Fifth Edition

Introduction to INFORMATION SYSTEMS

SUPPORTING AND TRANSFORMING BUSINESS

Rainer • Prince • Cegielski

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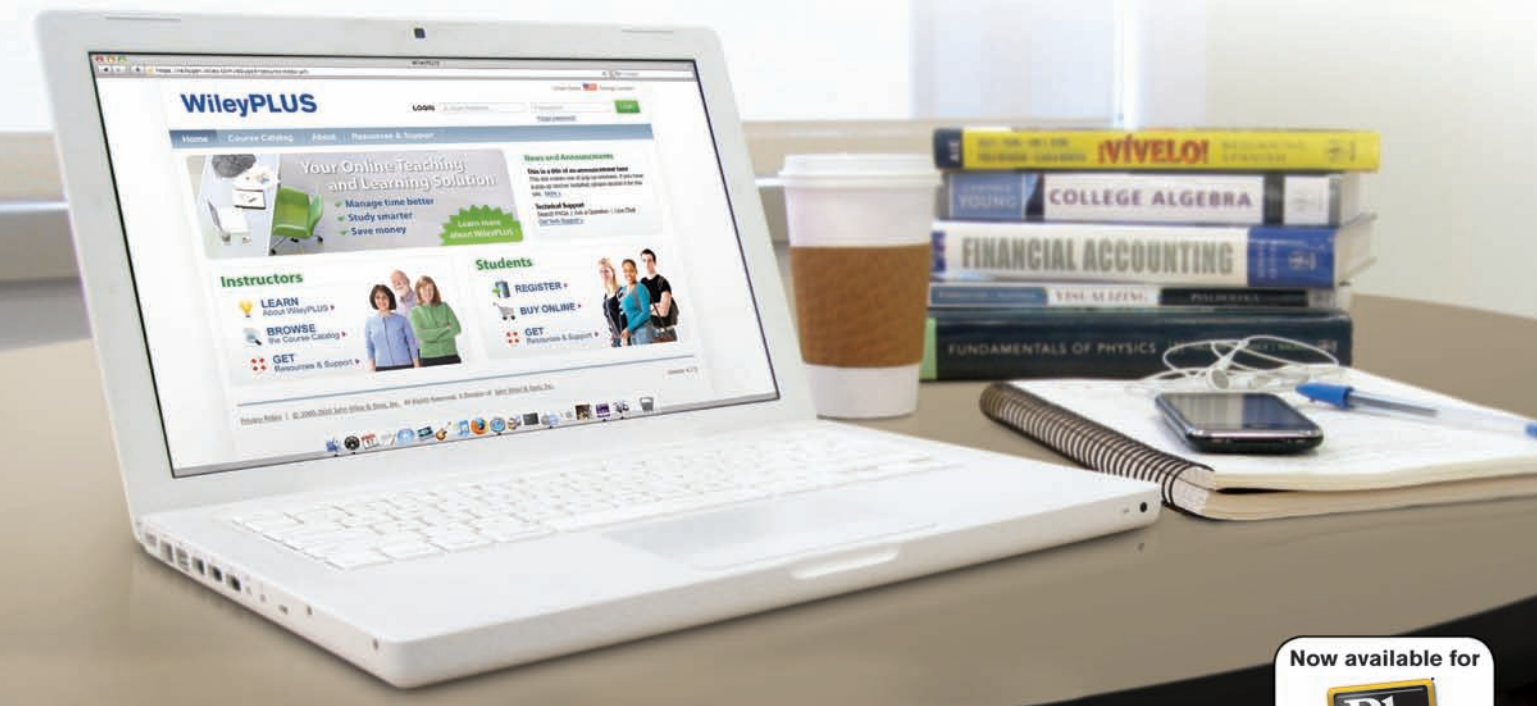

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Introduction to Information Systems

Supporting and Transforming Business

Fifth Edition

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ISBN 978-1-118-67436-9 (Main Book)
ISBN 978-1-118-77964-4 (Binder-Ready Version)

Preface

What Do Information Systems Have to Do with Business?

This edition of Rainer, Prince, and Cegielski's *Introduction to Information Systems* will answer this question for you. In every chapter, you will see how real global businesses use technology and information systems to increase their profitability, gain market share, improve their customer service, and manage their daily operations. In other words, you will learn how information systems provide the foundation for modern business enterprises.

Our goal is to teach all business majors, especially undergraduates, how to use IT to master their current or future jobs and to help ensure the success of their organization. Our focus is not on merely *learning* the concepts of information technology but rather on *applying* those concepts to perform business processes more effi ciently and effectively. We concentrate on placing information systems in the context of business, so that you will more readily grasp the concepts presented in the text.

The theme of this book, *What's in IT for Me?*, is a question asked by most students who take this course. Our book will show you that IT is the backbone of any business, whether you're majoring in Accounting, Finance, Marketing, Human Resources, Operations Management, or MIS.

