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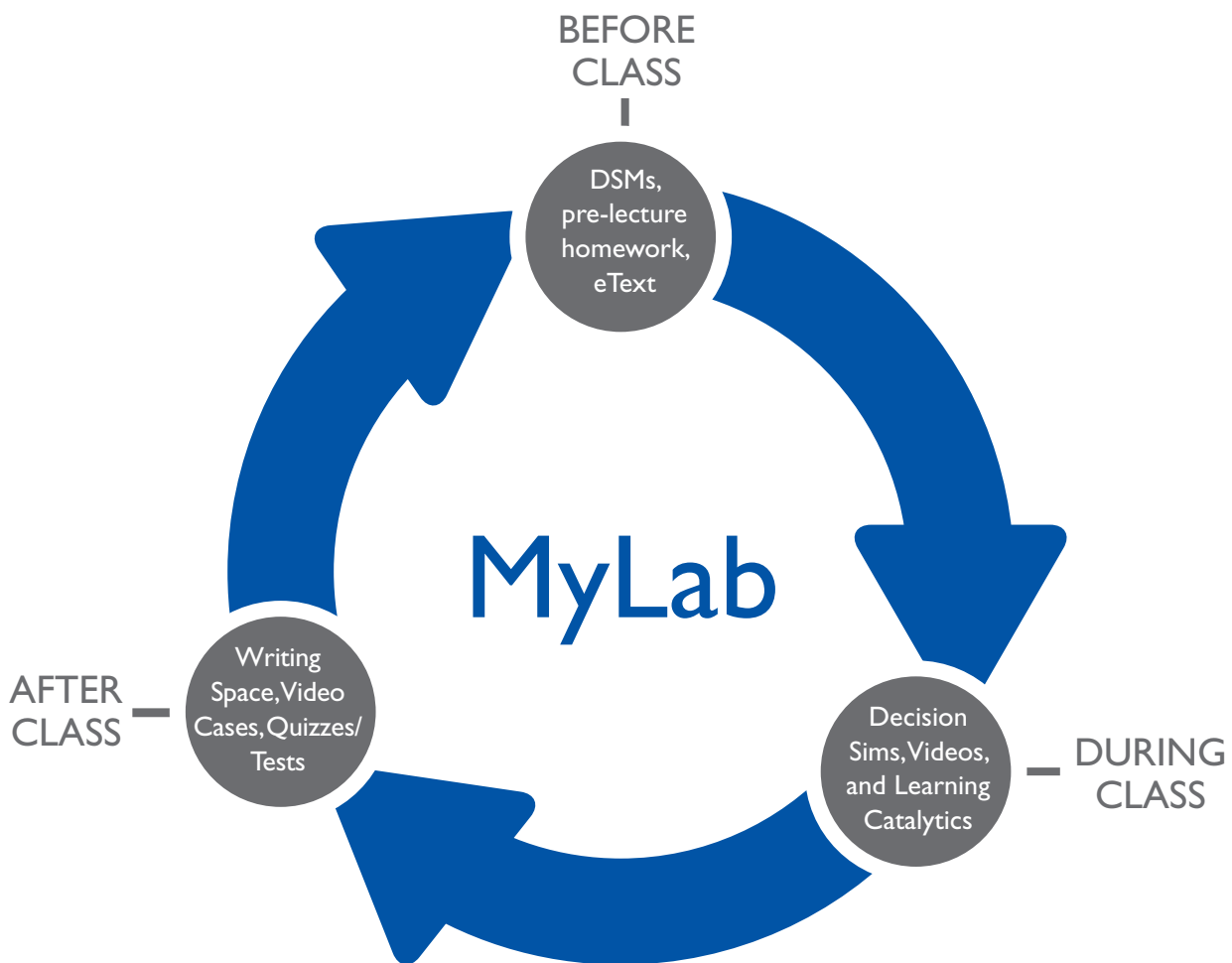
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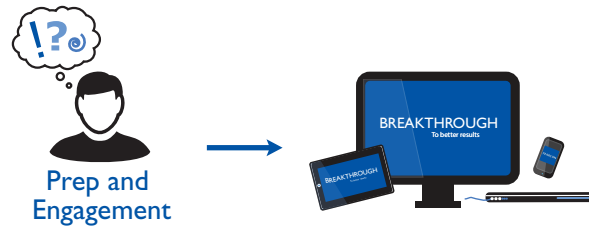
KENNETH C. LAUDON JANE P. LAUDON

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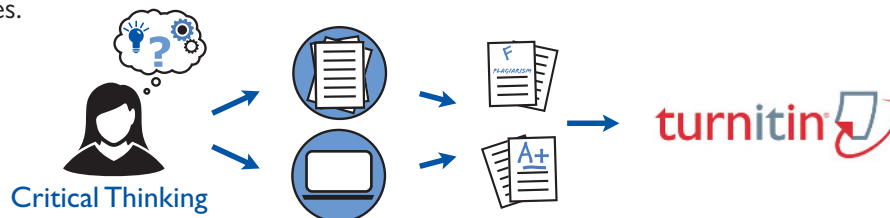
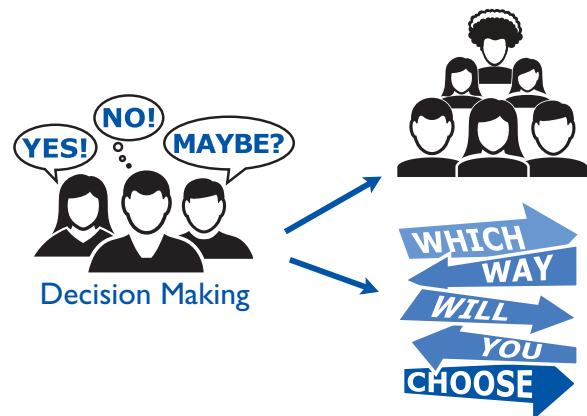


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# Integrating Business with Technology

By completing the projects in this text, students will be able to demonstrate business knowledge, application software proficiency, and Internet skills. These projects can be used by instructors as learning assessment tools and by students as demonstrations of business, software, and problem-solving skills to future employers. Here are some of the skills and competencies students using this text will be able to demonstrate:

**Business Application skills:** Use of both business and software skills in real-world business applications. Demonstrates both business knowledge and proficiency in spreadsheet, database, and Web page/blog creation tools.

**Internet skills:** Ability to use Internet tools to access information, conduct research, or perform online calculations and analysis.

**Analytical, writing and presentation skills:** Ability to research a specific topic, analyze a problem, think creatively, suggest a solution, and prepare a clear written or oral presentation of the solution, working either individually or with others in a group.

