’ abilities comple mented each other and were an asset to the company they founded. Jobs, somewhat flamboyant and intuitive in an ticipating which new concepts will capture consumers’ imaginations, is still Apple Computer’s CEO. Wozniak, a talented engineer, is more introverted and less willing than Jobs to assume center stage, although in 2009 he had an unsuccessful run on the television show *Dancing with the Stars.* “Woz” has founded several companies since leaving Apple, has taught children, and sponsors music festivals and charitable events. Furthermore, Wozniak is actually still on the payroll as an Apple employee. (He appreciates the 10 percent discount he gets when he buys Apple products.)

Many biographies have been written about the two Steves (*Inside Steve’s Brain* by Leander Kahney is a recent one about Jobs), and Wozniak has written his autobiogra phy, *iWoz.* The books offer firsthand accounts of the fabled partnership and glimpses into the creation of one of the world’s most successful computer companies. Ron Wayne’s share of the company would now be worth U.S.$2.2 billion.

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Based on:

Anonymous. (n.d.). Woz.org . . . Everyone is welcome. Retrieved April 16, 2010, from http://www.woz.org.

Bellis, M. (n.d.). Inventors of the modern computer: The invention of the Apple Macintosh—Apple Computers—Steve Jobs and Steve Wozniak. *About.com*. Retrieved April 16, 2010, from http://inventors .about.com/library/weekly/aa051599.htm.

Hoyer, S. (2007, May 14). Interview: Steve Wozniak. *Macnotes.de*. Retrieved April 16, 2010, from http://www.macnotes.de/2007/05/14/ interview-steve-wozniak-english-version.

Keizer, G. (2009, April 1). Dancing with the Stars dumps Wozniak. *Computerworld.* Retrieved April 16, 2010, from

http://www.computerworld.com/s/article/9130883/

\_i\_Dancing\_with\_the\_Stars\_i\_dumps\_Wozniak.

Newman, B. (2010, June 5). Apple’s lost founder: Jobs, Woz and Wayne. *San Jose Mercury News.* Retrieved July 26, 2010, from http://www.mercurynews.com/bay-area-news/ci\_15214122.

Steve Jobs. (2010, May 20). In *Wikipedia, the free encyclopedia*. Retrieved May 21, 2010, from http://en.wikipedia.org/w/index.php ?title Steve\_Jobs&oldid 363276938.

Steve Wozniak. (2010, May 20). In *Wikipedia, the free encyclopedia*. Retrieved May 21, 2010, from http://en.wikipedia.org/w/index.php ?title Steve\_Wozniak&oldid 363277720.

Finally, in 2010, *US News & World Report* selected being a systems analyst as one of its 50 best careers.

In addition to an ample supply of jobs, earnings for IS professionals will remain strong. According to the U.S. Bureau of Labor Statistics, median annual earnings of these managers in May 2009 were $113,720. The middle 50 percent earned between $89,240 and $143,590. Also, according to Salary.com, the median salary in 2009 for IT managers was $104,297. According to a 2010 survey by the National Association of Colleges and Employers, starting salary offers for IS majors, with one year or less of experience, averaged $54,038, making it one of the 10 top paid bachelor’s degrees. Finally, computer and IS managers, especially those at higher levels, of ten receive more employment-related benefits—such as expense accounts, stock option plans, and bonuses—than do nonmanagerial workers in their organizations.

Even with lower-level, highly technical jobs (such as systems programmers) being out sourced to organizations in other countries, there continues to be a very strong need for people with IS knowledge, skills, and abilities—in particular, people with advanced IS capabilities, as we describe here. In fact, IS careers are regularly selected as not only one of the fastest grow ing but also a career with far-above-average opportunities for greater personal growth, stability, and advancement. Although technology continues to become easier to use, there is still and is likely to continue to be an acute need for people within the organization to have the responsi bility of planning for, designing, developing, maintaining, and managing technologies. Much of this will happen within the business units and will be done by those with primarily business duties and tasks as opposed to systems duties and tasks. However, we are a long way from the day when technology is so easy to deploy that a need no longer exists for people with advanced IS knowledge and skills. In fact, many people believe that this day may never come. Although increasing numbers of people will incorporate systems responsibilities within their nonsystems jobs, there will continue to be a need for people with primarily systems responsibilities. In short, IS staffs and departments will likely continue to exist and play an important role in the foresee able future.

Given that information systems continue to be a critical tool for business success, it is not likely that IS departments will go away or even shrink significantly. Indeed, all projections are for long-term growth of information systems in both scale and scope. Also, as is the case in any area of business, those people who are continually learning, continuing to grow, and continuing to find new ways to add value and who have advanced and/or unique skills will always be sought after, whether in information systems or in any area of the firm.

The future opportunities in the IS field are likely to be found in a variety of areas, which is good news for everyone. Diversity in the technology area can embrace us all. It really does not matter much which area of information systems you choose to pursue—there will likely be a promising future there for you. Even if your career interests are outside information systems, being a well-informed and capable user of information technologies will greatly enhance your career prospects.

Careers in Information Systems The field of information systems includes those people in organizations who design and build systems, those who use these systems, and those responsible

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TABLE 1.8 **Some IS Management Job Titles and Brief Job Descriptions**

IS Activities Job Title Job Description

Develop Systems analyst Responsible for analyzing business requirements and selecting information systems that meet those needs

Salary Ranges in

Percentiles (25%–75%) $54,000–$87,000

Programmer Responsible for coding, testing, debugging, and installing programs $50,000–$80,000

Systems consultant

Provide IS knowledge to external clients $80,000–$120,000

Maintain IS auditor Responsible for auditing information systems and operating procedures for compliance with internal and external standards

$45,000–$75,000

Database

administrator

Responsible for managing database and database management software use

$75,000–$100,000

Webmaster Responsible for managing the firm’s Web site $50,000–$83,000 Manage IS manager Responsible for the management of an existing information system $60,000–$90,000

IS security manager

Responsible for managing security measures and disaster recovery $55,000–$85,000

Chief information

officer

Study University professor

Government

scientist

Highest-ranking IS manager; responsible for strategic planning and IS use throughout the firm

Teach undergraduate and graduate students; study the use of information systems in organizations and society Research and development of information systems for homeland security, intelligence, and other related applications

$150,000–$180,000 $70,000–$180,000 $60,000–$200,000

Source: Based on http://www.salary.com; http://cnnmoney.com and http://www.payscale.com.

for managing these systems. The people who help develop and manage systems in organizations

include systems analysts, systems programmers, systems operators, network administrators, data

base administrators, systems designers, systems managers, and chief information officers. In

Table 1.8 we describe some of these careers. This list is not exhaustive; rather, it is intended to

provide a sampling of IS management positions. Furthermore, many firms will use the same job

title, but each is likely to define it in a different way, or companies will have different titles for

the same basic function. As you can see from Table 1.8, the range of career opportunities for IS

managers is very broad, and salary expectations are very high.

What Makes IS Personnel So Valuable? In addition to the growing importance of people in

the IS field, there have been changes in the nature of this type of work. No longer are IS depart

ments in organizations filled only with nerdy men with pocket protectors (Figure 1.13). Many

FIGURE 1.13

IS personnel are no longer nerds.

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TABLE 1.9 **IS Professional Core Competencies** Domain Description Technical Knowledge and Skills

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Hardware Hardware platforms, infrastructure, virtualization, peripherals

Software Operating systems, application software, drivers

Networking Network operating systems, cabling and network interface cards, local area networks, wide area networks, wireless, Internet, security

Business Knowledge and Skills

Business integration, industry Business processes, functional areas of business and their integration, industry characteristics Managing people and projects Planning, organizing, leading, controlling, managing people and projects Social Interpersonal, group dynamics, political

Communication Verbal, written, and technological communication and presentation Systems Knowledge and Skills

Systems integration Connectivity, compatibility, integrating subsystems and systems Development methodologies Steps in systems analysis and design, systems development life cycle, alternative development methodologies

Critical thinking Challenging one’s and others’ assumptions and ideas

Problem solving Information gathering and synthesis, problem identification, solution formulation, comparison, choice

more women are in IS positions now. Also, it is now more common for an IS professional to be a polished, professional systems analyst who can speak fluently about both business and technol ogy. IS personnel are now well-trained, highly skilled, valuable professionals who garner high wages and prestige and who play a pivotal role in helping firms be successful.

Many studies have been aimed at helping us understand what knowledge and skills are

necessary for a person in the IS area to be successful (see, for example, Todd, McKeen, & Gallupe, 1995). Interestingly, these studies also point out just what it is about IS personnel that makes them so valuable to their organizations. In a nutshell, good IS personnel possess valu able, integrated knowledge and skills in three areas—technical, business, and systems—as out lined in Table 1.9.