New to This Edition

The fifth edition contains many exciting additions and changes. These elements make the text more interesting and readable for students of all majors, while still providing the most current information possible in the rapidly changing field of information systems.

Overall

- A new chapter on Social Computing (Chapter 9).
- A new Technology Guide on Cloud Computing (Technology Guide 3).
- A new section on Big Data in Chapter 5 (Data and Knowledge Management).
- A new section on Enterprise Resource Planning in Chapter 10 (Information Systems Within Organizations.)
- An expanded section on Business Processes in Chapter 2 (Organizational Strategy, Competitive Advantage, and Information Systems).

- All new or updated chapter-opening and closing cases.
- All new or updated *IT's About Business* boxes in every chapter.
- New "Internship Activities" replace the Ruby's Club activities from previous editions. Students act as interns to solve problems by applying decision-making skills to the chapter content.

Specifically

- Chapter 2
  - Chapter 2, Section 2.1, contains an expanded, rewritten discussion on Business Processes, focusing on cross-functional business processes.
  - Chapter 2, Section 2.2, contains an expanded, rewritten discussion on Business Process Reengineering, Business Process Improvement, and Business Process Management.
- Chapter 10
  - Chapter 10 has a completely rewritten, expanded section on Enterprise Resource Planning systems (Section 10.3).
  - Chapter 10 has a new section on Enterprise Resource Planning systems support for business processes (Section 10.4).

Key Features

We have been guided by the following goals that we believe will enhance the teaching and learning experience.

"What's in IT for Me?" theme

- We show why IT is important by calling attention in each chapter to how that chapter's IT topic relates to students in each major.
  - A new feature of this edition is chapter-opening "teasers" that list specific tasks for each major that the chapter will help prepare students to do.
  - Throughout each chapter, icons guide the reader to relevant issues for their specific functional area—Accounting (ACC), Finance (FIN), Marketing (MKT), Operations Management (POM), Management Information Systems (MIS), and Human Resources Management (HRM).
  - Every chapter concludes with a summary of how the concepts relate to each functional area ("What's in IT for Me?").

Active Learning

We recognize the need to actively involve students in problem solving, creative thinking, and capitalizing on opportunities. Therefore, we have included in every chapter a variety of hands-on exercises, activities, and mini-cases, including exercises that require students to use software application tools. Through these activities and an interactive Web site, we enable students to apply the concepts they learn.

Diversified and Unique Examples from Different Industries

Extensive use of vivid examples from large corporations, small businesses, and government and not-for-profit organizations helps to enliven concepts by demonstrating the capabilities of IT, its cost and justification, and innovative ways in which real corporations are using IT in their operations. Each chapter constantly highlights the integral connection between IT and business. This is especially evident in the "IT's About Business" boxes and a new "IT's about *Small* Business" box in each chapter.

Misuse of IS

Like other textbooks, this text presents many examples of IS success. But we also provide numerous examples of IS failures, in the context of lessons that can be learned from such failures. Misuse of IS can be very expensive, as we illustrate.

Innovation and Creativity

In today's rapidly changing environment, creativity and innovation are essential for a business to operate effectively and profitably. Throughout the text we demonstrate how IT facilitates these concepts.

Global Focus

Because an understanding of global competition, partnerships, and trading is essential to success in business, we provide a broad selection of international cases and examples. We discuss how IT facilitates export and import, the management of multinational companies, and electronic trading around the globe. These global examples are highlighted with the global icon.

Focus on Ethics

With corporate scandals appearing daily in the news, ethics and ethical questions have come to the forefront of business people's minds. In addition to a chapter that concentrates on ethics and privacy (Chapter 3), we have included examples and cases that focus on business ethics throughout the chapters. These examples are highlighted with the ethics icon.

Pedagogical Structure

Other pedagogical features provide a structured learning system that reinforces the concepts through features such as chapter-opening organizers, section reviews, frequent applications, and hands-on exercises and activities.

Chapter-opening organizers include the following pedagogical features:

- The *Learning Objectives* provide an overview of the key concepts students should come away with after reading the chapter.
- *Web Resources* highlight ancillary materials available on the book companion site and within *WileyPLUS* for both instructors and students.
- The *Chapter Outline* lists the major chapter headings.
- An opening *case* identifies a business problem faced by an actual company, describes the IT solution applied to the business problem, presents the results of the IT solution, and summarizes what students can learn from the case.
- New "What's in IT for Me?" "teasers" give students a quick hint about skills in their majors for which this chapter will help prepare them.

Study aids are provided throughout each chapter. These include the following:

- *IT's About Business* cases provide real-world applications, with questions that relate to concepts covered in the text. Icons relate these sections to the specific functional areas.
- New *IT's About Small Business* cases show examples of small businesses to which students may relate more closely than to large corporations.
- Highlighted *Examples* interspersed throughout the text illustrate the use (and misuse) of IT by real-world organizations, thus making the conceptual discussion more concrete.
- *Tables* list key points or summarize different concepts.
- End-of-section reviews (*Before You Go On . . .*) prompt students to pause and test their understanding of basic concepts before moving on to the next section.