\* **Dirt Bikes Running Case in MyMISLab**

## Business Application Skills

Business Skills	Software Skills	Chapter
<b>Finance and Accounting</b>		
Financial statement analysis	Spreadsheet charts	Chapter 2*
	Spreadsheet formulas	Chapter 10
	Spreadsheet downloading and formatting	
Pricing hardware and software	Spreadsheet formulas	Chapter 5
Technology rent vs. buy decision	Spreadsheet formulas	Chapter 5*
Total Cost of Ownership (TCO) Analysis		
Analyzing telecommunications services and costs	Spreadsheet formulas	Chapter 7
Risk assessment	Spreadsheet charts and formulas	Chapter 8
<b>Human Resources</b>		
Employee training and skills tracking	Database design	Chapter 12*
	Database querying and reporting	
<b>Manufacturing and Production</b>		
Analyzing supplier performance and pricing	Spreadsheet date functions	Chapter 2
	Data filtering	
	Database functions	
Inventory management	Importing data into a database	Chapter 6
	Database querying and reporting	
Bill of materials cost sensitivity analysis	Spreadsheet data tables	Chapter 11*
	Spreadsheet formulas	
<b>Sales and Marketing</b>		
Sales trend analysis	Database querying and reporting	Chapter 1
Customer reservation system	Database querying and reporting	Chapter 3
Customer sales analysis	Database design	
Marketing decisions	Spreadsheet pivot tables	Chapter 11
Customer profiling	Database design	Chapter 6*
	Database querying and reporting	

Customer service analysis	Database design Database querying and reporting	Chapter 9
Sales lead and customer analysis	Database design Database querying and reporting	Chapter 12
Blog creation and design	Blog creation tool	Chapter 4

## Internet Skills

Using online software tools for job hunting and career development	Chapter 1
Using online interactive mapping software to plan efficient transportation routes	Chapter 2
Researching product information Evaluating Web sites for auto sales	Chapter 3
Analyzing Web browser privacy protection	Chapter 4
Researching travel costs using online travel sites	Chapter 5
Searching online databases for products and services	Chapter 6
Using Web search engines for business research	Chapter 7
Researching and evaluating business outsourcing services	Chapter 8
Researching and evaluating supply chain management services	Chapter 9
Evaluating e-commerce hosting services	Chapter 10
Using shopping bots to compare product price, features, and availability	Chapter 11
Analyzing Web site design	Chapter 12

## Analytical, Writing, and Presentation Skills\*

<b>Business Problem</b>	<b>Chapter</b>
Management analysis of a business	Chapter 1
Value chain and competitive forces analysis Business strategy formulation	Chapter 3
Formulating a corporate privacy policy	Chapter 4
Employee productivity analysis	Chapter 7
Disaster recovery planning	Chapter 8
Locating and evaluating suppliers	Chapter 9
Developing an e-commerce strategy	Chapter 10

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# Essentials of Management Information Systems

*Twelfth Edition*

**Kenneth C. Laudon**

*New York University*

**Jane P. Laudon**

*Azimuth Information Systems*

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The Laudons have two daughters, Erica and Elisabeth, to whom this book is dedicated.

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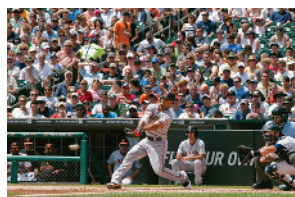
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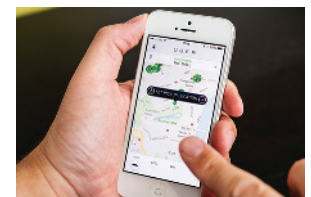
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# Preface

We wrote this book for business school students who wanted an in-depth look at how today's business firms use information technologies and systems to achieve corporate objectives. Information systems are one of the major tools available to business managers for achieving operational excellence, developing new products and services, improving decision making, and achieving competitive advantage. Students will find here the most up-to-date and comprehensive overview of how business firms use information systems to achieve these objectives. After reading this book, we expect students will be able to participate in, and even lead, management discussions of information systems for their firms.

When interviewing potential employees, business firms often look for new hires who know how to use information systems and technologies for achieving bottom-line business results. Regardless of whether you are an accounting, finance, management, operations management, marketing, or information systems major, the knowledge and information you find in this book will be valuable throughout your business career.

## What's New in This Edition

### CURRENCY

The 12th edition features all new opening, closing, and Interactive Session cases. The text, figures, tables, and cases have been updated through September 2015 with the latest sources from industry and MIS research.

### NEW FEATURES

- Assisted-graded Writing Questions at the end of each chapter with prebuilt grading rubrics and computerized essay scoring help instructors prepare, deliver, and grade writing assignments.
- A new Video Cases collection contains 31 video cases (2 or more per chapter) and 13 additional instructional videos covering key concepts and experiences in the MIS world.
- The text contains 47 Learning Tracks in MyMISLab for additional coverage of selected topics.
- Video Cases and Chapter Cases are listed at the beginning of each chapter.

### NEW TOPICS

- **Big data and the Internet of Things:** In-depth coverage of big data, big data analytics, and the Internet of Things (IoT) are included in Chapters 1, 6, 7, and 11. Coverage includes big data analytics, analyzing IoT data streams, Hadoop, in-memory computing, nonrelational databases, and analytic platforms.
- **Cloud computing:** Updated and expanded coverage of cloud computing appears in Chapter 5 (IT Infrastructure) with more detail on types of cloud services, private and public clouds, hybrid clouds, managing cloud services, and a new Interactive Session on using cloud services. Cloud computing is also covered in Chapter 6 (databases in the cloud), Chapter 8 (cloud security), Chapter 9 (cloud-based CRM and ERP), Chapter 10 (e-commerce), and Chapter 12 (cloud-based systems development).
- **Social, mobile, local:** New e-commerce content in Chapter 10 describes how social tools, mobile technology, and location-based services are transforming marketing and advertising.

- **Social business:** Expanded coverage of social business is introduced in Chapter 2 and discussed throughout the text. Detailed discussions of enterprise (internal corporate) social networking as well as social networking in e-commerce are included.
- BYOD and mobile device management
- Wearable computers
- Smart products
- Internet of Things (IoT)
- Mobile application development, mobile and native apps
- Operational intelligence
- Expanded coverage of business analytics, including big data analytics
- On-demand business
- Windows 10
- Microsoft Office 365
- Zero-day vulnerabilities
- Two-factor authentication
- Ransomware
- Chief data officer
- MOOCs in business firms

## What's New in MIS?

Plenty. In fact, there's a whole new world of doing business using new technologies for managing and organizing. What makes the MIS field the most exciting area of study in schools of business is the continuous change in technology, management, and business processes. (Chapter 1 describes these changes in more detail.)

### IT INNOVATIONS

A continuing stream of information technology innovations is transforming the traditional business world. Examples include the emergence of cloud computing, the growth of a mobile digital business platform based on smartphones and tablet computers, big data, and the use of social networks by managers to achieve business objectives. Most of these changes have occurred in the past few years. These innovations enable entrepreneurs and innovative traditional firms to create new products and services, develop new business models, and transform the day-to-day conduct of business. In the process, some old businesses, even industries, are being destroyed while new businesses are springing up.

### NEW BUSINESS MODELS

For instance, the emergence of online video services such as Netflix for streaming, Apple iTunes, Amazon, and many others for downloading video, has forever changed how premium video is distributed and even created. Netflix in 2015 attracted 62 million subscribers worldwide to what it calls the Internet TV revolution. Netflix has moved into premium TV show production with nearly 30 original shows such as *House of Cards* and *Orange Is the New Black* challenging cable and broadcast producers of TV shows and potentially disrupting cable network dominance of TV show production. Apple's iTunes now accounts for 67 percent of movie and TV show downloads and has struck deals with major Hollywood studios for recent movies and TV shows. A growing trickle of viewers are unplugging from cable and using only the Internet for entertainment.

### E-COMMERCE EXPANDING

E-commerce generated about \$531 billion in revenues in 2015 and is estimated to grow to nearly \$800 billion by 2019. E-commerce is changing how firms design, produce, and

deliver their products and services. E-commerce has reinvented itself again, disrupting the traditional marketing and advertising industry and putting major media and content firms in jeopardy. Facebook and other social networking sites such as YouTube, Twitter, and Tumblr, along with Netflix, Apple Beats music service, and many other media firms exemplify the new face of e-commerce in the 21st century. They sell services. When we think of e-commerce, we tend to think of selling physical products. Although this iconic vision of e-commerce is still very powerful and the fastest growing form of retail in the U.S., growing up alongside is a whole new value stream based on selling services, not goods. It's a services model of e-commerce. Growth in social commerce is spurred by powerful growth of the mobile platform; 80 percent of Facebook's users access the service from mobile phones and tablets. Information systems and technologies are the foundation of this new services-based e-commerce.