*Technical Competency.* The technical competency area includes knowledge and skills in hard ware, software, networking, and security. In a sense, this is the “nuts and bolts” of information systems. This is not to say that the IS professional must be a high-level technical expert in these areas. On the contrary, the IS professional must know just enough about these areas to understand how they work and how they can and should be applied. Typically, the IS professional manages or directs those who have deeper, more detailed technical knowledge.

The technical area of competency is, perhaps, the most difficult to maintain because the pop

ularity of individual technologies is so fleeting. With the economy rebounding, organizations are starting new projects or are reviving projects put on hold during the economic downturn; hence, while it once appeared as if most programming jobs or support jobs would be outsourced to third party providers abroad (Collett, 2006), there is an increased demand in many companies for peo ple with application development skills, especially in combination with sound business analysis and project management skills (Brandel, 2009). In fact, many of the hot skills listed in Table 1.10 are focused on the business domain, which is discussed next.

*Business Competency.* The business competency area is one that sets the IS professional apart from others who have only technical knowledge and skills, and in an era of increased outsourc ing, it may well save a person’s job. For example, even though some low-level technology jobs may be outsourced, MSNBC.com recently reported (http://www.msnbc.msn.com/id/5077435)

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TABLE 1.10 **Hot Skills for 2010 and Beyond**

Domain Hot Skills

Business • Business–IT alignment

• Business analysis

• Enterprise solutions

• Project management

• Business process modeling

• Project planning, budgeting, and scheduling

• Third-party provider management

• Web 2.0 business models

Technology infrastructure and services

• Virtualization

• Systems analysis

• Systems design

• Network design

• Systems auditing

• Wireless

• Telecommunications/VoIP (Voice over Internet Protocol) • Data center

Security • IT security planning and management

Applications • Customer-facing application development • Web development, open source, portal technologies

• Legacy systems integration

Internet • Web 2.0

• Customer-facing Web application systems

• Mobile applications

• Search engine optimization

• Artificial intelligence

• Web mining

Business intelligence • Business intelligence

• Data warehousing

• Data mining

Source: Based on Brandel (2009), Leung (2009), and Veritude (2009).

that IS management is one of 10 professions that is not likely to be outsourced. As a result, it is absolutely vital for IS professionals to understand the technical areas *and* the nature of the busi ness as well. IS professionals must also be able to understand and manage people and projects, not just the technology. These business skills propel IS professionals into project management and, ultimately, high-paying middle- and upper-level management positions.

*Systems Competency.* Systems competency is another area that sets the IS professional apart from others with only technical knowledge and skills. Those who understand how to build and integrate systems and how to solve problems will ultimately manage large, complex systems proj ects as well as manage those in the firm who have only technical knowledge and skills.

Perhaps now you can see why IS professionals are so valuable to their organizations. These individuals have a solid, integrated foundation in technical, business, and systems knowledge and skills. Perhaps most important, they also have the social skills to understand how to work well with and motivate others. It is these core competencies that continue to make IS professionals valuable employees.

Given how important technology is, what does this mean for your career? Technology is be ing used to radically change how business is conducted—from the way products and services are produced, distributed, and accounted for to the ways they are marketed and sold. Whether you are majoring in information systems, finance, accounting, operations management, human resource management, business law, or marketing, knowledge of technology is critical to a successful career in business.

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Finding Qualified Personnel Unfortunately, given the increased sophistication of modern in

formation systems, organizations can often have a difficult time finding qualified personnel, and

attracting the right people with the right skills is not possible in some areas. Consequently, many

technology-focused organizations tend to cluster in areas where talented workers are available.

Such areas are often characterized by a high quality of life for the people living there, and it is no

surprise that many companies in the IT sector within the United States are headquartered in

Silicon Valley, California; Boston, Massachusetts; Austin, Texas; or Seattle, Washington. With in

creasing globalization, other regions throughout the world are boasting about their highly skilled

personnel. One such example is the Indian city of Bangalore, where, over a century ago, Maharajas

started to lure talented technology-oriented people to the region, building a world-class human

resource infrastructure that attracted companies from around the world. In other areas, organiza

tions may have to find creative ways to attract and retain people, such as by offering favorable

benefits packages that include educational grants or expense-matching programs to encourage em

ployees to improve their education and skills. Other human resource policies, such as telecommut

ing, flextime, and creative benefit packages, can also help to attract and retain the best employees.

Organizations: The Context of Information Systems

We have talked about data versus information, the technology side of information systems, and

the people side of information systems. The last part of our IS definition is the term “organiza

tion.” People use information systems to help their organizations be more productive and prof

itable, to help their firms gain competitive advantage, to help their firms reach more customers or

to improve service to their customers. This holds true for all types of organizations—professional,

social, religious, educational, and governmental. In fact, not too long ago, the U.S. Internal Rev

enue Service launched its own site on the Web for the reasons just described (see Figure 1.14).

The Web site was so popular that approximately 220,000 users visited it during the first 24 hours

and more than a million visited it in its first week—even before the Web address for the site

was officially announced. Today, popular Web sites like Facebook.com and Yahoo.com receive

millions of visitors every day.

Types of Information Systems Throughout this book, we explore various types of informa

tion systems commonly used in organizations. It makes sense, however, for us to describe briefly

here the various types of systems used so that you will better understand what we mean by the

term “information system” as we use it throughout the rest of the book. Table 1.11 provides a list

of the major types of information systems used in organizations.

FIGURE 1.14 

Web site of the U.S. Department

of the Treasury, Internal Revenue

Service, http://www.irs.gov.

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TABLE 1.11 **Types of Information Systems Used in Organizations**

Type of System Purpose Sample Application

Transaction processing system Process day-to-day business event data at the operational level of the organization

Management information system Produce detailed information to help manage a firm or a part of the firm

Decision support system Provide analysis tools and access to databases in order to support quantitative decision making

Grocery store checkout cash register with connection to network

Inventory management and

planning system

Product demand forecasting system

Intelligent system Emulate or enhance human capabilities Automated system for analyzing bank loan applications

Data mining and visualization system

Office automation system (personal productivity software)

Methods and systems for analyzing data warehouses to better understand various aspects of a business Support a wide range of predefined day-to-day work activities of individuals and small groups

Market analysis Word processor

Collaboration system Enable people to communicate, collaborate, and coordinate with each other

Knowledge management system Collection of technology-based tools to enable the generation, storage, sharing, and management of knowledge assets

Electronic mail system with automated, shared calendar Knowledge portal

Geographical information system Create, store, analyze, and manage spatial data Site selection for new shopping mall

Functional area information system

Support the activities within a specific functional area of the firm

System for planning for personnel training and work assignments

Customer relationship management system

Support interaction between the firm and its customers Sales force automation

Enterprise resource planning system

Supply chain management system

Support and integrate all facets of the business, including planning, manufacturing, sales, marketing, and so on Support the coordination of suppliers, product or service production, and distribution

Financial, operations, and human resource management

Procurement planning

Electronic commerce system Enable customers to buy goods and services from a firm’s Web site

Amazon.com

Topping the list in the table are some of the more traditional, major categories that are used to describe information systems. For example, **transaction processing systems (TPS)** are used by a broad range of organizations to not only more efficiently processes customer transactions, but also generate a tremendous amount of data that can be used by the organization to learn about customers or ever-changing product trends. Your local grocery store uses a TPS at the checkout that scans bar codes on products; as this occurs, many stores will print discount coupons on the backs of receipts for products related to current purchases. Every hour, online retailer Amazon.com’s website processes thousands of transactions from around the world. This massive amount of information is fed into large data warehouses and is then analyzed to provide purchase recommendations to future customers. In addition, TPS data is sorted and organized to support a broad range of managerial de cision making, using a variety of systems; the most common of these is generally referred to as a **management information system**. TPS data also fuels the use of a vast variety of information sys tems within organizations, including *decision support systems, intelligent systems, data mining and visualization systems, knowledge management systems, geographic information systems,* and *functional area information systems*. Five to 10 years ago, it would have been typical to see systems that fell cleanly into one of these categories. Today, with **internetworking**—connecting host com puters and their networks together to form even larger networks like the Internet—and **systems integration**—connecting separate information systems and data to improve business processes and decision making—it is difficult to say that any given information system fits into only one of these categories (e.g., that a system is a management information system only and nothing else). Modern day information systems tend to span several of these categories of information systems, helping not only to collect data from throughout the firm and from customers but also to integrate all that diverse data and present it to busy decision makers, along with tools to manipulate and analyze those

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data. *Customer relationship management*, *supply chain management,* and *enterprise resource plan*

*ning* systems are good examples of these types of systems that encompass many features and types

of data and cannot easily be categorized.

**Office automation systems** such as Microsoft Office and the OpenOffice.org Productivity

Suite provide word processing, spreadsheet, and other personal productivity tools, enabling

knowledge workers to accomplish their tasks; **collaboration systems,** such as Microsoft’s

Exchange/Outlook and Lotus Notes, provide people with e-mail, automated calendaring, and on

line, threaded discussions, enabling close collaboration with others, regardless of their location.