End-of-chapter study aids provide extensive opportunity for the reader to review and actually "do something" with the concepts they have just studied:

- *What's in IT for Me?* is a unique chapter summary section that demonstrates the relevance of topics for different functional areas (accounting, finance, marketing, production/operations management, and human resources management).
- The *Chapter Summary*, keyed to learning objectives listed at the beginning of the chapter, enables students to review the major concepts covered in the chapter.
- The end-of-chapter *Glossary* facilitates studying by listing and defining all of the key terms introduced in the chapter.
- *Discussion Questions*, *Problem-Solving Activities*, and *Team Assignments* provide practice through active learning. These exercises are hands-on opportunities to use the concepts discussed in the chapter.
- A *Case* presents a brief case study organized around a business problem and explains how IT helped to solve it. Questions at the end of the case relate it to concepts discussed in the chapter.
- "Internship Activities" present problems found in four recurring businesses (in the areas of healthcare, banking, manufacturing, and retail.) Students are asked to act as interns to solve the problems by applying decision-making skills to the chapter content.

Online Resources

www.wiley.com/college/rainer

This text also facilitates the teaching of an introductory IS course by providing extensive support materials for instructors and students. Go to *www.wiley.com/college/rainer* to access the Student and Instructor Web Sites.

Instructor's Manual

The *Instructor's Manual*, created by Bob Gehling of Auburn University at Montgomery, includes a chapter overview, teaching tips and strategies, answers to all end-of-chapter questions, supplemental mini-cases with essay questions and answers, and experiential exercises that relate to particular topics.

Test Bank

The *Test Bank*, written by Aditi Mukherjee of University of Florida is a comprehensive resource for test questions. It contains multiple-choice, true/false, short answer, and essay questions for each chapter. The multiple-choice and true/false questions are labeled according to difficulty: easy, medium, or hard. New to this edition are "Apply the Concept" questions that require the students to use critical thinking to solve a problem.

The test bank is available for use in Respondus' easy-to-use software. Respondus is a powerful tool for creating and managing exams that can be printed to paper or published directly to Blackboard, WebCT, Desire2Learn, eCollege, ANGEL, and other eLearning systems. For more information on Respondus and the Respondus Test Bank Network, please visit *www.respondus.com*.

PowerPoint Presentations

The *PowerPoint Presentations* created by Ken Corley of Appalachian State University consist of a series of slides for each chapter of the text that are designed around the text content, incorporating key points from the text and all text illustrations as appropriate.

Wiley Information Systems Hub

http://wileyiscommunity.ning.com/

This is a new online, interactive community designed to support the teaching of the Intro IS course. The Hub will allow IS faculty to explore a centralized and constantly updated set of

current articles for use in class, connect with IS colleagues for help and advice about upcoming course topics, and share course materials with other IS faculty. The Community Manager is David Firth of University of Montana

Weekly Updates

Weekly updates, harvested from around the web by David Firth of the University of Montana, provide you with the latest IT news and issues. These are posted every Monday morning throughout the year at *http://wileyinformationsystemsupdates.com/* and include links to articles and videos as well as discussion questions to assign or use in class.

Image Library

All textbook figures are available for download from the Web site. These figures can easily be added to PowerPoint presentations.

OfficeGrader

OfficeGrader™ is an Access-based VBA macro that enables automatic grading of Office assignments. The macros compare Office files and grade them against a master file. OfficeGrader™ is available for Word, Access, Excel, and PowerPoint for Office 2010 and Office 2013. For more information, contact your Wiley sales representative or visit www.wiley.com/college/microsoft and click on "OfficeGrader."

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For Students

Different learning styles, different levels of proficiency, different levels of preparation—each of your students is unique. *WileyPLUS* empowers them to take advantage of their individual strengths.

– **Integrated, multi-media resources** provide multiple study-paths to fit each student's learning preferences and encourage more active learning. Resources include:
  - Author podcasts, several for each chapter, to use for review,
  - Manager Videos,
  - Internship Activities,
  - Student lecture slides (PowerPoint) for note-taking,
  - Microsoft Office lab manual
– *WileyPLUS* includes **many opportunities for self-assessment** linked to the relevant portions of the text. Students can take control of their own learning and practice until they master the material. Resources include:
  - Automatically-graded practice questions from the Test Bank
  - Pre- and post-lecture quizzes,
  - Vocabulary flash cards and quizzes

For Instructors:

WileyPLUS empowers you with the tools and resources you need to make your teaching even more effective.

- You can customize your classroom presentation with a wealth of resources and functionality. You can even add your own materials to your *WileyPLUS* course. Resources include:
  - PowerPoint presentations
  - Completely revised Testbank with a wide range of levels and new "Apply the Concepts" questions.
- With *WileyPLUS* you can identify those students who are falling behind and intervene accordingly, without having to wait for them to come to office hours.
- *WileyPLUS* simplifies and automates such tasks as student performance assessment, making assignments, scoring student work, keeping grades, and more.