## **MANAGEMENT CHANGES**

Likewise, the management of business firms has changed: With new mobile smartphones, high-speed wireless Wi-Fi networks, and wireless laptop computers, remote salespeople on the road are only seconds away from their managers' questions and oversight. Business is going mobile, along with consumers. Managers on the move are in direct, continuous contact with their employees. The growth of enterprise-wide information systems with extraordinarily rich data means that managers no longer operate in a fog of confusion but, instead, have online, nearly instant access to the really important information they need for accurate and timely decisions. In addition to their public uses on the web, wikis and blogs are becoming important corporate tools for communication, collaboration, and information sharing.

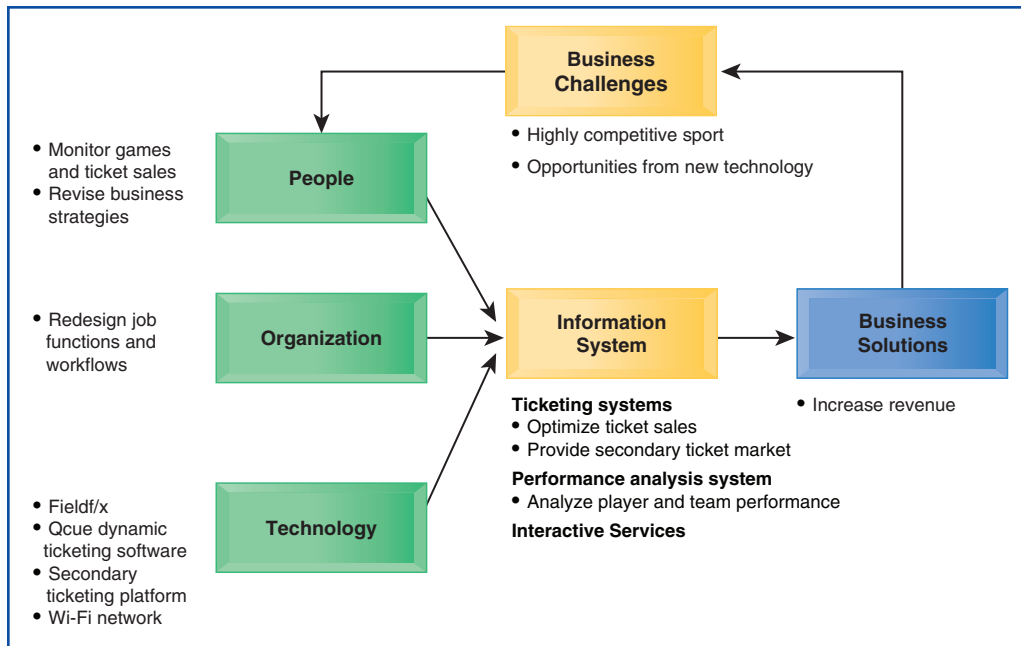
## **CHANGES IN FIRMS AND ORGANIZATIONS**

Compared to industrial organizations of the previous century, new, fast-growing, 21st-century business firms put less emphasis on hierarchy and structure and more emphasis on employees taking on multiple roles and tasks. They put greater emphasis on competency and skills than on position in the hierarchy. They emphasize higher speed and more accurate decision making based on data and analysis. They are more aware of changes in technology, consumer attitudes, and culture. They use social media to enter into conversations with consumers and demonstrate a greater willingness to listen to consumers, in part because they have no choice. They show better understanding of the importance of information technology in creating and managing business firms and other organizations. To the extent that organizations and business firms demonstrate these characteristics, they are 21st-century digital firms.

## **The 12th Edition: The Comprehensive Solution for the MIS Curriculum**

Since its inception, this text has helped define the MIS course around the globe. This edition continues to be authoritative but is also more customizable, flexible, and geared to meeting the needs of different colleges, universities, and individual instructors. Many of its learning tools are now available in digital form. This book is now part of a complete learning package that includes the core text, Video Case Study Package, and Learning Tracks.

The core text consists of 12 chapters with hands-on projects covering the most essential topics in MIS. An important part of the core text is the Video Case Study and Instructional Video Package: 31 video case studies (2 to 3 per chapter) plus 13 instructional videos that illustrate business uses of information systems, explain new technologies, and explore concepts. Videos are keyed to the topics of each chapter.



A diagram accompanying each chapter-opening case graphically illustrates how people, organization, and technology elements work together to create an information system solution to the business challenges discussed in the case.

In addition, for students and instructors who want to go deeper into selected topics, 47 Learning Tracks in MyMISLab cover a variety of MIS topics in greater depth.

## THE CORE TEXT

The core text provides an overview of fundamental MIS concepts by using an integrated framework for describing and analyzing information systems. This framework shows information systems composed of people, organization, and technology elements and is reinforced in student projects and case studies.

## CHAPTER ORGANIZATION

Each chapter contains the following elements:

- A Chapter Outline based on Learning Objectives
- Lists of all the Case Studies and Video Cases for each chapter
- A chapter-opening case describing a real-world organization to establish the theme and importance of the chapter
- A diagram analyzing the opening case in terms of the people, organization, and technology model used throughout the text
- Two Interactive Sessions with Case Study Questions
- A Review Summary keyed to the Student Learning Objectives
- A list of Key Terms that students can use to review concepts
- Review questions for students to test their comprehension of chapter material
- Discussion questions the broader themes of the chapter raise.
- A series of Hands-on MIS Projects consisting of two Management Decision Problems, a hands-on application software project, and a project to develop Internet skills
- A Collaboration and Teamwork Project to develop teamwork and presentation skills, with options for using open source collaboration tools
- A chapter-ending case study for students to apply chapter concepts
- Two assisted-graded writing questions with prebuilt grading rubrics
- Chapter references

## KEY FEATURES

We have enhanced the text to make it more interactive, leading-edge, and appealing to both students and instructors. The features and learning tools are described in the following sections:

### Business-Driven with Real-World Business Cases and Examples

The text helps students see the direct connection between information systems and business performance. It describes the main business objectives driving the use of information systems and technologies in corporations all over the world: operational excellence, new products and services, customer and supplier intimacy, improved decision making, competitive advantage, and survival. In-text examples and case studies show students how specific companies use information systems to achieve these objectives.

We use only current (2015) examples from business and public organizations throughout the text to illustrate the important concepts in each chapter. All the case studies describe companies or organizations that are familiar to students, such as the San Francisco Giants, Facebook, Walmart, Google, Target, and Home Depot.

### Interactivity

There's no better way to learn about MIS than by doing MIS! We provide different kinds of hands-on projects by which students can work with real-world business scenarios and data and learn firsthand what MIS is all about. These projects heighten student involvement in this exciting subject.

- **Online Video Case Package:** Students can watch short videos online, either in class or at home or work, and then apply the concepts of the book to the analysis of the video. Every chapter contains at least two business video cases that explain how business firms and managers are using information systems and explore concepts discussed in the chapter. Each video case consists of a video about a real-world company, a background text case, and case study questions. These video cases enhance students' understanding of MIS topics and the relevance of MIS to the business world. In addition, 13 Instructional Videos describe developments and concepts in MIS keyed to respective chapters.
- **Interactive Sessions:** Two short cases in each chapter have been redesigned as Interactive Sessions to be used in the classroom (or on Internet discussion boards) to stimulate student interest and active learning. Each case concludes with case study questions. The case study questions provide topics for class discussion, Internet discussion, or written assignments.