Systems for electronic commerce, such as corporate Web sites, are also very popular and impor

tant. These systems are typically Internet-based and enable (1) consumers to find information about,

and to purchase goods and services from, each other and from business firms and (2) business firms

to electronically exchange products, services, and information. In Chapter 4, “Enabling Commerce

Using the Internet,” we talk about business-to-business electronic commerce and its variants as well

as how people are using the Internet to conduct electronic commerce.

While many modern-day information systems span several of these IS categories, it is still

useful to understand these categories. Doing so enables you to better understand the myriad

approaches, goals, features, and functions of modern information systems.

We have talked about each of the parts of our definition of information systems, and we have

talked about different types of information systems. In the next section, we focus on how infor

mation systems can be managed within organizations.

Organizing the IS Function The current emphasis on the use of technology within businesses

is not a fad. Indeed, all indicators point to the increased use of technology and to organizations’

continued awareness of the importance of technology, both as a tool for productivity and as a

vehicle for achieving competitive advantage and organizational change. Just as information sys

tems have evolved over the past several years, so too has the IS function. Next, we briefly review

the evolution of the IS function within organizations.

*Early History: Poor Service and Worse Attitudes.*Early IS departments typically had huge proj

ect backlogs, and IS personnel would often deliver systems that were over budget, were completed

much too late, were difficult to use, and did not always work well. In addition, many of these old

school IS personnel believed that they owned and controlled the computing resources, that they knew

better than users did, and that they should tell users what they could and could not do with the

computing resources. Needless to say, this was not a recipe for success and good relationships. Indeed,

relations between IS personnel and users within a firm were often sour and were sometimes bitter.

*The Rise and Fall of End-User Development.* In the early years of information systems

within organizations, users were often forced to put up with the poor service and the poor atti

tude. Then technology started to become significantly better—faster, easier to build and use, and

cheaper—with the advent of the PC and standard software packages (see Figure 1.15). As a re

sult, end users began to develop their own computing applications using PC-based spreadsheet

packages (e.g., Visicalc), database management systems (e.g., dBase), and programming lan

guages (e.g., BASIC). Disgruntled users simply said, “If the IS staff cannot or will not do this for

us, then we will build our own systems.” In many cases, they did just that, and they did it well,

much to the dismay of some of the IS managers. Although end-user development clearly has

strengths and still exists in some organizations, it also has serious weaknesses (see Chapter 9,

“Developing and Acquiring Information Systems”); thus, today, most organizations leave the sys

tems development to the professionals.

*The Modern IS Organization.* Business managers soon became more savvy about technology

and the possibilities and opportunities that it offered, and they reasoned that the possibilities and

opportunities were too great to let the IS function simply wither away as end-user development

took over. In addition, smart, concerned IS personnel realized that they needed an attitude adjust

ment. Some people believe that the changes in the nature of technology forced people to cooper

ate more. For example, the shift from large “mainframe” computers to a “server-centric” model

(i.e., relatively powerful PCs spread throughout the organization that share data, applications, or

peripherals that are hosted by more powerful server computers) may have forced people within

the IS function to improve their operations and their relationships with people in other units of

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FIGURE 1.15 

The advent of the IBM PC and

early applications packages led to

end-user development.

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the firm. The client-server model required a new kind of relationship between information sys

tems and other people throughout the firm (Stevens, 1994). As a result of these forces, in modern

IS units that do a good job, the atmosphere, attitude, and culture are very different and much more

sensitive and responsive than they used to be.

In these more responsive IS units, the personnel have taken on more of a consulting relation

ship with their users. The IS personnel believe that, fundamentally, they are there to help the users

solve problems and be more productive. Indeed, in many cases, the IS personnel do not even re

fer to the users as “users.” They are “clients” or “customers,” or, even better, they are “colleagues”

within the organization. This new attitude is a major change from the old days, when IS person

nel did not want to be bothered by users and thought that the techies knew better than users. It is

unfortunate that this old-school mentality still exists in some organizations.

The new IS culture is much like that found in successful service organizations. Think of how

customers are treated by service organizations, such as Citigroup’s Smith Barney or Ernst &

Young, or by product-based organizations where service is also important, such as McDonald’s or

Nordstrom. Great service to the customer is absolutely critical, and employees do everything they

can to please customers. They often live by the credo that “the customer is always right.”

The same holds for IS units that have taken on this new **service mentality.** The IS personnel

do everything they can to ensure that they are satisfying their systems customers within the firm.

They reach out to customers and proactively seek their input and needs rather than waiting for cus

tomers to come in with systems complaints. They modify the systems at a moment’s notice just to

meet customer needs quickly and effectively. They celebrate the customer’s new systems ideas

rather than putting up roadblocks and giving reasons that the new ideas cannot or will not work.

They fundamentally believe that the customers own the technology and the information and that

the technology and information are there for the customers, not for the systems personnel. They

create help desks, hotlines, information centers, and training centers to support customers. These

service-oriented IS units structure the IS function so that it can better serve the customer.

The implications of this new service mentality for the IS function are staggering. It is simply

amazing how unproductive a company can be when the IS personnel and other people within the

firm are at odds with one another. On the other hand, it is even more amazing how productive and

enjoyable work can be when people in the IS function work hand in hand with people through

out the organization. Technology is, potentially, the great lever, but it works best when people

work together, not against each other, to use it.

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The Spread of Technology in Organizations Another phenomenon that shows how integral

and vital information systems and their proper management have become to organizations is the

extent to which the technology is firmly integrated and entrenched within the various business

units (such as accounting, sales, and marketing).

In many organizations today, you will find that the builders and managers of a particular in

formation system or subsystem spend most of their time out in the business unit, along with the

users of that particular system. Many times, these systems personnel are permanently placed—

with an office, desk, phone, and PC—in the business unit along with the users.

In addition, it is not uncommon for systems personnel to have formal education, training, and

work experience in information systems as well as in the functional area that the system supports,

such as finance. It is becoming increasingly more difficult to separate the technology from the

business or the systems staff from the other people in the organization. For this reason, how in

formation systems are managed is important to you, no matter what career option you pursue.

As information systems are used more broadly throughout organizations, IS personnel often

have dual-reporting relationships—reporting both to the central IS group and to the business

function they serve. Therefore, at least some need for centralized IS planning, deployment, and

management continues—particularly with respect to achieving economies of scale in systems ac

quisition and development and in optimizing systems integration, enterprise networking, and the

like. Even in organizations that are decentralizing technology and related decisions, a need to

coordinate technology and related decisions across the firm still persists. This coordination is

likely to continue to happen through some form of a centralized (or, at least, centrally coordi

nated) IS staff. Organizations are likely to continue to want to reap the benefits of IS decentral

ization (flexibility, adaptability, and systems responsiveness), but it is equally likely that they will

not want to—and will not be able to—forgo the benefits of IS centralization (coordination,

economies of scale, compatibility, and connectivity).

Given the trend toward pushing people from the IS staff out into the various business units

of the firm and given the need for people within each of the functional areas of the business to

have technology skills, there is clearly a need for people who know the technology side *and* the

business side of the business. We suspect that the need for people to play these boundary

spanning roles will continue.

The Dual Nature of Information Systems

Given how important and expensive information systems have become, information technology

is like a sword—you can use it effectively as a competitive weapon, but, as the old saying goes,

those who live by the sword sometimes die by the sword. The two following cases illustrate this

dual nature of information systems.

Case in Point: An Information System Gone Awry:

Software Glitch Stops Hybrid Vehicle (or Doesn’t?)

What happens when an information system does not function as planned? An example of an

information system gone wrong that made the news in early 2010 is the computer-controlled

braking system of the Toyota Prius hybrid vehicle. Even more than today’s “conventional”

gasoline-driven vehicles, hybrid vehicles rely on sophisticated information systems to control the

interaction of the different engines, the braking systems, batteries, and so on (see Figure 1.16).

Typically a hybrid vehicle uses, in addition to hydraulic brakes, a regenerative braking system to

recharge the battery while slowing down the vehicle. Depending on factors such as driving speed

and pressure on the brake pedal, the car’s computer controls when the hydraulic brakes are ap

plied and when the antilock braking system is activated. In early 2010, it became known that a

software glitch could cause a delay in the response of the brakes under a certain combination of

conditions. Although no fatalities were linked to the software glitch, this incident severely blem

ished the automaker’s reputation for safety and quality, which had already suffered because of an

other model’s problems with the accelerator pedal.