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Acknowledgments

Creating, developing, and producing a text for an introduction to information technology course is a formidable undertaking. Along the way, we were fortunate to receive continuous evaluation, criticism, and direction from many colleagues who regularly teach this course. We would like to acknowledge the contributions made by the following individuals.

We would like thank the Wiley team: Beth Lang Golub, Executive Editor; Wendy Ashenberg, Senior Content Editor; Jennifer Welter, Senior Product Designer, Margaret Barrett, Senior Marketing Manager; and Katherine Willis, Editorial Program Assistant. We also thank the production team, including Kevin Holm, Senior Content Manager; Tim Lindner, Production Editor; and Namit Grover of Thomson Digital. And thanks to Harry Nolan, Design Director; Maureen Eide, Senior Designer; and Lisa Gee, Senior Photo Editor. We also would like to thank Robert Weiss for his skillful and thorough editing of the manuscript.

We also acknowledge and appreciate Bob Gehling, Aditi Mukherjee, and Ken Corley for their work on the supplements, and David Firth for his work on the Weekly Updates and the new Faculty Hub. Many thanks also to Alina M. Chircu and Marco Marabelli of Bentley University for developing new material that enhances our coverage of business processes and ERP. Finally, we thank all the faculty listed below who have generously shared their varied opinions by reviewing the manuscript and/or completing our user surveys.

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Brief Contents

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Chapter 1

Introduction to Information Systems

[LEARNING OBJECTIVES]

1. Identify the reasons why being an informed user of information systems is important in today's world.
2. Describe the various types of computer-based information systems in an organization.
3. Discuss ways in which information technology can affect managers and nonmanagerial workers.
4. Identify positive and negative societal effects of the increased use of information technology.

[CHAPTER OUTLINE]

[WEB RESOURCES]

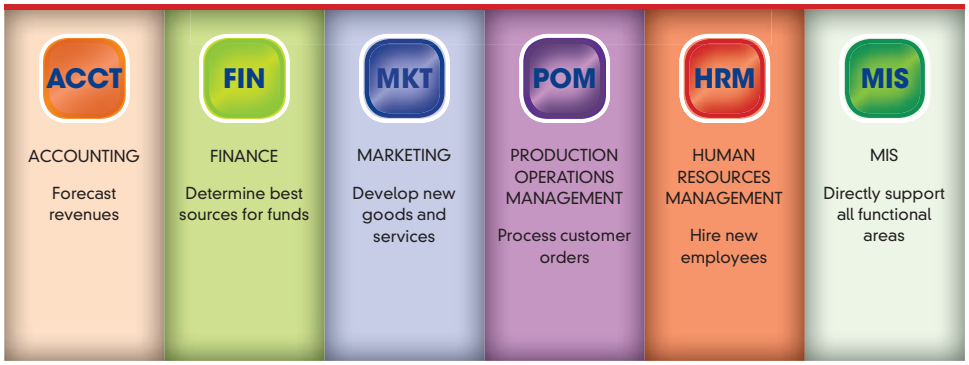
- Student PowerPoints for note taking

WileyPLUS

- E-book
- Author video lecture for each chapter section
- Practice quizzes
- Flash Cards for vocabulary review
- Additional "IT's About Business" cases
- Video interviews with managers
- Lab Manuals for Microsoft Office 2010 and 2013

What's In IT For Me?

This Chapter Will Help Prepare You To...



The Business Problem

Sixty years into the computer revolution, 40 years into the age of the microprocessor, and 20 years into the rise of the modern Internet, all of the technology required to transform industries through software has been developed and integrated and can be delivered globally. Billions of people now access the Internet via broadband connections. Worldwide, more than 5 billion people use cell phones. Of those users, 1 billion have smartphones that provide them with instant access to the Internet at all times from multiple locations.

In addition, software programming tools and Internet-based services allow companies in many industries to launch new software-powered startups without investing in new infrastructure or training new employees. For example, in 2000, operating a basic Internet application cost businesses approximately $150,000 per month. Today, operating that same application in Amazon's cloud (we discuss cloud computing in detail in Technology Guide 3) costs about $1,000 per month.

In essence, software is disrupting every industry, and every organization must prepare for this disruption. Numerous companies have attempted to meet the disruption challenge: Some have succeeded and some have failed.

[Today, Every Company Is a Technology Company]

MIS

Software Disruptions

Let's look at examples of software disruption across several industries. Many of these examples focus on two scenarios: (1) industries where software disrupted the previous market-leading companies and (2) industries where a new company (or companies) used software to achieve a competitive advantage.

- *The book industry*: A dramatic example of software disruption is the fate of Borders bookstore. In 2001, Borders agreed to hand over its online business to Amazon because the bookstore was convinced that online book sales were nonstrategic and unimportant. Ten years later, Borders filed for bankruptcy. That same year, the www.borders.com Web site was replaced with a redirect link to the Barnes & Noble Web site (www.bn.com).