Each chapter contains two Interactive Sessions on People, Organizations, or Technology using real-world companies to illustrate chapter concepts and issues.

#### INTERACTIVE SESSION: PEOPLE

#### Getting Social with Customers

Businesses of all sizes are finding Facebook, Twitter, and other social media to be powerful tools for engaging customers, amplifying product messages, discovering trends and influencers, building brand awareness, and taking action on customer requests and recommendations. Half of all Twitter users recommend products in their tweets.

About 1.4 billion people use Facebook, and more than 30 million businesses have active brand pages enabling users to interact with the brand through blogs, comment pages, contests, and offerings on the brand page. The Like button gives users a chance to share with their social network their feelings about content and other objects they are viewing and websites they are visiting. With Like buttons on millions of websites, Facebook can

In addition to monitoring people's chatter on Twitter, Facebook, and other social media, some companies are using sentiment analysis (see Chapter 6) to probe more deeply into their likes and dislikes. For example, during the 2014 Golden Globe Awards, thousands of women watching the ceremony tweeted detailed comments about Hayden Panettiere and Kelly Osborne's slicked-back hairdos. Almost instantaneously, the Twitter feeds of these women received instructions from L'Oréal Paris showing them how to capture various red-carpet looks at home, along with promotions and special deals for L'Oréal products. L'Oréal had worked with Poptip, a real-time market research company to analyze what conversations about hairstyling connected to Golden Globe



## CASE STUDY QUESTIONS

1. Assess the people, organization, and technology issues for using social media to engage with customers.
2. What are the advantages and disadvantages of using social media for advertising, brand building, market research, and customer service?
3. Give some examples of business decisions in this case study that were facilitated by using social media to interact with customers.
4. Should all companies use Facebook and Twitter for customer service and marketing? Why or why not? What kinds of companies are best suited to use these platforms?

Case Study Questions encourage students to apply chapter concepts to real-world companies in class discussions, student presentations, or writing assignments.

- **Hands-on MIS Projects:** Every chapter concludes with a Hands-on MIS Projects section containing three types of projects: two Management Decision problems; a hands-on application software exercise using Microsoft Excel, Access, or web page and blog creation tools; and a project that develops Internet business skills. A Dirt Bikes USA running case in MyMISLab provides additional hands-on projects for each chapter.

**11-9** Applebee's is the largest casual dining chain in the world, with more than 1800 locations throughout the United States and 20 other countries. The menu features beef, chicken, and pork items as well as burgers, pasta, and seafood. Applebee's CEO wants to make the restaurant more profitable by developing menus that are tastier and contain more items that customers want and are willing to pay for despite rising costs for gasoline and agricultural products. How might business intelligence help management implement this strategy? What pieces of data would Applebee's need to collect? What kinds of reports would be useful to help management make decisions about how to improve menus and profitability?

Two real-world business scenarios per chapter provide opportunities for students to apply chapter concepts and practice management decision making.

Store & Region Sales Database								
ID	Store	Sales Regic	Item ID	Item Descripti	Unit Pri	Units So	Week Ending	Click to Add
1	1	South	2005	17" Monitor	\$229.00	28	10/27/2015	
2	1	South	2005	17" Monitor	\$229.00	30	11/24/2015	
3	1	South	2005	17" Monitor	\$229.00	9	12/29/2015	
4	1	South	3006	101 Keyboard	\$19.95	30	10/27/2015	
5	1	South	3006	101 Keyboard	\$19.95	35	11/24/2015	
6	1	South	3006	101 Keyboard	\$19.95	39	12/29/2015	
7	1	South	6050	PC Mouse	\$8.95	28	10/27/2015	
8	1	South	6050	PC Mouse	\$8.95	3	11/24/2015	
9	1	South	6050	PC Mouse	\$8.95	38	12/29/2015	
10	1	South	8500	Desktop CPU	\$849.95	25	10/27/2015	
11	1	South	8500	Desktop CPU	\$849.95	27	11/24/2015	
12	1	South	8500	Desktop CPU	\$849.95	33	12/29/2015	
13	2	South	2005	17" Monitor	\$229.00	8	10/27/2015	
14	2	South	2005	17" Monitor	\$229.00	8	11/24/2015	
15	2	South	2005	17" Monitor	\$229.00	10	12/29/2015	
16	2	South	3006	101 Keyboard	\$19.95	8	10/27/2015	
17	2	South	3006	101 Keyboard	\$19.95	8	11/24/2015	
18	2	South	3006	101 Keyboard	\$19.95	8	12/29/2015	
19	2	South	6050	PC Mouse	\$8.95	9	10/27/2015	
20	2	South	6050	PC Mouse	\$8.95	9	11/24/2015	
21	2	South	6050	PC Mouse	\$8.95	8	12/29/2015	
22	2	South	8500	Desktop CPU	\$849.95	18	10/27/2015	

Students practice using software in real-world settings for achieving operational excellence and enhancing decision making.

Each chapter features a project to develop Internet skills for accessing information, conducting research, and performing online calculations and analysis.

## IMPROVING DECISION MAKING: USING WEB TOOLS TO CONFIGURE AND PRICE AN AUTOMOBILE

Software skills: Internet-based software

Business skills: Researching product information and pricing

**3-11** In this exercise, you will use software at car-selling websites to find product information about a car of your choice and use that information to make an important purchase decision. You will also evaluate two of these sites as selling tools.

You are interested in purchasing a new Ford Escape (or some other car of your choice). Go to the website of CarsDirect ([www.carsdirect.com](http://www.carsdirect.com)) and begin your investigation. Locate the Ford Escape. Research the various Escape models; choose one you prefer in terms of price, features, and safety ratings. Locate and read at least two reviews. Surf the website of the manufacturer, in this case Ford ([www.ford.com](http://www.ford.com)). Compare the information available on Ford's website with that of CarsDirect for the Ford Escape. Try to locate the lowest price for the car you want in a local dealer's inventory. Suggest improvements for CarsDirect.com and Ford.com.

- **Collaboration and Teamwork Projects:** Each chapter features a collaborative project that encourages students working in teams to use Google Drive, Google Docs, or other open-source collaboration tools. The first team project in Chapter 1 asks students to build a collaborative Google site.

### Assessment and AACSB Assessment Guidelines

The Association to Advance Collegiate Schools of Business (AACSB) is a not-for-profit corporation of educational institutions, corporations and other organizations that seek to improve business education primarily by accrediting university business programs. As part of its accreditation activities, the AACSB has developed an Assurance of Learning Program designed to ensure that schools do in fact teach students what they promise. Schools are required to state a clear mission, develop a coherent business program, identify student learning objectives, and then prove that students do in fact achieve the objectives.

We have attempted in this book to support AACSB efforts to encourage assessment-based education. The front end papers of this edition identify student learning objectives and anticipated outcomes for our Hands-on MIS projects. The authors will provide custom advice on how to use this text in their colleges with different missions and assessment needs. Please email the authors or contact your local Pearson representative for contact information.

For more information on the AACSB Assurance of Learning Program, and how this text supports assessment-based learning, please visit the website for this book.

### Customization and Flexibility: New Learning Track Modules

Our Learning Tracks feature gives instructors the flexibility to provide in-depth coverage of the topics they choose. Forty-seven Learning Tracks in MyMISLab are available to instructors and students. This supplementary content takes students deeper into MIS topics, concepts, and debates; reviews basic technology concepts in hardware, software, database design, telecommunications, and other areas; and provides additional hands-on software instruction. The 12th edition includes new Learning Tracks on e-commerce payment systems, including Bitcoin, and Occupational and Career Outlook for Information Systems Majors 2012–2020.