This story has a happy ending—or beginning, as it were—as Toyota’s dealerships could eas

ily upload the new software to the affected vehicles. Increasingly sophisticated systems, intended

to make driving safer by assisting the drivers in various ways, are one of many ways that this or

ganization is attempting to be innovative and to outdo the competition, and Toyota will be even

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FIGURE 1.16 

Hybrid vehicles rely on

information technology to control

the interaction between various

systems.

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more vigilant about the performance of such systems. However, this is still useful as an example

of how a problematic information system can adversely affect the performance of an organization.

Case in Point: An Information System That Works: FedEx

Just as there are examples of information systems gone wrong, there are many examples of infor

mation systems gone right. FedEx, now a $32 billion family of companies (2010 data), is the

world’s largest express transportation company and delivers millions of packages and millions of

pounds of freight to 220 countries and territories each business day (see Figure 1.17). FedEx uses

extensive, interconnected information systems to coordinate more than 140,000 employees, hun

dreds of aircraft, and tens of thousands of ground vehicles worldwide.

To improve its services and sustain a competitive advantage, FedEx offers extensive services

on the Internet. FedEx.com has more than 15 million unique visitors per month and over 3 million

tracking requests per day. FedEx.com has become the information hub for a business where man

aging information *is the business.* In addition to shipment tracking, customers use the site for

FIGURE 1.17 

FedEx is an innovator in success

fully using information systems.

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finding out about delivery options and costs, use tools to prepare their own packages, verify them

online, and print bar-coded shipping documents. These and other information systems have posi

tioned FedEx as the global leader in express transportation.

Information Systems for Competitive Advantage

Toyota’s automotive electronics systems and FedEx’s Web site are typical of systems that are per

vasive in today’s life or used in large, complex organizations. These systems are so large in scale

and scope that they are difficult to build. It is important to handle the development of such sys

tems the right way the first time around. These examples also show that as we rely more and more

on information systems, the capabilities of these systems are paramount to business success.

Not only were these systems large and complicated, but they were—and continue to be—

critical to the success of the firms that built them. The choices made in developing the systems at

both Toyota and FedEx were **strategic** in their intent. These systems were not developed solely

because managers in these organizations wanted to do things faster or because they wanted to

have the latest, greatest technology. These organizations developed these systems strategically to

help gain or sustain some **competitive advantage** (Porter, 1985; Porter & Millar, 1985) over their

rivals. Let us not let this notion slip by us—while the use of technology can enable efficiency and

while information systems must provide a return on investment, technology use can also be strate

gic and can be a powerful enabler of competitive advantage.

Although we described the use of information systems at two relatively large organizations,

firms of all types and sizes can use information systems to gain or sustain a competitive advan

tage over their rivals. Whether it is a small mom-and-pop boutique or a large government agency,

every organization can find a way to use information technology to beat its rivals. In Chapter 2,

“Gaining Competitive Advantage Through Information Systems,” we talk more about this oppor

tunity to use information systems strategically.

Why Information Systems Matter

On May 1, 2003, Nicholas Carr published an article titled “IT Doesn’t Matter” in *Harvard Busi*

*ness Review* that created quite a stir. He argued that as information technology becomes more per

vasive, it will become more standardized and ubiquitous, more of a commodity that is absolutely

necessary for every company. He reasoned, then, that companies should focus information tech

nology strictly on cost reduction and risk mitigation and that investing in information technology

for differentiation or for competitive advantage is futile. Many experts in academia, in the popu

lar press, and within technology companies not only disagreed with that argument but also felt

that, if taken literally, such a line of thinking could hurt companies’ competitiveness.

Given the debate that this article caused, on May 1, 2004, *CIO* magazine’s editor in chief,

Abbie Lundberg, published an interview with Carr on the subject, along with an invited counter

point essay titled “The Engine That Drives Success: The Best Companies Have the Best Business

Models Because They Have the Best IT Strategies” by noted technology and business strategy

author Don Tapscott. Tapscott argued that companies with bad business models tend to fail re

gardless of whether they use information technology or not. On the other hand, companies that

have good business models and use information technology successfully to carry out those busi

ness models tend to be very successful. He described many examples, across a variety of indus

tries, where firms dominate their respective markets; have superior customer relationships,

business designs, and differentiated offerings; and are well known for their superior use of infor

mation technology in supporting a unique business strategy. His examples included Amazon.com,

Best Buy, Citigroup, PepsiCo, Herman Miller, Cisco, Progressive Casualty Insurance, Marriott,

FedEx, GE, Southwest Airlines, and Starbucks.

We tend to side with Tapscott on this one. We believe that information systems are a neces

sary part of doing business, that they can be used to create efficiencies, and that they can also be

used as an enabler of competitive advantage. We do agree with Carr, however, that the competi

tive advantage from the use of information systems can be fleeting, as competitors can eventu

ally do the same thing. Also, given how expensive IS projects have become and given how cost

conscious and competitive businesses now are, nearly every IS project today must show a clear

return on investment. Again, we talk more about the role of information systems in competitive

advantage in Chapter 2 and about return on investment issues in Chapter 9.

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IS Ethics

A broad range of ethical issues have emerged through the use and proliferation of computers. Just

as the Luddites opposed technological progress during industrialization, **neo-Luddites** oppose in

formation systems, fearing negative impacts such as social decay, increased consumerism, or loss

of privacy. **Computer ethics** is used to describe the issues and standards of conduct as they per

tain to the use of information systems. In 1986, Richard O. Mason wrote a classic article on the

issues central to this debate—information privacy, accuracy, property, and accessibility. These is

sues are still at the forefront of most ethical debates related to how information systems store and

process information (see Figure 1.18). Next, we examine each of these issues.

Information Privacy

If you use the Internet regularly, sending e-mail messages and visiting Web sites, you may have

felt that your personal privacy is at risk. Several Web sites where you like to shop greet you by

name and seem to know which products you are most likely to buy (see Figure 1.19). Every day,

the in-box in your browser’s mail program is full to overflowing with messages urging you to buy

something. As a result, you may feel as though eyes are on you every time you go online.

**Information privacy** is concerned with what information an individual should have to reveal to

others in the workplace or through other transactions, such as online shopping.

While the information age has brought widespread access to information, the downside is

that others may now have access to personal information that you would prefer to keep private.

Personal information, such as Social Security numbers, credit card numbers, medical histories,

FIGURE 1.18

Information privacy, accuracy, property, and accessibility are cen tral to most ethical concerns about information technology.

Information Accessibility

Information

Privacy

**Information Systems Ethics**

Information

Property

Information Accuracy

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FIGURE 1.19 

Amazon.com is famous for

personalizing its Web site to

individual customers.

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and even family histories, is now available on the Internet. Using search engines, your friends,

coworkers, current or future employers, or even your spouse can find out almost anything that has

been posted by or about you on the Internet. For example, it is very easy to locate your personal

blog, your most recent party pictures posted on Facebook, or even sensitive questions you asked

in a public discussion forum about drug use or mental health. Moreover, many of these pages are

stored in the search engines’ long-term cache, so they remain accessible for a long time even af

ter they have been taken off the Web.

How to Maintain Your Privacy Online When you make Web purchases, vendors are not re

quired by law to respect your privacy. In other words, a vendor can track what pages you look at,

what products you examine in detail, which products you choose to buy, what method of payment

you choose to use, and where you have the product delivered. After collecting all that informa

tion, unscrupulous vendors can sell it to others, resulting in more direct-mail advertising, elec

tronic spam in your e-mail in-box, or calls from telemarketers.

When surveyed about concerns related to online shopping, most consumers list issues of infor

mation privacy as a top concern. As a result, governments have pressured businesses to post their

privacy policies on their Web sites. Unfortunately, these policies do not often protect the privacy of

consumers. To protect yourself, you should always review the privacy policy of all companies you

do business with and refuse to do business with those that do not have a clear policy or do not re

spect your privacy. According to the Consumer Protection Working Group of the American Bar As

sociation at safeshopping.org, a seller’s privacy policy should indicate at least the following:

What information the seller is gathering from you

How the seller will use this information

Whether and how you can “opt out” of these practices

To make sure your shopping experience is a good one, you can take a few additional steps to main

tain your privacy:

***Choose Web Sites That Are Monitored by Independent Organizations.*** Several indepen

dent organizations monitor the privacy and business practices of Web sites (e.g., www

.truste.com).

***Avoid Having “Cookies” Left on Your Machine.*** Many commercial Web sites leave cook

ies on your machine so that the owner of the site can monitor where you go and what you

do on the site. To enhance your privacy, you should carefully manage your browser’s

cookie settings or get special “cookie management” software (see Chapter 10, “Securing

Information Systems,” for more on cookies).

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***Visit Sites Anonymously.*** There are ways to visit Web sites anonymously. Using services

provided by companies such as Anonymizer (www.anonymizer.com), you have a high de

gree of privacy from marketers, identity thieves, or even coworkers when surfing the Web.