Then, in January 2012, Barnes & Noble warned analysts that it would lose twice as much money in 2012 as it had previously predicted. On April 30, 2012, the bookstore entered into a partnership with Microsoft that will spin off the Nook and college businesses into a subsidiary.

Today, the world's largest bookseller, Amazon, is a software company. Its core capability is its software engine, which can sell virtually anything online without building or maintaining any retail stores. Amazon has even reorganized its Web site to promote its Kindle digital books over physical books. (In August 2012, Amazon announced that it sold more electronic books than hardback books and paperback books combined.) Now, even the books themselves are software products.

- *The music industry*: As with publishing, today's dominant music companies are software companies: Apple's iTunes (www.apple.com/itunes), Spotify (www.spotify.com), and Pandora (www.pandora.com). Traditional record labels now exist largely to provide those software companies with content. In mid-2013, the Recording Industry Association of America (RIAA) continues to fight battles over copyright infringement and the illegal download and sharing of digital music files.
- *The video industry*: Blockbuster—which rented and sold videos and ancillary products through its chain of stores—was the industry leader until it was disrupted by a software company, Netflix (www.netflix.com). In mid-2013, Netflix has the largest subscriber base of any video service with some 33 million subscribers. Meanwhile, Blockbuster declared bankruptcy in February 2011 and was acquired by satellite television provider Dish Networks in March 2011.
- *The software industry*: Incumbent software companies such as Oracle and Microsoft are increasingly threatened by software-as-a-service products (e.g., Salesforce.com) and Android, an open-source operating system developed by the Open Handset Alliance (www.openhandsetalliance.com). (We discuss operating systems in Technology Guide 2 and software-as-a-service in Technology Guide 3.)
- *The videogame industry*: Today, the fastest-growing entertainment companies are videogame makers—again, software. Examples are
  - Zynga (www.zynga.com), which makes FarmVille, delivers its games entirely online.
  - Rovio (www.rovio.com), the maker of Angry Birds, made almost $195 million in 2012. The company was nearly bankrupt when it launched Angry Birds on the iPhone in late 2009.
  - Minecraft (www.minecraft.net), another video game delivered exclusively over the Internet, was first released in 2009. By January 2013, more than 20 million people had downloaded it. Interestingly, the creator of Minecraft, Markus Persson, has never spent any money to market his game. Instead, sales resulted entirely from word of mouth.
- *The photography industry*: This industry was disrupted by software years ago. Today it is virtually impossible to buy a mobile phone that does not include a software-powered camera. In addition, people can upload photos automatically to the Internet for permanent archiving and global sharing. The leading photography companies include Shutterfly (www.shutterfly.com), Snapfish (www.snapfish.com), Flickr (www.flickr.com), and Instagram (www.instagram.com). Meanwhile, the long-time market leader, Kodak—whose name was almost synonymous with cameras—declared bankruptcy in January 2012.
  - Each day people upload more than 350 million digital photos just to Facebook. Snapchat (www.snapchat.com) is a smartphone app that enables users to send a photo (or video) to someone and have it "self-destruct" within seconds. Snapchat users are now sharing more than 100 million "snaps" daily.
- *The marketing industry*: Today's largest direct marketing companies include Facebook (www.facebook.com), Google (www.google.com), Groupon (www.groupon.com), Living Social (www.livingsocial.com), and Foursquare (www.foursquare.com). All of these companies are using software to disrupt the retail marketing industry.

- *The recruiting industry*: LinkedIn (www.linkedin.com) is a fast-growing company that is disrupting the traditional job recruiting industry. For the first time, employees and job searchers can maintain their own resumes on LinkedIn for recruiters to search in real time.
- *The financial services industry*: Software has transformed the financial services industry. Practically every financial transaction is now performed by software. Also, many of the leading innovators in financial services are software companies. For example, Square (https://squareup.com) allows anyone to accept credit card payments with a mobile phone.
- *Fundraising*: In early 2013, Joel Silver and Rob Thomas, the producers of *Veronica Mars*, a feature film, used Kickstarter (www.kickstarter.com) to raise money to produce the film. They achieved their goal of $2 million in just 10 hours. Kickstarter takes a 5 percent cut of every transaction.
- *Genomics*: Illumina (www.illumina.com) has reduced the cost of sequencing a human genome from more $1 million in 2007 to $4,000 in 2013. Illumina's technology has helped medical researchers develop cancer drugs that target specific genetic mutations that can cause cancer.
- *The motion picture industry*: Making feature-length computer-generated films has become incredibly IT intensive. Studios require state-of-the-art information technologies, including massive numbers of servers (described in Technology Guide 1), sophisticated software (described in Technology Guide 2), and an enormous amount of storage (described in Technology Guide 1).

  Consider DreamWorks Animation (www.dreamworksanimation.com), a motion picture studio that creates animated feature films, television programs, and online virtual worlds. The studio has released 26 feature films, including the franchises of *Shrek*, *Madagascar*, *Kung Fu Panda*, and *How to Train Your Dragon*. By late 2012, its feature films had grossed more than $10 billion globally.