### Author-certified test bank and supplements

- **Author-certified test bank:** The authors have worked closely with skilled test item writers to ensure that higher-level cognitive skills are tested. Test bank multiple choice questions include questions on content but also include many questions that require analysis, synthesis, and evaluation skills.



- **Annotated slides:** The authors have prepared a comprehensive collection of 50 PowerPoint slides to be used in your lectures. Many of these slides are the same as Ken Laudon uses in his MIS classes and executive education presentations. Each of the slides is annotated with teaching suggestions for asking students questions, developing in-class lists that illustrate key concepts, and recommending other firms as examples in addition to those provided in the text. The annotations are like an instructor's manual built into the slides and make it easier to teach the course effectively.

### **Student Learning Focused**

Student Learning Objectives are organized around a set of study questions to focus student attention. Each chapter concludes with a Review Summary and Review Questions organized around these study questions, and each major chapter section is based on a Learning Objective.

### **Career Resources**

The instructor resources for this text include extensive career resources, including job-hunting guides and instructions on how to build a digital portfolio demonstrating the business knowledge, application software proficiency, and Internet skills acquired from using the text. The portfolio can be included in a résumé or job application or used as a learning assessment tool for instructors.

## **INSTRUCTOR RESOURCES**

At the Instructor Resource Center, [www.pearsonhighered.com/irc](http://www.pearsonhighered.com/irc), instructors can easily register to gain access to a variety of instructor resources available with this text in downloadable format.

If assistance is needed, our dedicated technical support team is ready to help with the media supplements that accompany this text. Visit <http://247.pearsoned.com> for answers to frequently asked questions and toll-free user support phone numbers.

The following supplements are available with this text:

- Instructor's Resource Manual
- Test Bank
- TestGen® Computerized Test Bank
- PowerPoint Presentation
- Image Library
- Lecture Notes

### **Video Cases and Instructional Videos**

Instructors can download step-by-step instructions for accessing the video cases from the Instructor Resources Center. All Video Cases and Instructional Videos are listed at the beginning of each chapter as well as in the Preface.

### **Learning Tracks Modules**

Forty-seven Learning Tracks in MyMISLab provide additional coverage topics for students and instructors. See page xxv for a list of the Learning Tracks available for this edition.

## Video Cases and Instructional Videos

Chapter	Video
Chapter 1: Business Information Systems in Your Career	Case 1: UPS Global Operations with the DIAD Case 2: Google Data Center Efficiency Best Practices Instructional Video 1: Green Energy Efficiency in a Data Center Using Tivoli Architecture (IBM) Instructional Video 2: Tour IBM's Raleigh Data Center
Chapter 2: Global E-Business and Collaboration	Case 1: Walmart's Retail Link Supply Chain Case 2: CEMEX - Becoming a Social Business Instructional Video 1: US Foodservice Grows Market with Oracle CRM on Demand
Chapter 3: Achieving Competitive Advantage with Information Systems	Case 1: National Basketball Association: Competing on Global Delivery with Akamai OS Streaming Case 2: IT and Geo-Mapping Help a Small Business Succeed Case 3: Materials Handling Equipment Corp: Enterprise Systems Drive Corporate Strategy for a Small Business Instructional Video 1: SAP BusinessOne ERP: From Orders to Final Delivery and Payment
Chapter 4: Ethical and Social Issues in Information Systems	Case 1: What Net Neutrality Means for You Case 2: Facebook Privacy: Social Network Data Mining Case 3: Data Mining for Terrorists and Innocents Instructional Video 1: Viktor Mayer Schönberger on the Right to Be Forgotten
Chapter 5: IT Infrastructure: Hardware and Software	Case 1: Rockwell Automation Fuels the Oil and Gas Industry with the Internet of Things Case 2: ESPN.com: Getting to eXtreme Scale on the Web Instructional Video 1: IBM Blue Cloud Is Ready-to-Use Computing
Chapter 6: Foundations of Business Intelligence: Databases and Information Management	Case 1: Dubuque Uses Cloud Computing and Sensors to Build a Smarter City Case 2: Brooks Brothers Closes in on Omnichannel Retail Case 3: Maruti Suzuki Business Intelligence and Enterprise Databases
Chapter 7: Telecommunications, the Internet, and Wireless Technology	Case 1: Telepresence Moves Out of the Boardroom and into the Field Case 2: Virtual Collaboration with Lotus Sametime
Chapter 8: Securing Information Systems	Case 1: Stuxnet and Cyberwarfare Case 2: Cyberespionage: The Chinese Threat Case 3: IBM Zone Trusted Information Channel Instructional Video 1: Sony PlayStation Hacked; Data Stolen from 77 Million Users Instructional Video 2: Zappos Working to Correct Online Security Breach Instructional Video 3: Meet the Hackers: Anonymous Statement on Hacking Sony
Chapter 9: Achieving Operational Excellence and Customer Intimacy: Enterprise Applications	Case 1: Workday: Enterprise Cloud Software-as-a-Service (SaaS) Case 2: Evolution Homecare Manages Patients with Microsoft Dynamics CRM Instructional Video 1: GSMS Protects Patients by Serializing Every Bottle of Drugs
Chapter 10: E-Commerce: Digital Markets, Digital Goods	Case 1: Groupon: Deals Galore Case 2: Etsy: A Marketplace and Community Case 3: Ford Manufacturing Supply Chain: B2B Marketplace
Chapter 11: Improving Decision Making and Managing Knowledge	Case 1: How IBM's Watson Became a Jeopardy Champion Case 2: Alfresco: Open Source Document Management and Collaboration Case 3: FreshDirect Uses Business Intelligence to Manage Its Online Grocery Case 4: Business Intelligence Helps the Cincinnati Zoo Instructional Video 1: Analyzing Big Data: IBM Watson: After Jeopardy
Chapter 12: Building Information Systems and Managing Projects	Case 1: IBM: BPM in a Service-Oriented Architecture Case 2: IBM Helps the City of Madrid with Real-Time BPM Software Instructional Video 1: BPM: Business Process Management Customer Story Instructional Video 2: Workflow Management Visualized