***Use Caution When Requesting Confirmation E-Mail.*** When you buy products online,

many companies will send you a confirming e-mail message to let you know that the order

was received correctly. A good strategy is to have a separate e-mail account, such as one that

is available for viewing via a Web browser, that you use when making online purchases.

Of course, there are no guarantees that all your online experiences will be problem free, but if you

follow the advice provided here, you are much more likely to maintain your privacy.

Information Accuracy

The issue of **information accuracy** has become highly charged in today’s wired world. Informa

tion accuracy is concerned with ensuring the authenticity and fidelity of information as well as with

identifying who is responsible for informational errors that harm people. With all the computeriza

tion that has taken place, people have come to expect to receive and retrieve information more eas

ily and quickly than ever before. In addition, because computers “never make mistakes,” we have

come to expect this information to be accurate. A case in point is at the bank. The combination of

automated teller machines, computerized record systems, and large, electronic client and transac

tion databases should provide customers with quick and accurate access to their account informa

tion. However, we continue to hear about and experience record-keeping errors at banks.

An error of a few dollars in your banking records does not seem significant. However, what

if it were an error of hundreds or thousands of dollars in the bank’s favor? What if the error caused

one of your important payments (such as a home mortgage payment) to bounce? Bank errors can

have quite significant consequences.

Now, imagine how significant a data accuracy error might be in other settings. Hospitals use

similar automation and computer-intensive record keeping. What would happen if prescription in

formation appeared incorrectly on a patient’s chart and the patient became fatally ill as a result of the

medicine that was mistakenly dispensed to him? The significance of such a data accuracy error could

be tremendous. Furthermore, it would not be clear who was to blame. Would this be the fault of the

doctor, the pharmacist, the programmer, the data entry clerk, or maybe some combination of errors

by the system designer, the system analyst, the system programmer, the database administrator, and

the vendor? It would be too easy simply to blame the computer; some one person would need to be

found at fault. As a case in point, in late 2000, a software flaw in a radiation therapy device in a can

cer treatment center in Panama City, Panama, increased exposure levels by up to 100 percent, caus

ing multiple deaths and countless injured patients. Blame was placed on the software and also on the

doctors who didn’t manually double-check the device’s settings.As the device and the software were

manufactured in the United States, the U.S. Food and Drug Administration filed an injunction to

force the manufacturer to stop manufacturing and distributing software for radiation therapy

devices; but the physicians involved were indicted for murder under Panama law.

Computer-based information systems and the data within those systems are only as accurate

and as useful as they have been made to be. This suggests the need for better precautions and

greater scrutiny when modern information systems are designed, built, and used. This means that

everyone must be concerned with data integrity, from the design of the system, to the building of

the system, to the person who actually enters data into the system, to the people who use and man

age the system. Perhaps more important, when data errors are found, people should not blame the

computer. After all, people designed it, built it, and entered data into it in the first place.

Information Property

It happens to all of us. Nearly every day in the mail, we receive unwanted solicitations from credit

card companies, department stores, magazines, or charitable organizations (see Figure 1.20).

Many of these envelopes are never opened. We ask the same question over and over again: “How

did I get on another mailing list?” Your name, address, and other personal information were most

likely sold from one company to another for use in mass mailings. You probably did not give any

one permission to buy or sell information about you, but that is not a legal issue or a matter of

concern for some firms. **Information property** focuses on who owns information about individ

uals and how that information can be sold and exchanged.

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FIGURE 1.20 

Selling personal information has

become big business.

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Data Privacy Statements Who owns the computerized information about people—the infor

mation that is stored in thousands of databases by retailers, credit card companies, and marketing

research companies? The answer is that the company that maintains the database of customers or

subscribers legally owns the information and is free to sell it. Your name, address, and other in

formation are all legally kept in a company database to be used for the company’s future mailings

and solicitations. However, the company can sell its customer list or parts of it to other compa

nies who want to send similar mailings.

There are limits, however, to what a company can do with such data. For example, if a com

pany stated at one time that its collection of marketing data was to be used strictly internally as a

gauge of its own customer base and then sold that data to a second company years later, it would

be unethically and illegally breaking its original promise. Companies collect data from credit card

purchases (by using a credit card, you indirectly allow this) or from surveys and questionnaires

you fill out when applying for a card. They also collect data when you fill in a survey at a bar,

restaurant, supermarket, or the mall about the quality of the service or product preferences. By

providing this information, you implicitly agree that this data can be used as the company wishes

(within legal limits, of course).

What is even more problematic is the combination of this survey data with transaction data

from your credit card purchases. Using the demographic data (Who am I, and where do I live?) and

the psychographic data (What are my tastes and preferences?), companies can create a highly accu

rate profile of customers. How do you know who is accessing these databases? This is an issue that

each company must address at both a strategic/ethical level (Is this something that we should be do

ing?) and a tactical level (If we do this, what can we do to ensure the security and integrity of the

data?). The company needs to ensure proper hiring, training, and supervision of employees who

have access to the data and implement the necessary software and hardware security safeguards.

In today’s interconnected world, there are even more dangers to information property. Al

though more and more people are concerned about their privacy settings on social networks such

as Facebook, there are things that you may not be able to control. For example, if one of your

friends tags you on a photo posted on Facebook, a notice about you being in the photo will be on

your Facebook “Wall” whether you like it or not. By the time you realize it, most of your friends,

coworkers, and family members may have already seen it. Similarly, in early 2010, Google made

a huge public relations blunder when it launched its Google Buzz social networking application:

by default, this service exposed all of one’s Gmail (Google’s e-mail service) contacts to others,

revealing sensitive information such as lawyers’ clients or doctors’ patients. After much uproar,

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Google quickly changed the settings, but the damage was done, and Google is now facing a class

action lawsuit about this breach of personal rights. At other times, you may divulge sensitive in

formation (such as your address or date of birth) when signing up for yet another social network;

as newer, more exciting applications come up, you abandon your profile, but your information

stays out there. Sometimes, you may forget who’s following your activities at the various social

networking sites, and you may tell people things you never wanted them to know. As these ex

amples show, there are many more threats to your privacy than you may have thought.

Information Accessibility

With the rapid increase in online databases containing personal information and the surge in the

use of computer-based communication between individuals, ethical concerns have been raised

concerning who has the right to access and monitor this information. **Information accessibility**

focuses on defining what information a person or organization has the right to obtain about oth

ers and how this information can be accessed and used.

For example, almost everyone sends and receives electronic mail, whether or not they have a PC.

All that is needed to participate is access to the Internet, whether through a home PC, a school’s com

puter lab, a wireless phone, a handheld computer, or any of several other devices that provide Internet

access. E-mail is one of the most popular software applications of all time, and projections are that its

use will only continue to increase. However, recent court cases have not supported computer privacy

for employee e-mail transmissions and Internet usage. For example, although most companies provide

employees with access to the Internet and other outside e-mail systems, many periodically monitor the

e-mail messages that employees send and receive. Monitoring employee behavior is nothing new, and

for many businesses it was a natural extension to monitor employee e-mail messages.

Surprisingly, there is little legal recourse for those who support e-mail privacy. In 1986, Con

gress passed the Electronic Communications Privacy Act (ECPA), but it offered far stronger

support for voice mail than it did for e-mail communications. This act made it much more difficult

for anyone (including the government) to eavesdrop on phone conversations. E-mail privacy is,

therefore, much harder to protect. In addition, no other laws at the federal or state levels protect

e-mail privacy. However, some states, most notably California, have passed laws that define how

companies should inform their employees of this situation and in which situations monitoring is

legal. Even so, this law is more of a guideline for ethical practice than a protection of privacy

(Sipior & Ward, 1995).

Fortunately, the ECPA and the court case judgments thus far on e-mail monitoring suggest

that companies must be prudent and open about their monitoring of e-mail messages and Internet

usage. Companies should use good judgment in monitoring e-mail and should make public their

policy about monitoring messages. One primary reason that employees perceive their e-mail to

be private is the fact that they are never told otherwise (Weisband & Reinig, 1995). In addition,

employees should use e-mail only as appropriate, based on their company’s policy and their own

ethical standards. Given recent actions and rulings on the capture and usage of e-mail messages

over the Internet, it appears that online privacy is in jeopardy both in and out of business organi

zations. As a general rule, we all need to realize that what we type and send via e-mail in and out

of the workplace is likely to be read by others for whom the messages were not intended. It is wise

to generate only those e-mail messages that would not embarrass us if they were made public.

The Need for a Code of Ethical Conduct

Not only has the Internet age found government playing catch-up to pass legislation pertaining to

computer crime, privacy, and security, it has also created an ethical conundrum. For instance, the

technology exists to rearrange and otherwise change photographs, but is the practice ethical? If

you can use a computer at your school or workplace for professional purposes but “steal” com

puter time to do personal business, is this ethical? Is it ethical for companies to compile informa

tion about your shopping habits, credit history, and other aspects of your life for the purpose of

selling such data to others? Should guidelines be in place to dictate how businesses and others use

information and computers? If so, what should the guidelines include, and who should write

them? Should there be penalties imposed for those who violate established guidelines? If so, who

should enforce such penalties?