  For a single motion picture such as *The Croods*, the studio manages more than 500,000 files and 300 terabytes (a terabyte is 1 trillion bytes) of data, and it uses about 80 million central processing unit (CPU; described in Technology Guide 1) hours. As DreamWorks executives state, "In reality, our product is data that looks like a movie. We are a digital manufacturing company."

Software is also disrupting industries that operate primarily in the physical world. Consider the following examples:

- *The automobile industry*: In modern cars, software is responsible for running the engines, controlling safety features, entertaining passengers, guiding drivers to their destinations, and connecting the car to mobile, satellite, and GPS networks. Other software functions in modern cars include Wi-Fi receivers, which turn your car into a mobile hot spot; software, which helps maximize fuel efficiency; and ultrasonic sensors, which enable some models to parallel-park automatically.

  The next step is to network all vehicles together, a necessary step toward driverless cars. The creation of software-powered driverless cars is already being undertaken at Google as well as several major car companies.
- *The logistics industry*: Today's leading real-world retailer, Walmart, uses software to power its logistics and distribution capabilities. This technology has enabled Walmart to become dominant in its industry.
- *The postal industry*: FedEx, which early in its history adopted the view that "the information about the package is as important as the package itself," now employs hundreds of developers who build and deploy software products for 350,000 customer sites to help customers with their mailing and shipping needs.
- *The oil and gas industry*: Companies in this industry were early innovators in supercomputing and data visualization and analysis, which are critically important to oil and gas exploration efforts.

- *The agriculture industry*: Agriculture is increasingly powered by software, including satellite analysis of soils linked to per-acre seed selection software algorithms. In addition, precision agriculture makes use of automated, driverless tractors controlled by global positioning systems and software.
- *National defense*: Even national defense is increasingly software based. The modern combat soldier is embedded in a web of software that provides intelligence, communications, logistics, and weapons guidance. Software-powered drone aircraft launch airstrikes without placing human pilots at risk. (We discuss drone technology later in the chapter.) Intelligence agencies perform large-scale data mining with software to uncover and track potential terrorist plots.
- *The retail industry*: Women have long "borrowed" special-occasion dresses from department stores, buying them and then returning them after one night wearing them. Now, Rent the Runway (www.renttherunway.com) has redefined the fashion business, making expensive clothing available to more women than ever before. The firm is also disrupting traditional physical retailers. After all, why buy a dress when you can rent one for a very low price? Some department stores feel so threatened by Rent the Runway that they have reportedly told vendors that they will pull floor merchandise if it ever shows up on that company's Web site.

  Rent the Runway employs 200 people, including one of the nation's largest dry-cleaning operations. Their Web site has more than 3 million members, and it features 35,000 dresses and 7,000 accessories created by 170 designers.
- *Education*: College graduates owe approximately $1 trillion in student debt, a crippling burden for many recent graduates. UniversityNow (www.unow.com) was founded to make college more accessible to working adults by offering online, self-paced degrees. Two key characteristics distinguish UniversityNow from an increasing number of rivals: (1) very low fees (as little as $2,600, which includes tuition and books for as many courses students can complete in one year) and (2) fully accredited degrees, from an associate's degree to an M.B.A.
- *The legal profession*: Today, electronic discovery (e-discovery) software applications can analyze documents in a fraction of the time that human lawyers would take, at a fraction of the cost. For example, Blackstone Discovery (www.blackstonediscovery.com) helped one company analyze 1.5 million documents for less than $100,000. That company estimated that the process would have cost $1.5 million if performed by lawyers.

  E-discovery applications go beyond simply finding documents rapidly using relevant terms. They can also extract relevant concepts, even in the absence of specific terms, and they can deduce peoples' patterns of behavior that would have eluded lawyers examining millions of documents. These applications can also analyze documents for information pertaining to the activities and interactions of people—who did what and when, and who talked to whom.

The Results

Clearly, then, an increasing number of major businesses and industries are being run on software and delivered as online services—from motion pictures to agriculture to national defense. Regardless of the industry, companies face constant competitive threats from both established rivals and entrepreneurial technology companies that are developing disruptive software. These threats will force companies to become more agile and to respond to competitive threats more quickly, efficiently, and effectively.

Sources: Compiled from C. Howard, M. Noer, and T. Post, "Disruptors," *Forbes*, April 15, 2013; S. Mendelson, "Can Fox and DreamWorks Combined Challenge Disney's Animation Empire?" *Forbes*, April 10, 2013; S. Greengard, "DreamWorks Takes a Picture-Perfect Approach to IT," *Baseline Magazine*, April 1, 2013; M. K. Rodriguez, "Traditional vs. Disruptive Tech: What's Best for Your Business?" *Amadeus Consulting White Paper*, February 28, 2013; S. Noonoo, "How Disruptive Technologies Are Leading the Next Great Education Revolution," *T.H.E. Journal*, January 16, 2013; De La Merced, "Eastman Kodak

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Questions

1. If every company is now a technology company, then what does this mean for the company's employees? Provide specific examples to support your answer.
2. If every company is now a technology company, then what does this mean for every student attending a business college? Provide specific examples to support your answer.