## Learning Tracks

Chapter	Learning Tracks
Chapter 1: Business Information Systems in Your Career	<ul style="list-style-type: none"> <li>How Much Does IT Matter?</li> <li>The Changing Business Environment for IT</li> <li>The Business Information Value Chain</li> <li>The Mobile Digital Platform</li> <li>Occupational and Career Outlook for Information Systems Majors 2012–2020</li> </ul>
Chapter 2: Global E-Business and Collaboration	<ul style="list-style-type: none"> <li>Systems from a Functional Perspective</li> <li>IT Enables Collaboration and Teamwork</li> <li>Challenges of Using Business Information Systems</li> <li>Organizing the Information Systems Function</li> </ul>
Chapter 3: Achieving Competitive Advantage with Information Systems	<ul style="list-style-type: none"> <li>Challenges of Using Information Systems for Competitive Advantage</li> <li>Primer on Business Process Design and Documentation</li> <li>Primer on Business Process Management</li> </ul>
Chapter 4: Ethical and Social Issues in Information Systems	<ul style="list-style-type: none"> <li>Developing a Corporate Code of Ethics for IT</li> </ul>
Chapter 5: IT Infrastructure: Hardware and Software	<ul style="list-style-type: none"> <li>How Computer Hardware and Software Work</li> <li>Service Level Agreements</li> <li>Cloud Computing</li> <li>The Open Source Software Initiative</li> <li>The Evolution of IT Infrastructure</li> <li>Technology Drivers of IT Infrastructure</li> <li>Fourth Generation Languages</li> </ul>
Chapter 6: Foundations of Business Intelligence: Databases and Information Management	<ul style="list-style-type: none"> <li>Database Design, Normalization, and Entity-Relationship Diagramming</li> <li>Introduction to SQL</li> <li>Hierarchical and Network Data Models</li> </ul>
Chapter 7: Telecommunications, the Internet, and Wireless Technology	<ul style="list-style-type: none"> <li>Broadband Network Services and Technologies</li> <li>Cellular System Generations</li> <li>Wireless Applications for Customer Relationship Management, Supply Chain Management, and Health Care</li> <li>Introduction to Web 2.0</li> <li>LAN Topologies</li> </ul>
Chapter 8: Securing Information Systems	<ul style="list-style-type: none"> <li>The Booming Job Market in IT Security</li> <li>The Sarbanes-Oxley Act</li> <li>Computer Forensics</li> <li>General and Application Controls for Information Systems</li> <li>Management Challenges of Security and Control</li> <li>Software Vulnerability and Reliability</li> </ul>
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Chapter 11: Improving Decision Making and Managing Knowledge	<ul style="list-style-type: none"> <li>Building and Using Pivot Tables</li> <li>The Expert System Inference Engine</li> <li>Challenges of Knowledge Management Systems</li> </ul>
Chapter 12: Building Information Systems and Managing Projects	<ul style="list-style-type: none"> <li>Capital Budgeting Methods for Information Systems Investments</li> <li>Enterprise Analysis: Business Systems Planning and Critical Success Factors</li> <li>Unified Modeling Language</li> <li>Information Technology Investments and Productivity</li> </ul>

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# Information Systems in the Digital Age

# PART

- 1 Business Information Systems in Your Career**
- 2 Global E-Business and Collaboration**
- 3 Achieving Competitive Advantage with Information Systems**
- 4 Ethical and Social Issues in Information Systems**

**P**art I introduces the major themes and the problem-solving approaches that are used throughout this book. While surveying the role of information systems in today's businesses, this part raises a series of major questions: What is an information system? Why are information systems so essential in businesses today? How can information systems help businesses become more competitive? What do I need to know about information systems to succeed in my business career? What ethical and social issues do widespread use of information systems raise?

# Business Information Systems in Your Career

# CHAPTER 1

## LEARNING OBJECTIVES

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

- I-1 Why are information systems so essential for running and managing a business today?
- I-2 What exactly is an information system? How does it work? What are its people, organizational, and technology components?
- I-3 How will a four-step method for business problem solving help you solve information system-related problems?
- I-4 How will information systems affect business careers, and what information systems skills and knowledge are essential?

## CHAPTER CASES

The San Francisco Giants Keep Winning with Information Technology  
The Mobile Pocket Office  
UPS Competes Globally with Information Technology  
Home Depot Renovates Itself with New Systems and Ways of Working

## VIDEO CASES

Case 1: UPS Global Operations with the DIAD  
Case 2: Google Data Center Efficiency Best Practices  
*Instructional Videos*  
Green Energy Efficiency in a Data Center, Using Tivoli Architecture (IBM)  
Tour IBM's Raleigh Data Center

## THE SAN FRANCISCO GIANTS KEEP WINNING WITH INFORMATION TECHNOLOGY

The San Francisco Giants have won the most games of any team in the history of American baseball. They have captured 23 National League pennants and appeared in 20 World Series competitions—both records in the National League. The Giants have outstanding players (with the most Hall of Fame players in all of professional baseball) and coaches, but some of their success, both as a team and as a business, can be attributed to their use of information technology.

Baseball is very much a game of statistics, and all the major teams are constantly analyzing their data on player performance and optimal positioning on the field, but the Giants are doing more. They have started to use a video system from Sportsvision called Fieldf/x, which digitally records the position of all players and hit balls in real time. The system generates defensive statistics such as the difficulty of a catch and the probability of a particular fielder making that catch. Information the system produces on player speed and response time, such as how quickly an outfielder comes in for a ball or reacts to line drives, enables the Giants to make player data analysis much more precise. In some cases, it provides information that didn't exist before on players' defensive skills and other skills. Fieldf/x generates a million records per game. That amounts to 5 billion records in three years, the length of time required to provide a high level of confidence in the data. In addition to player and team statistics, the Giants are starting to collect data about fans, including ticket purchases and social media activity.



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Under the leadership of chief information officer (CIO) Bill Schlough, the San Francisco Giants have pioneered in dynamic ticket pricing, based on software from Qcue, in which the price of a ticket fluctuates according to the level of demand for a particular ball game. It's similar to the dynamic ticket pricing used in the airline industry. If a game is part of a crucial series, the Giants are playing an in-division rival, or the game appears to be selling out especially fast, ticket prices will rise. If the game isn't a big draw, ticket prices fall. Since implementing dynamic pricing, the Giants have increased ticket sales 7 percent each year.

Season ticket-holders don't normally attend every game, and this can lose revenue for a team. Every time a fan with a season ticket decides to stay home from a game, the sports franchise loses an average of \$20 in concession and merchandise sales. To make sure stadium seats are always filled, the Giants created a secondary online ticket market on which season ticket holders can resell tickets they are not using. The Giants' information technology specialists found a way to activate and deactivate the bar codes on tickets so that they can be resold. The system is also a way for the Giants to provide additional service to customers.

The Giants have also taken advantage of wireless technology to enhance their fans' experience. A network extends from the seats to the concession stands to areas outside the stadium and is one of the largest public wireless networks in the world. The stadium, AT&T Park, has a giant high-speed wireless network, which fans can use to check scores and video highlights, update their social networks, and do email.

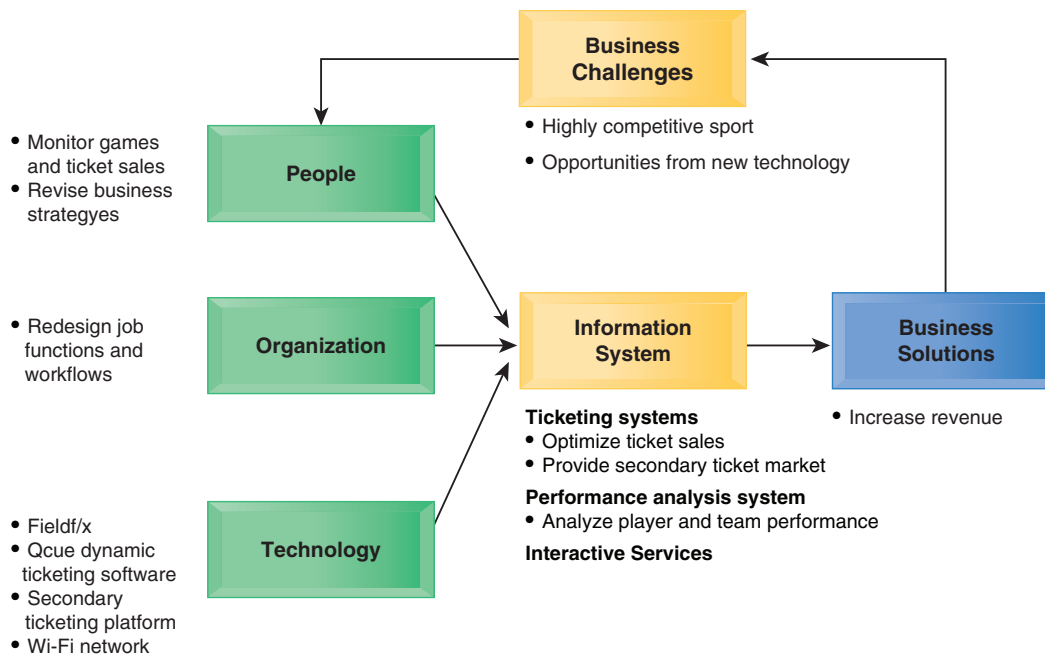
Sources: Ed Burns, "Data Analytics Applications Let Teams Call New Ticket-pricing Plays," *Search Business Analytics*, March 19, 2015; [www/qcue.net](http://www.qcue.net), accessed March 5, 2015; <http://www.sportvision.com>, accessed March 5, 2015; [http://mlb.mlb.com/sf/team/frontoffice\\_bios/schlough\\_bill.jsp](http://mlb.mlb.com/sf/team/frontoffice_bios/schlough_bill.jsp), accessed February 1, 2015; Peter High, "Interview with World Champion San Francisco Giants CIO and San Jose Giants Chairman, Bill Schlough," *Forbes*, February 4, 2013; and Fritz Nelson, "Chief of the Year," *Information Week*, December 17, 2012.