Many businesses have devised guidelines for the ethical use of information technology and

computer systems; similarly, most universities and many public school systems have written

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guidelines for students, faculty, and employees about the ethical use of computers. EduCom, a

nonprofit organization of colleges and universities, has developed a policy for ethics in informa

tion technology that many universities endorse. In part, the EduCom statement concerning

software and intellectual rights says,

Because electronic information is volatile and easily reproduced, respect for the work and personal

expression of others is especially critical in computer environments. Violations of authorial in

tegrity, including plagiarism, invasion of privacy, unauthorized access, and trade secret and copy

right violations, may be grounds for sanctions against members of the academic community.

Most organization and school guidelines encourage all system users to act responsibly, ethically,

and legally when using computers and to follow accepted rules of online etiquette as well as

federal and state laws.

Responsible Computer Use The Computer Ethics Institute is a research, education, and pol

icy study organization that studies how advances in information technology have impacted ethics

and corporate and public policy. The institute has issued widely quoted guidelines for the ethical

use of computers. The guidelines prohibit the following:

Using a computer to harm others

Interfering with other people’s computer work

Snooping in other people’s files

Using a computer to steal

Using a computer to bear false witness

Copying or using proprietary software without paying for it

Using other people’s computer resources without authorization or compensation

Appropriating other people’s intellectual output

The guidelines recommend the following:

Thinking about social consequences of programs you write and systems you design

Using a computer in ways that show consideration and respect for others

Responsible computer use in the information age includes following the guidelines mentioned

here. As a computer user, when in doubt, you should review the ethical guidelines published by

your school, place of employment, and/or professional organization. Some users bent on illegal

or unethical behavior are attracted by the anonymity they believe the Internet affords. But the

fact is that we leave electronic tracks as we wander through the Web, and many perpetrators

have been traced and successfully prosecuted when they thought they had hidden their trails.

The fact is, too, that if you post objectionable material on the Internet and people complain

about it, your Internet service provider can ask you to remove the material or remove yourself

from the service.

The Digital Divide

Unfortunately, there are still many people in our society who are being left behind in the infor

mation age. The gap between those individuals in our society who are computer literate and have

access to information resources like the Internet and those who do not is referred to as the **digital**

**divide.** The digital divide is one of the major ethical challenges facing society today when you

consider the strong linkage between computer literacy and a person’s ability to compete in the in

formation age. For example, access to raw materials and money fueled the industrial revolution,

“but in the informational society, the fuel, the power, is knowledge,” emphasized John Kenneth

Galbraith, an American economist who specialized in emerging trends in the U.S. economy. “One

has now come to see a new class structure divided by those who have information and those who

must function out of ignorance. This new class has its power not from money, not from land, but

from knowledge.”

The good news is that the digital divide in America is rapidly shrinking, but there are still

major challenges to overcome. In particular, people in rural communities, the elderly, people with

disabilities, and minorities lag behind national averages for Internet access and computer literacy.

Outside the United States, the gap gets even wider, and the obstacles get much more difficult to

overcome, particularly in the developing countries, where infrastructure and financial resources

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Brief Case d

**GUERILLA WI-FI HELPS TO BRIDGE THE DIVIDE**

**T**he digital divide refers to the “haves” and “have-nots” in the IT world. One Laptop per Child (OLPC), a nonprofit organization formed in 2005, attempts to overcome the digital divide, in part by providing low-cost computers to children who could other wise not afford to buy them. However, just having a computer is not enough to join the club of the haves, and even households that have computers do not always have access to affordable Internet connection services. One company addressing this problem is Meraki Networks, Inc., headed by Sanjit Biswas. Biswas, a stu dent at Massachusetts Institute of Technology, is taking time off from working on his doctoral degree in computer science to help bridge the digital divide. (*Meraki* is a Greek word meaning “in serting yourself into something you create.”)

It has been determined that at least 1 billion people now con nect to the Internet. Biswas’s goal is to help the next billion— and the next after that—connect. The company sells small wireless routers (about the size of two iPhones stacked up), which feature software that allows them to “piggyback,” so that one Meraki router connected to the Internet can relay the con nection through other Meraki devices, thus forming a large net work for Internet users. According to Biswas, devices within line of sight (approximately 700 feet) allow a single DSL connection to accommodate up to fifty Internet users. In this way, a network administrator can provide Internet connection service at nominal cost—perhaps as low as $1 per month. The drawback is that some Internet connection providers, such as Verizon and Time Warner, forbid subscribers from sharing connections. Less well known providers, such as Speakeasy and bway.net, have no such restrictions.

Thanks to Meraki, the so-called Guerilla Wi-Fi phenomenon is spreading and helping former Internet connection have-nots become connected—and part of the Internet community.

Mobile technology may be a promising way to reduce the digital divide. Compared to fixed-line Internet services, mobile Internet is much cheaper, is easier to acquire, and covers a larger

geographic area. More important, mobile services allow users to access the Internet while on the move. In fact, mobile technology shows great promise for reducing the digital divide. Statistics from the Communications Commission of Kenya show that the country has 3.5 million Internet users. However, driven by mobile access, the number will increase to 10 million by 2012.

While people in developed countries often use mobile media for entertainment and social activities, people in developing coun tries use their mobile device as tools to acquire information, knowl edge that can help them reshape their lives, families, and societies. For instance, in Kenya, RSS feeds from the Internet are fed into mobile phones to educate and inform people. In this southern African country, the Guardian’s Activate 09 project sends out head lines to tens of thousands of citizens through text messages.

**Questions**

**1.** Should Internet providers be pressured to allow customers to share their connections with “nonpaying” customers? **2.** Would you share your connection with a total stranger even if it meant that you would sometimes experience a slow down to your connection speed?

Based on:

Anonymous. (2009, December 21). Combating the digital divide in the developing world with mobile phones. *Online Journalism Blog.* Retrieved April 1, 2010, from http://onlinejournalismblog.com/2009/12/21/combating -the-digital-divide-in-the-developing-world-with-mobile-phones.

Mims, C. (2007, August 6). Meraki’s guerilla Wi-Fi to put a billion more people online. *Scientific American.* Retrieved April 1, 2010, from http://www.sciam.com/article.cfm?id=merakis-guerilla-wi-fi-to-put -billion-people-online.

Okuttah, M. (2010, February 4). Mobile phone the new driver of Inter net access. *Business Daily.* Retrieved April 01, 2010, from http://www .businessdailyafrica.com/-/539444/854972/-/t2ckye/-/index.html.

Wakefield, J. (2010, March 19). World wakes up to digital divide. *BBC News.* Retrieved April 1, 2010, from http://news.bbc.co.uk/2/hi/ technology/8568681.stm.

are lacking. For example, most developing countries are lacking modern informational resources such as affordable Internet access or efficient electronic payment methods like credit cards. In an attempt to shrink the digital divide, a global project called **One Laptop per Child (OLPC)** is at tempting to distribute low-cost laptop computers to children in developing countries around the world (see Figure 1.21). The initial goal was to price these computers at $100 each for govern ments and charitable organizations to purchase and distribute. The project is making progress, but there are numerous obstacles to providing a low-cost computer to children throughout the devel oping world (e.g., the price is still around $200; for more on OLPC and other efforts to develop computers for children in the developing world, see Case 1, “Bridging the Digital Divide,” at the end of this chapter). Clearly, the digital divide is a major ethical concern facing the information age.



INDUSTRY ANALYSIS

Business Career Outlook

**T**oday, organizations are increasingly moving away from focusing exclusively on local markets. For example, Price WaterhouseCoopers is focusing on forming overseas part nerships to increase its client base and to better serve the regions located away from its U.S. home. This means that it is not only more likely that you will need to travel overseas in your career or even take an overseas assignment, but also extremely likely that you will have to work with customers, suppliers, or colleagues from other parts of the world. Given this globalization trend, there is a shortage of business pro fessionals with the necessary “global skills” for operating in the digital world. Three strategies for improving your skills include the following:

**1. *Gain International Experience.*** The first strategy is very straightforward. Simply put, by gaining interna tional experiences, you will more likely possess the necessary cultural sensitivity to empathize with other cultures, and, more important, you will be a valuable asset to any global organization.

**2. *Learn More Than One Language.*** A second strategy is to learn more than your native language. Language problems within global organizations are often hidden beneath the surface. Many people are embarrassed to

admit when they don’t completely understand a foreign colleague. Unfortunately, the miscommunication of

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FIGURE 1.21

One Laptop per Child (OLPC)

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important information can have disastrous effects on the business.