What We Learned from This Case

The chapter-opening case illustrates that the impacts of information technology are wide-ranging, global, and disruptive. You will encounter many other examples of the societal and environmental effects of information technology throughout this text. The opening case underscores how important it is for you to have an understanding of information technology, regardless of your career choice.

Before we proceed, we need to define information technology and information systems. **Information technology (IT)** refers to any computer-based tool that people use to work with information and to support the information and information-processing needs of an organization. An **information system (IS)** collects, processes, stores, analyzes, and disseminates information for a specific purpose.

The opening case is a dramatic example of the far-reaching effects of IT on individuals, organizations, and our planet. Although this text is largely devoted to the many ways in which IT has transformed modern organizations, you will also learn about the significant impacts of IT on individuals and societies, the global economy, and our physical environment. In addition, IT is making our world smaller, enabling more and more people to communicate, collaborate, and compete, thereby leveling the digital playing field.

When you graduate, you either will start your own business or you will work for an organization, whether it is public sector, private sector, for-profit, or not-for-profit. Your organization will have to survive and compete in an environment that has been radically transformed by information technology. This environment is global, massively interconnected, intensely competitive, 24/7/365, real-time, rapidly changing, and information-intensive. To compete successfully, your organization must use IT effectively.

As you read this chapter and this text, keep in mind that the information technologies you will learn about are important to businesses of all sizes. No matter what area of business you major in, what industry you work for, or the size of your company, you will benefit from learning about IT. Who knows? Maybe you will use the tools you learn about in this class to make your great idea a reality!

The modern environment is intensely competitive not only for your organization, but for you as well. You must compete with human talent from around the world. Therefore, you will also have to make effective use of IT.

Accordingly, this chapter begins with a discussion of why you should become knowledgeable about IT. It also distinguishes among data, information, and knowledge, and it differentiates computer-based information systems from application programs. Finally, it considers the impacts of information systems on organizations and on society in general.

As you see in IT's About [Small] Business 1.1, small business owners do not need to be experts in information technology to be successful. The core competency of Warby Parker's business is not technology. Rather, the company's business model is its core competency. However, the firm is effectively using IT to support its business model and, thus, to create a successful business.

IT's about [small] business

1.1 Warby Parker

Warby Parker (www.warbyparker.com) is an online eyewear retailer that was founded in 2010. The idea for the company was conceived when the firm's founders (MBA students at the time) observed that glasses—uncomplicated, easily breakable, and mass-produced—were typically quite expensive ($500 or more, for example). Significantly, the founders were convinced they knew the reason why glasses cost so much. They perceived the optical industry as an *oligopoly*, meaning that a small number of companies dominate the business and are making large margins.

Consider, for example, Luxottica (www.luxottica.com), based in Milan, Italy. This company owns LensCrafters, Pearle Vision, Sunglass Hut, Ray-Ban, Oakley, and Oliver Peoples, in addition to the optical shops in Target and Sears. In addition, as a result of a series of license agreements, Luxottica manufactures eyewear for more than 20 top brands, including Chanel, Burberry, Prada, and Stella McCartney. Warby Parker's founders realized that Luxottica had "created the illusion of choice," when in fact they practically monopolized the industry.

Warby Parker devised a strategy to compete with Luxottica. The company uses the same materials and the same Chinese factories as Luxottica. It then sells its glasses at a lower price because it does not have to pay licensing fees, which can amount to as much as 15 percent of the $100 wholesale cost of a pair of glasses. In addition, because Warby Parker markets and sells its products directly to its customers, it does not have to deal with retailers, whose markups can double prices.

Warby Parker's business model allows customers to test the company's retro-style glasses via a mail-order, try-it-at-home program. The glasses (including prescription lenses) cost a mere $95, and customers may test up to five frames at a time. In addition, the Warby Parker Web site enables shoppers to upload photos and "try on" frames virtually. Such large-scale individualized shopping experiences have attracted a devoted following among young, trendy professionals. This business model has made the firm a commercial success.

By mid-2013, Warby Parker had sold more than 100,000 pairs of glasses. The company raised $1.5 million from investors in May 2011, and in 2012 it raised an additional $37 million. It has 113 employees, and it opened a 2,500-square-foot store in New York City.

In addition to enjoying great commercial success, Warby Parker has a social mission. For every pair of glasses it sells, it provides subsidies to help someone in need to buy a pair—although not one of Warby's creations.

The company's success is inspiring competition from more established eyeglass retailers. For example, discount fashion site Bluefly (www.bluefly.com) has introduced Eyefly (www.eyefly.com), which sells custom, vintage-looking glasses for $99.