**T**he challenges facing the San Francisco Giants and other baseball teams show why information systems are so essential today. Major League Baseball is a business as well as a sport, and teams such as the Giants need to take in revenue from games to stay in business. Major League Baseball is also a business in which what matters above all is winning, and any way of using information to improve player performance is a competitive edge.

The chapter-opening diagram calls attention to important points this case and this chapter raise. To increase stadium revenue, the San Francisco Giants developed a dynamic ticket pricing system designed to adjust ticket prices to customer demand and to sell seats at the optimum price. The team developed another ticketing system that enables existing ticketholders to sell their tickets easily online to someone else. An additional way of cultivating customers is to deploy modern information technology at AT&T Park, including a massive Wi-Fi wireless network with interactive services. To improve player performance, the Giants implemented a system that captures video on players and then uses the data to analyze player defensive statistics, including speed and reaction times.

Here are some questions to think about: What role does technology play in the San Francisco Giants' success as a baseball team? Assess the contributions of the systems described in this case study.





## I-I Why are information systems so essential for running and managing a business today?

It's not business as usual in America, or the rest of the global economy, any more. In 2015, American businesses will invest nearly \$600 billion in information systems hardware, software, and telecommunications equipment—about one quarter of all capital investment in the United States. In addition, they will spend another \$400 billion on business and management consulting and information technology services, much of which involves redesigning firms' business operations to take advantage of these new technologies. Together, investments in technology and management consulting added up to more than \$1 trillion being invested in information systems in 2014. These expenditures grew at around 4 percent in 2014, far faster than the economy as a whole (BEA, 2014). Worldwide, expenditures for information technology exceeded \$3.8 trillion (Gartner, 2015).

### HOW INFORMATION SYSTEMS ARE TRANSFORMING BUSINESS

You can see the results of this spending around you every day by observing how people conduct business. Cell phones, smartphones, tablet computers, email, and online conferencing over the Internet have all become essential tools of business. In 2015, more than 118 million businesses had registered dot-com Internet sites. Approximately 227 million adult Americans are online, 170 million people buy something online, 205 million research a product, and 220 million use a search engine. What this means is that if you and your business aren't connected to the Internet and wireless networks, chances are you are not being as effective as you could be (Pew Internet and American Life, 2015; eMarketer, 2015).

Despite the economic downturn, in 2014 FedEx moved more than one billion packages in the United States, mostly overnight, and United Parcel Service (UPS) moved more than 4 billion packages, as businesses sought to sense and respond to rapidly changing customer demand, reduce inventories to the lowest possible levels, and achieve higher levels of operational efficiency. The growth of e-commerce has had a significant impact on UPS's shipping volume; UPS delivers about 42 percent

of all e-commerce shipments, representing about 22 percent of its revenue. Supply chains have become faster paced, with companies of all sizes depending on the delivery of just-in-time inventory to help them compete. Companies today manage their inventories in near real time to reduce their overhead costs and get to market faster. If you are not part of this new supply chain management economy, chances are your business is not as efficient as it could be.

As newspaper readership continues to decline, 150 million people read at least some of their news online, 110 million read actual newspapers online, and 180 million use a social networking site such as Facebook, Tumblr, or Google+. More than 135 million bank online, and around 79 million now read blogs, creating an explosion of new writers, readers, and new forms of customer feedback that did not exist before. At 39 of the top 50 news sites, more than half of the visitors come from mobile devices. Adding to this mix of new social media, about 300 million people worldwide use Twitter (about 60 million in the United States), including 80 percent of *Fortune* 500 firms communicating with their customers. This means your customers are empowered and able to talk to each other about your business products and services. Do you have a solid online customer relationship program in place? Do you know what your customers are saying about your firm? Is your marketing department listening?

E-commerce and Internet advertising spending will reach \$58 billion in 2015, growing at around 15 percent at a time when traditional advertising and commerce have been flat. Facebook's ad revenue hit \$12 billion in 2014, and Google's online ad revenues surpassed \$60 billion in 2014. Is your advertising department reaching this new web-based customer?

New federal security and accounting laws require many businesses to keep email messages for 5 years. Coupled with existing occupational and health laws requiring firms to store employee chemical exposure data for up to 60 years, these laws are spurring the growth of digital information now estimated to be 1.8 zettabytes (1.8 trillion gigabytes), equivalent to more than 50,000 Libraries of Congress. This trove of information is doubling every year thanks in part to more than 200 billion Internet sensors and data generators. Does your compliance department meet the minimal requirements for storing financial, health, and occupational information? If they don't, your entire business may be at risk.

Briefly, it's a new world of doing business, one that will greatly affect your future business career. Along with the changes in business come changes in jobs and careers. No matter whether you are a finance, accounting, management, marketing, operations management, or information systems major, how you work, where you work, and how well you are compensated will all be affected by business information systems. The purpose of this book is to help you understand and benefit from these new business realities and opportunities.

## **WHAT'S NEW IN MANAGEMENT INFORMATION SYSTEMS?**

Lots! What makes management information systems the most exciting topic in business is the continual change in technology, management use of the technology, and the impact on business success. New businesses and industries appear, old ones decline, and successful firms are those that learn how to use the new technologies. Table 1.1 summarizes the major new themes in business uses of information systems. These themes will appear throughout the book in all the chapters, so it might be a good idea to take some time now to discuss these with your professor and other students.

In the technology area are three interrelated changes: (1) the mobile digital platform composed of smartphones and tablet devices, (2) the growing business use of big data, including the Internet of Things (IoT) driven by billions of data-producing sensors, and (3) the growth in cloud computing, by which more and more business software runs over the Internet.