**3. *Sensitize Yourself to Global Cultural and Political Issues.*** A third strategy focuses on developing greater sensitivity to the various cultural and political differences within the world. Such sensitivity and awareness can be developed through course work, seminars, and interna tional travel. Understanding current events and the po litical climate of international colleagues will enhance communication, cohesiveness, and job performance.

In addition to these strategies, prior to making an interna tional visit or taking an international assignment, there are many things you can do to improve your effectiveness as well as enhance your chances of having fun, including the following:

**1.** Read books, newspapers, magazines, and Web sites about the country.

**2.** Talk to people who already know the country and its culture.

**3.** Avoid literal translations of work materials, brochures, memos, and other important documents.

**4.** Watch locally produced television and monitor the local news through international news stations and Web sites.

(*continued*)

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**5.** After arriving in the new country, take time to tour local parks, monuments, museums, entertainment locations, and other cultural venues.

**6.** Share meals and breaks with local workers and discuss more than just work-related issues such as current local events and issues.

**7.** Learn several words and phrases in the local languages.

Regardless of what business profession you choose, global ization is a reality within the digital world. In addition to globalization, the proliferation of information systems is hav ing specific ramifications for all business careers. This is dis cussed next.

*For Accounting and Finance.* In today’s digital world, ac counting and finance professionals rely heavily on informa tion systems. Information systems are used to support various resource planning and control processes as well as to provide managers with up-to-date information. Accounting and finance professionals use a variety of information sys tems, networks, and databases to effectively perform their functions. In addition to changing the ways internal processes are managed and performed, information systems have also changed the ways organizations exchange financial informa tion with suppliers, distributors, and customers. If you choose a career in accounting or finance, it is very likely that you will be working with various types of information sys tems every day.

*For Operations Management.* Information systems have also greatly changed the operations management profession. In the past, orders for supplies had to be placed over the phone, production processes had to be optimized using tedious calculations, and forecasts were sometimes only edu cated guesses. Today, enterprise resource planning and sup ply chain management systems have eliminated much of the “busywork” associated with making production forecasts and placing orders. Additionally, with the use of corporate ex tranets, companies are connecting to their suppliers’ and dis tributors’ networks, helping to reduce costs in procurement and distribution processes. If you choose operations manage ment as your profession, the use of information systems will likely be a big part of your workday.

*For Human Resources Management.* The human re sources management profession has experienced widespread

use of information systems for recruiting employees via Internet job sites, distributing information through corporate intranets, or analyzing employee data stored in databases. In addition to using information systems within your daily work activities, you will also have to deal with other issues related to IS use and misuse within your organization. For example, what are the best methods for motivating employ ees to use a system they do not want to use? What policies should you use regarding monitoring employee productivity or Internet misuse? If you choose human resource manage ment as a profession, information systems have become an invaluable addition to the recruitment and management of personnel.

*For Marketing.* Information systems have changed the way organizations promote and sell their products. For ex ample, business-to-consumer electronic commerce, enabled by the Internet, allows companies to directly interact with their customers without the need for intermediaries; like wise, customer relationship management systems facilitate the targeting of narrow market segments with highly per sonalized promotional campaigns. Marketing professionals must therefore be proficient in the use of various types of information systems in order to attract and retain loyal customers.

*For Information Systems.* Information systems have be come a ubiquitous part of organizational life, where systems are used by all organizational levels and functions. Because of this, there is a growing need for professionals to develop and support these systems. To most effectively utilize the invest ment in information systems, professionals must be proficient in both business—management, marketing, finance, and accounting—and technology. In other words, IS professionals must understand the business rationale for implementing a particular system as well as how organizations can use various systems to obtain a competitive advantage. Being able to un derstand both the business needs of the organization and the way in which IS-based solutions can meet these needs will pro vide you with a competitive advantage in the job market.

Based on:

Treitel, R. (2000, October 9). Global success. *Gantthead.com*. Retrieved April 23, 2010, from http://www.gantthead.com/articles/articlesPrint .cfm?ID 12706.

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Key Points Review

**1. *Describe the characteristics of the digital world and the advent of the information age.*** Today, we live in a knowledge society, and information systems have become pervasive throughout our organizational and personal lives. The information age refers to a time in the history of civilization when information became the currency of the realm. Being successful in many careers today requires that people be computer literate, because the ability to access and effectively operate computing technology is a key part of many careers.

**2. *Define globalization, describe how it evolved over time, and describe the key drivers of globalization.*** A more global and competitive world includes visible economic, cultural, and technological changes. Global ization is the integration of economies throughout the world, fueled by technological progress and innovation. Over the past centuries, globalization has come a long way; starting with Columbus’s discovery of America, Globalization 1.0 was fueled by power. Then, in 1800, Globalization 2.0 started, fueled mainly by a fall in transportation and telecommunications costs. Globaliza tion 3.0 started in 2000 and was enabled by the conver gence of a number of enablers, namely, the fall of the Berlin Wall, Netscape going public, work flow software, uploading, outsourcing, offshoring, supply chaining, in sourcing, in-forming, and “the steroids.” This has led to a rise in outsourcing and has helped to shape the world as we know it today. Companies operating in the digital world see a number of opportunities, many of which are enabled by Globalization 3.0, such as access to new markets and access to a talented labor pool in countries with lower wages. In addition to the opportunities, oper ating in the digital world also poses a number of chal lenges to companies. These challenges are of a governmental, geoeconomic, and cultural nature.

**3. *Explain what an information system is, contrasting its data, technology, people, and organizational components.*** Information systems are combinations of hardware, software, and telecommunications networks that people build and use to collect, create, and distribute useful data, typically in organizational settings. When data are organized in a way that is use ful to people, these data are defined as information. The term “information systems” is also used to repre sent the field in which people develop, use, manage, and study computer-based information systems in or ganizations. The field of information systems is huge, diverse, and growing, and encompasses many different people, purposes, systems, and technologies. The tech nology part of information systems is the hardware, software, and telecommunications networks. The peo ple who build, manage, use, and study information sys tems make up the people component. They include systems analysts, systems programmers, IS professors,

and many others. Finally, information systems typi cally reside and are used within organizations, so they are said to have an organizational component. To gether, these four aspects form an information system.

**4. *Describe the dual nature of information systems in the success and failure of modern organizations.*** If information systems are conceived, designed, used, and managed effectively and strategically, then to gether with a sound business model they can enable organizations to be more effective, to be more produc tive, to expand their reach, and to gain or sustain com petitive advantage over rivals. If information systems are not conceived, designed, used, or managed well, they can have negative effects on organizations such as loss of money, loss of time, loss of customers’ good will, and, ultimately, loss of customers. Modern organ izations that embrace and manage information systems effectively and strategically and combine that with sound business models tend to be the organizations that are successful and competitive.

**5. *Describe how computer ethics impact the use of information systems and discuss the ethical concerns associated with information privacy, accuracy, prop erty, and accessibility.*** Information privacy is con cerned with what information an individual should have to reveal to others through the course of employment or through other transactions, such as online shopping. En suring authenticity and fidelity of information, as well as identifying who is responsible for informational errors that harm people, is information accuracy. Information property focuses on who owns information about individ uals and how information can be sold and exchanged. In formation accessibility refers to what information a person or organization has the right to obtain about others and how this information can be accessed and used. While the information age has brought widespread access to information, the downside is that others may now have access to personal information that you would prefer to keep private. Because there are few safeguards for ensuring the accuracy of information, individuals and companies can be damaged by informational errors. Addi tionally, because information is so easy to exchange and modify, information ownership violations readily occur. Likewise, with the rapid increase in online databases con taining personal information and the increase in the use of computer-based communication between individuals, the question of who has the right to access and monitor this information has raised many ethical concerns. Finally, the digital divide between people who are computer liter ate and have access to information resources and those who do not is one of the major ethical challenges facing society today. While the digital divide is shrinking in the United States, it continues to be a major challenge else where, especially in developing countries.

46 CHAPTER 1 • MANAGING IN THE DIGITAL WORLD Key Terms

cloud computing 9

collaboration system 31 competitive advantage 35 computer-based information system 23

computer ethics 36

computer fluency 9

computer literacy 8

data 22

digital divide 41

downsizing 15

globalization 10

Globalization 1.0 10

Globalization 2.0 11

Globalization 3.0 12

hardware 21

information 22

Review Questions

information accessibility 40 information accuracy 38 information age 7

information privacy 36 information property 38 information system 21 information technology 21 in-forming 15

in-sourcing 15

internetworking 30

knowledge 22

knowledge society 5

knowledge worker 5

Luddite 7

management information system 30

nearshoring 18

neo-Luddite 36

office automation system 31 offshore outsourcing 14

offshoring 14

One Laptop per Child (OLPC) 42 outsourcing 14

service mentality 32

software 21

strategic 35

systems integration 30

telecommunications network 21 transaction processing system (TPS) 30

uploading 13

wiki 14

work flow software 13

**1.** Define the term “knowledge worker.” Who coined the term? **2.** Describe and contrast the economic, cultural, and techno logical changes occurring in the digital world.