Another competitor is Ditto (www.ditto.com), where shoppers use a computer webcam to record a video of their faces and create a virtual, three-dimensional "you." Then, shoppers can virtually try on different frames, look side to side, and blink. They can also solicit feedback from friends on Facebook by sharing shots of their virtual selves wearing different frames.

Google wants to avoid making users of its Google Glass product look like an actor in a science fiction movie. As a result, the company is working with Warby Parker to design more fashionable frames for Google Glass.

Sources: Compiled from S. Rodriguez, "Google in Talks with Warby Parker for Its Glasses," *The Los Angeles Times*, February 21, 2013; D. Primack, "Warby Parker Raises $37 Million," *CNN Money*, September 9, 2012; A. Pack, "Warby Parker's Vision for Growth," *CNBC*, June 11, 2012; L. Sanders, "Ditto Lets You Try on Glasses via Webcam," *San Francisco Chronicle*, April 27, 2012; D. Muse, "The New Startup Scene: From Silicon Strip to Silicon Mitten," *Forbes*, December 19, 2011; S. Berfield, "A Startup's New Prescription for Eyewear," *Bloomberg BusinessWeek*, July 4–10, 2011; D. Mau, "Warby Parker vs. Eyefly," *Fashionista*, June 6, 2011; H. Elliot, "The New Model for Retail: Buying Glasses Online," *Forbes*, January 17, 2011; N. Perlroth, "Name You Need to Know in 2011: Warby Parker," *Forbes*, November 22, 2010; www.warbyparker.com, www.eyefly.com, accessed February 18, 2013.

Questions

1. Provide two examples of how Warby Parker uses information technology to support its business model.
2. How might Warby Parker further use information technology to counter large competitors who want to copy their business model? Be specific.

1.1 Why Should I Study Information Systems?

You are part of the most connected generation in history: You have grown up online; you are, quite literally, never out of touch; you use more information technologies (in the form of digital devices), for more tasks, and are bombarded with more information, than any generation in history. The MIT Technology Review refers to you as *Homo conexus*. Information technologies are so deeply embedded in your lives that your daily routines would be almost unrecognizable to a college student just 20 years ago.

Essentially, you practice continuous computing, surrounded by a movable information network. This network is created by constant cooperation between the digital devices you carry (e.g., laptops, media players, and smartphones); the wired and wireless networks that you access as you move about; and Web-based tools for finding information and communicating and collaborating with other people. Your network enables you to pull information about virtually anything from anywhere, at any time, and to push your own ideas back to the Web, from wherever you are, via a mobile device. Think of everything you do online, often with your smart phone: register for classes; take classes (and not just at your university); access class syllabi, information, PowerPoints, and lectures; research class papers and presentations; conduct banking; pay your bills; research, shop, and buy products from companies or other people; sell your "stuff"; search for, and apply for, jobs; make your travel reservations (hotel, airline, rental car); create your own blog and post your own podcasts and videocasts to it; design your own page on Facebook; make and upload videos to YouTube; take, edit, and print your own digital photographs; "burn" your own custom-music CDs and DVDs; use RSS feeds to create your personal electronic newspaper; text and tweet your friends and family throughout your day; and many other activities. (Note: If any of these terms are unfamiliar to you, don't worry. You will learn about everything mentioned here in detail later in this text.)

The Informed User—You!

So, the question is: Why you should learn about information systems and information technologies? After all, you can comfortably use a computer (or other electronic devices) to perform many activities, you have been surfing the Web for years, and you feel confident that you can manage any IT application that your organization's MIS department installs.

The answer lies in your becoming an **informed user**; that is, a person knowledgeable about information systems and information technology. There are several reasons why you should be an informed user.

In general, informed users tend to get more value from whatever technologies they use. You will enjoy many benefits from being an informed user of IT.

- First, you will benefit more from your organization's IT applications because you will understand what is "behind" those applications (see Figure 1.1). That is, what you see on your computer screen is brought to you by your MIS department, who are operating "behind" your screen.
- Second, you will be in a position to enhance the quality of your organization's IT applications with your input.
- Third, even as a new graduate, you will quickly be in a position to recommend—and perhaps help select—the IT applications that your organization will use.
- Fourth, being an informed user will keep you abreast of both new information technologies and rapid developments in existing technologies. Remaining "on top of things" will help you to anticipate the impacts that "new and improved" technologies will have on your organization and to make recommendations on the adoption and use of these technologies.
- Fifth, you will understand how using IT can improve your organization's performance and teamwork as well as your own productivity.
- Finally, if you have ideas of becoming an entrepreneur, then being an informed user will help you use IT when you start your own business.

Going further, managing the IS function within an organization is no longer the exclusive responsibility of the IS department. Rather, users now play key roles in every step of this process. The overall objective in this text is to provide you with the necessary information to contribute immediately to managing the IS function in your organization. In short, the goal is to help you become a very informed user!

IT Offers Career Opportunities

Because information technology is vital to the operation of modern businesses, it offers many employment opportunities. The demand for traditional IT staff—programmers, business