**TABLE 1.1**

What's New in MIS

<b>Change</b>	<b>Business Impact</b>
<b>TECHNOLOGY</b>	
Cloud computing platform emerges as a major business area of innovation	A flexible collection of computers on the Internet begins to perform tasks traditionally performed on corporate computers. Major business applications are delivered online as an Internet service (software as a service [SaaS]).
Big data and the Internet of Things (IoT)	Businesses look for insights in huge volumes of data from web traffic, email messages, social media content, and Internet-connected machines (sensors).
A mobile digital platform emerges to compete with the PC as a business system	The Apple iPhone and Android mobile devices can download hundreds of thousands of applications to support collaboration, location-based services, and communication with colleagues. Small tablet computers, including the iPad, Samsung Galaxy, and Kindle Fire, challenge conventional laptops as platforms for consumer and corporate computing.
<b>MANAGEMENT</b>	
Managers adopt online collaboration and social networking software to improve coordination, collaboration, and knowledge sharing.	More than 100 million business professionals worldwide use Google Apps, Google Drive, Microsoft SharePoint, and IBM Connections to support blogs, project management, online meetings, personal profiles, and online communities.
Business intelligence applications accelerate.	More powerful data analytics and interactive dashboards provide real-time performance information to managers to enhance decision making.
Virtual meetings proliferate.	Managers adopt telepresence, video conferencing, and web conferencing technologies to reduce travel time and cost, improving collaboration and decision making.
<b>ORGANIZATIONS</b>	
Social business	Businesses use social networking platforms, including Facebook, Twitter, Instagram, and internal corporate social tools, to deepen interactions with employees, customers, and suppliers. Employees use blogs, wikis, email, texting, and messaging to interact in online communities.
Telework gains momentum in the workplace.	The Internet, wireless laptops, smartphones, and tablet computers make it possible for growing numbers of people to work away from the traditional office. Fifty-five percent of U.S. businesses have some form of remote work program.
Co-creation of business value	Sources of business value shift from products to solutions and experiences and from internal sources to networks of suppliers and collaboration with customers. Supply chains and product development become more global and collaborative; customer interactions help firms define new products and services.

IPhones, Android phones, and high-definition tablet computers are not just gadgets or entertainment outlets. They represent new emerging computing and media platforms based on an array of new hardware and software technologies. More and more business computing is moving from PCs and desktop machines to these mobile devices. Managers are increasingly using these devices to coordinate work, communicate with employees, and provide information for decision making. In 2015, more than 60 percent of Internet users will access the web through mobile devices. To a large extent, these devices change the character of corporate computing.

### *iPhone and iPad Applications for Business*

1. Salesforce
2. Cisco WebEx
3. SAP Business ByDesign
4. iWork
5. Evernote
6. Adobe Reader
7. Oracle Business Intelligence
8. Dropbox



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*Whether it's attending an online meeting, checking orders, working with files and documents, or obtaining business intelligence, Apple's iPhone and iPad offer unlimited possibilities for business users. A stunning multitouch display, full Internet browsing, and capabilities for messaging, video and audio transmission, and document management make each an all-purpose platform for mobile computing.*

Managers routinely use online collaboration and social technologies to make better, faster decisions. As management behavior changes, how work is organized, coordinated, and measured also changes. By connecting employees working on teams and projects, the social network is where work is done, where plans are executed, and where managers manage. Collaboration spaces are where employees meet one another—even when they are separated by continents and time zones.

The strength of cloud computing, and the growth of the mobile digital platform, mean that organizations can rely more on telework, remote work, and distributed decision making. This same platform means firms can outsource more work and rely on markets (rather than employees) to build value. It also means that firms can collaborate with suppliers and customers to create new products or make existing products more efficiently.

You can see some of these trends at work in the Interactive Session on People. Millions of managers and employees rely heavily on the mobile digital platform to coordinate suppliers and shipments, satisfy customers, and organize work activities. A business day without these mobile devices or Internet access would be unthinkable. As you read the case on the next page note how the mobile platform has changed the way people do their work and make decisions.

## **GLOBALIZATION CHALLENGES AND OPPORTUNITIES: A FLATTENED WORLD**

Prior to AD 1500, there was no truly global economic system of trade that connected all the continents on earth. After the sixteenth century, a global trading system began to emerge based on global shipping and voyages of discovery and regular trade. The world trade that ensued after these voyages has brought the peoples and cultures of the world much closer together. The industrial revolution was really a worldwide phenomenon energized by expansion of trade among nations, and since that period, nations have been both competitors and collaborators in business. The Internet has greatly heightened both the competitive tensions among nations as global trade expands and strengthened the benefits that flow from trade.

By 2005, journalist Thomas Friedman wrote an influential book declaring the world was now flat, by which he meant that the Internet and global communications had greatly expanded the opportunities for people to communicate with one another and reduced the economic and cultural advantages of developed countries. U.S. and

**INTERACTIVE SESSION: PEOPLE****The Mobile Pocket Office**

Can you run your company out of your pocket? Perhaps not entirely, but many business functions today can be performed using an iPhone, iPad, or Android mobile handheld device. The smartphone has been called the Swiss Army knife of the digital age. A flick of the finger turns it into a web browser, a telephone, a camera, a music or video player, an email and messaging machine, and, increasingly, a gateway into corporate systems. New software applications for document sharing, collaboration, sales, order processing, inventory management, and production monitoring make these devices even more versatile business tools. Mobile pocket offices that fit into a purse or coat pocket are helping to run companies large and small.

Sonic Automotive is one of the largest automotive retailers in the United States, with more than 100 dealerships in 14 states. Every year, Sonic sells 250,000 new and used cars from approximately 25 automotive brands; it also sells auto parts and maintenance, warranty, collision, and vehicle financing services. Sonic Automotive managers and employees do much of their work on the iPhone and iPad.

Sonic developed several custom iPhone and iPad applications to speed up sales and service. Virtual Lot, a dealer inventory app, enables sales associates to search quickly for vehicles held in inventory at all Sonic dealerships. They have immediate access to vehicle information, pricing, trade-in values, interest rates, special promotions, financing, and what competitors are charging for identical vehicles. The associates can quickly find the best selection for each customer and, often, offer far many more choices than the competition. Dealers are not limited to selling only their own inventory.

A mobile app called the Sonic Inventory Management System (SIMS) has speeded up and simplified trade-in appraisals and pricing. Sonic staff members use their iPhones or iPads to take photos of a car, input the VIN (vehicle identification number) and mileage, and note any issues. The data are transmitted to corporate headquarters, which can quickly appraise the car. A Service Pad app simplifies the steps in repair and warranty work. In the past, customers with cars requiring repairs had to go inside the dealership and sit at a desk with a Sonic staff member who wrote up the repair order by hand. Now the Sonic staff

members go outside to the customer's vehicle and enter the repair order on an iPad on the spot.

SKF is a global engineering company headquartered in Gothenburg, Sweden, with 148 manufacturing sites in 28 countries and 40,000 employees worldwide. SKF produces bearings, seals, lubrication systems, and services used in more than 40 industries, including mining, transportation, and manufacturing. SKF has developed more than 30 custom iPhone and iPad applications for streamlining workflows and accessing critical corporate data from anywhere in the world.

For example, a virtual reality app uses the iPhone or iPad camera to identify a factory machine and produce a 3-D overlay of the SKF parts it contains. SKF service teams and customers in the field use a sensor-driven app called Shaft Align, which connects by wireless Bluetooth sensors to a piece of machinery such as a motor-driven fan to ensure that the drive shaft is running in proper alignment. If not, the app generates step-by-step instructions and a 3-D rendering to show how to align the motor manually. Then it checks the work and produces a report.

A mobile app called MOST enables factory operators to monitor some SKF factory production lines. MOST links to the back-end systems running the machinery and provides operators with key pieces of data. Operators using this mobile app use secure instant messaging to communicate with managers and each other, update maintenance logs, and track products in real time as they move through the factory line.

SKF's Shelf mobile app allows sales engineers and customers to access, on demand, more than 5000 pieces of product literature, catalogs, product specifications, and interactive marketing materials. Sales teams can use Shelf to create custom shelves to organize, annotate, and share materials with customers right from their iPhones or iPads. The iPhone, iPad, and Shelf app save company sales engineers as much as 25 minutes per day on processes and paperwork, freeing them up to spend more time in the field supporting customers. This increase in productivity is equivalent to putting 200 more sales engineers in the field.

SKF auditors perform about 60 audits per year, each audit taking more than one month to complete. With the SKF Data Collect app, auditors use their iPads to collect data and present customers with detailed reports instantly.