**3.** List the 10 factors that led to Globalization 3.0. **4.** Describe work flow software. How did this technology drive the flattening of the world?

**5.** Compare outsourcing, offshoring, and offshore outsourcing. **6.** Describe in-sourcing and provide examples of how organizations use in-sourcing.

**7.** List and describe several reasons why companies are choosing to outsource business activities.

**8.** List and contrast several challenges of operating in the digital world.

**9.** Define the term “information systems” and explain its data, technology, people, and organizational components. **10.** Define and contrast data, information, and knowledge.

Self-Study Questions

**1.** Information systems today are \_\_\_\_\_\_\_.

A. slower than in the past

B. continuing to evolve with improvements to the hard ware and software

C. utilized by only a few select individuals

D. stable and should not change

**2.** Whereas data are raw unformatted pieces or lists of words or numbers, information is \_\_\_\_\_\_\_.

A. data that has been organized in a form that is useful B. accumulated knowledge

C. what you put in your computer

D. what your computer prints out for you

**11.** Describe three or four types of jobs and career opportuni ties in information systems and in related fields. **12.** List and define three technical knowledge and/or skills core competencies.

**13.** List and define four business knowledge and/or skills core competencies.

**14.** List and define four of the systems knowledge and/or skills core competencies.

**15.** List and define five types of information systems used in organizations.

**16.** Describe the evolution of the information systems function within organizations.

**17.** How are the digital divide and computer literacy related? **18.** Compare and contrast information privacy, accuracy, prop erty, and accessibility.

**3.** Computer-based information systems were described in this chapter as \_\_\_\_\_\_\_.

A. any complicated technology that requires expert use B. a combination of hardware, software, and telecommuni cations networks that people build and use to collect, create, and distribute data

C. any technology (mechanical or electronic) used to sup plement, extend, or replace human, manual labor D. any technology used to leverage human capital

**4.** Other terms that can be used to represent the knowledge society include \_\_\_\_\_\_\_.

A. the new economy

B. the network society

C. the digital world

D. all of the above

**5.** Which of the following was *not* discussed as a common type, or category, of information system used in organizations? A. transaction processing

B. decision support

C. enterprise resource planning

D. Web graphics

**6.** What stage of globalization started with expansion of trade to India, where the horse and wind and, in later stages, steam were the primary drivers?

A. Globalization 0.5

B. Globalization 1.0

C. Globalization 2.0

D. Globalization 3.0

**7.** The release of the Netscape Web browser had the following effects on the flattening of the world *except* \_\_\_\_\_\_\_. A. helping setting standards for the display of Web data B. providing easy access to the Internet

C. providing integrated e-mail

D. helping setting standards for the transport of Web data

Problems and Exercises

**1.** Match the following terms with the appropriate definitions: i. Information

ii. Downsizing

iii. Information systems

iv. Information accuracy

v. Computer fluency

vi. Globalization 3.0

vii. Offshore outsourcing

viii. Digital divide

ix. Information privacy

x. Computer ethics

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**8.** Which of the following is *not* considered an enabler of a flat world by Friedman?

A. uploading

B. supply chaining

C. in-forming

D. customer service software

**9.** Which of the following is *not* considered open-source software?

A. Microsoft Office

B. OpenOffice.org

C. Firefox

D. Linux

**10.** Being \_\_\_\_\_\_\_, or knowing how to use the computer as a device to gather, store, organize, and process information, can open up myriad sources of information.

A. technology literate

B. digitally divided

C. computer literate

D. computer illiterate

Answers are on page 49.

a. The issues and standards of conduct as they pertain to the use of information systems

b. Data that have been formatted in a way that is useful c. Stage of globalization encompassing virtually every nation and shrinking the world from “size small to size tiny”

d. The ability to independently learn new technologies as they emerge and assess their impact on one’s work and life

e. The practice of slashing costs and streamlining opera tions by laying off employees

f. Combinations of hardware, software, and telecommu nications networks that people build and use to collect, create, and distribute useful data, typically in organiza tional settings

g. The outsourcing of business processes on a global scale

h. An area concerned with what information an individual should have to reveal to others through the course of employment or through other transactions, such as on line shopping

i. The gap between those individuals in our society who are computer literate and have access to information resources, such as the Internet, and those who do not

j. An area concerned with ensuring the authenticity and fidelity of information as well as identifying who is re sponsible for informational errors that harm people

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**2.** Peter Drucker has defined the knowledge worker and knowledge society. What are his definitions? Do you agree with them? What examples can you give to support or disprove these concepts?

**3.** Of the several information systems listed in the chapter, how many do you have experience with? What systems would you like to work with? What types of systems do you encounter at the university you are attending? The

Web is also a good source for additional information. **4.** Identify someone who works within the field of informa tion systems as an IS instructor, professor, or practitioner (e.g., as a systems analyst or systems manager). Find out why this individual got into this field and what this person likes and dislikes about working within the field of infor mation systems. What advice can this person offer to someone entering the field?

**5.** As a small group, conduct a search on the Web for job placement services. Pick at least four of these services and find as many IS job titles as you can. You may want to try monster.com or careerbuilder.com. How many did you find? Were any of them different from those presented in this chapter? Could you determine the responsibilities of these positions based on the information given to you?

**6.** Visit Walmart China (www.wal-martchina.com/english/ index.htm). Compare and contrast www.walmart.com with Walmart China’s site. What is the focus of Walmart China’s Web site? Discuss how the focus differs from www.walmart .com. What are possible reasons for the differences?

**7.** What digital news media do you use to get your news? According to this textbook’s definitions, are you in forming? If you are in-forming, describe how. What other ways could you in-form?

**8.** What are some examples of key technologies that utilize “steroids”? Using the technology definition provided by this textbook, how do you use technological steroids in your everyday life?

**9.** Should the U.S. government allow companies to use off shore outsourcing if qualified U.S. citizens are willing and able to do a job? Should the government regulate the amount that can be outsourced by any company? Why or why not?

**10.** Work flow software allows an organization to move docu ments and/or tasks through a work process. Using your own experiences and observations, either professionally or personally, describe how the work flow software worked.

Application Exercises

Note: The existing data files referenced in these exercises are available on the Student Companion Web site: **www.pearsonhighered.com/valacich.** 

Spreadsheet Application: 

Ticket Sales at Campus Travel

The local travel center, Campus Travel, has been losing sales. The presence of online ticketing Web sites, such as Travelocity .com and Expedia.com, has lured many students away. However,

**11.** As outlined in the chapter, UPS provides in-sourcing services for many businesses. Visit www.ups.com and identify some examples of UPS providing in-sourcing services and include a listing of some of UPS’s in-sourcing customers.

**12.** List 10 reasons why you would (or would not) be a good global manager.

**13.** Global outsourcing appears to be here to stay. Use the Web to identify a company that is providing low-cost labor from some less developed part of the world. Provide a

short report that explains who the company is, where it is located, who its customers are, what services and capabili ties it provides, how long it has been in business, and any other interesting information you can find in your research.

**14.** The Electronic Frontier Foundation (www.eff.org) has a mission of protecting rights and promoting freedom in the “electronic frontier.” The organization provides additional advice on how to protect your online privacy. Review its suggestions and provide a summary of what you can do to protect yourself.

**15.** Do you consider yourself computer literate? Do you know of any friends or relatives who are not computer literate? What can you do to improve your computer literacy? Is computer literacy necessary in today’s job market? Why or why not?

**16.** Complete the computer ethics quiz at http://web.cs.bgsu .edu/maner/xxicee/html/welcome.htm and visit www .onlineethics.org/Resources/19049.aspx for more issues on computer ethics and social implications of computing. Should ethical codes apply to all professions?

**17.** Find your school’s guidelines for ethical computer use on the Internet and answer the following questions: Are there limitations as to the type of Web sites and material that can be viewed (e.g., pornography)? Are students al lowed to change the programs on the hard drives of the lab computers or download software for their own use? Are there rules governing personal use of computers and e-mail?

**18.** Do you believe that there is a need for a unified informa tion systems code of ethics? Visit www.albion.com/ netiquette/corerules.html. What do you think of this code? Should it be expanded, or is it too general? Search the Internet for additional codes for programmers or Web developers. What did you find?

given the complexity of making international travel arrange ments, Campus Travel could have a thriving and profitable busi ness if it concentrated its efforts in this area. You have been asked by the director of sales and marketing to help with ana lyzing prior sales data in order to design better marketing strate gies. Looking at these data, you realize that it is nearly impossible to perform a detailed analysis of ticket sales given that it is not summarized or organized in a useful way to inform