

Management Information Systems

Managing the Digital Firm

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THIRTEENTH EDITION

Kenneth C. Laudon

New York University

Jane P. Laudon

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



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BUSINESS CASES AND INTERACTIVE SESSIONS

Here are some of the business firms you will find described in the cases and Interactive Sessions of this book:

Chapter 1: Information Systems in Global Business Today

Shortening Lines at Disney World: Technology to the Rescue
Running the Business from the Palm of Your Hand
UPS Competes Globally with Information Technology
Are Electronic Medical Records a Cure for Health Care?

Chapter 2: Global E-Business and Collaboration

Telus Embraces Social Learning
Can Airlines Solve Their Baggage Handling Problems?
Piloting Procter & Gamble from Decision Cockpits
Should Companies Embrace Social Business?

Chapter 3: Information Systems, Organizations, and Strategy

Will Sears's Technology Strategy Work This Time?
Technology Helps Starbucks Find New Ways to Compete
Automakers Become Software Companies
Can This Bookstore Be Saved?

Chapter 4: Ethical and Social Issues in Information Systems

Behavioral Targeting: Your Privacy is the Target
Life on the Grid: iPhone Becomes ITrack
Wasting Time: The New Digital Divide
Facebook: It's About the Money

Chapter 5: IT Infrastructure and Emerging Technologies

The Army Recasts Its IT Infrastructure
Should You Use Your iPhone for Work?
Green Data Centers: Good for Business?
Should Businesses Move to the Cloud?

Chapter 6: Foundations of Business Intelligence: Databases and Information Management

Banco de Credito del Peru Banks on Better Data Management
Big Data, Big Rewards
Controversy Whirls Around the Consumer Product Safety Database
Asking the Customer by Asking the Database

Chapter 7: Telecommunications, the Internet and Wireless Technology

RFID and Wireless Technology Speed Up Production at Continental Tires
The Battle Over Net Neutrality
Monitoring Employees on Networks: Unethical or Good Business?
Apple, Google, and Microsoft Battle for your Internet Experience

Chapter 8: Securing Information Systems

You're on LinkedIn? Watch Out!
Stuxnet and the Changing Face of Cyberwarfare
How Secure Is Your Smartphone?
Sony: The World's Largest Data Breach?

Chapter 9: Achieving Operational Excellence and Customer Intimacy: Enterprise Applications

Technology Helps Nvidia Anticipate the Future
Land O'Lakes Butter Becomes Fresher with Demand Planning
Customer Relationship Management Heads to the Cloud
Summit Electric Lights Up with a New ERP System

Chapter 10: E-Commerce: Digital Markets, Digital Goods

Groupon's Business Model: Social and Local
Walmart, Amazon, and EBay: Who Will Dominate Internet Retailing?
Social Commerce Creates New Customer Relationships
To Pay or Not to Pay: Zagat's Dilemma

Chapter 11: Managing Knowledge

Designing Drugs Virtually
Denver Goes Alfresco
Firewire Surfboards Lights Up with CAD
IBM's Watson: Can Computers Replace Humans?

Chapter 12: Enhancing Decision Making

Moneyball: Data-Driven Baseball
Analytics Help the Cincinnati Zoo Know Its Customers
Colgate-Palmolive Keeps Managers Smiling with Executive Dashboards
Zynga Wins with Business Intelligence

Chapter 13: Building Information Systems

New Systems and Business Processes Put MoneyGram "On the Money"
Burton Snowboards Speeds Ahead with Nimble Business Processes
What Does It Take to Go Mobile?
Honam Petrochemical's Quest for Better Management Reports

Chapter 14: Managing Projects

Nu Skin's New Human Resources System Project Puts People First
Austin Energy's Billing System Can't Light Up
Westinghouse Electric Takes on the Risks of a "Big Bang" Project
NYCAPS and CityTime: A Tale of Two New York City IS Projects

Chapter 15: Managing Global Systems

L'Oréal's Global Makeover
Hasbro Develops a Global Systems Strategy
CombineNet ASAP Helps Primark Manage Its Global Supply Chain
Sherwin-Williams Paints the World

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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 information systems used by business firms today.

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 13th edition features all new opening, closing, and Interactive Session cases. The text, figures, tables, and cases have been updated through November 2012 with the latest sources from industry and MIS research.

NEW FEATURES

- Chapter-opening cases have been expanded and new case study questions have been added.
- More online cases: MIS Classic Cases, consisting of five outstanding cases from previous editions on companies such as Kmart or Blockbuster/Netflix, will be available on the book's Web site. In addition, all of the chapter-ending cases from the previous edition (MIS12e) will be available online.
- New Video Cases collection: 30 video cases (2 per chapter) and additional instructional videos covering key concepts and experiences in the MIS world.
- Learning Tracks: over 40 Learning Tracks are for additional coverage of selected topics.

NEW TOPICS

- **Social Business:** Extensive coverage of social business, introduced in Chapter 2 and discussed in throughout the text. Detailed discussions of enterprise (internal corporate) social networking as well as social networking in e-commerce.
- **Big Data:** Chapter 6 on Databases and Information Management rewritten to provide in-depth coverage of Big Data and new data management

technologies, including Hadoop, in-memory computing, non-relational databases, and analytic platforms.

- **Cloud Computing:** Expanded and updated coverage of cloud computing 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 chapter-ending case on Amazon's cloud services. Cloud computing also covered in Chapter 6 (databases in the cloud); Chapter 8 (cloud security); Chapter 9 (cloud-based CRM); and Chapter 13 (cloud-based systems development and component-based development).
- **Ethical and Social issues:** expanded and updated coverage in Chapter 4 (Ethical and Social Issues) of the social and ethical issues that surround the rapid expansion of the mobile platform, including privacy, patent and copyright, behavioral and smartphone tracking, data quality, due process, and quality of life.
- Social graph
- Social marketing
- Social search
- Social CRM
- Consumerization of IT and BYOD
- Mobile device management
- Mobile application development
- Responsive Web design
- Cyberlockers
- Expanded coverage of business analytics
- Machine learning
- Windows 8, Android, iOS, and Chrome operating systems
- Apps
- HTML5
- IPv6
- Microblogging
- Multitouch interface
- Siri
- Software-defined networking
- Tablet computers
- 3-D printing

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.)

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, tablets, and ultrabooks, and not least, the use of social networks by managers to achieve business objectives. Most of these changes have occurred in the last few years. These innovations are enabling 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.

For instance, the rapid growth of online content stores such as iTunes and Amazon, based on cloud storage services—driven by millions of consumers who prefer smartphones and tablet computers as the center of their media world—has forever changed the older business models of distributing music, television, and movies on physical discs, such as CDs and DVDs. Cloud-based content delivered on the Internet is beginning to challenge the dominance of cable television networks for the delivery of television shows.

E-commerce is growing rapidly again following a deep recession, generating over \$362 billion in revenues in 2012, and is estimated to grow to over \$542 billion in 2016. With nearly 122 million Americans accessing the Internet with their smartphones, mobile commerce in 2012 has grown to \$30 billion in a few years, and is growing by double digits each year. Amazon's revenues grew 41 percent in 2011, despite the recession, while offline retail grew by 5 percent. 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, and new graphical social sites such as Pinterest, 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 an online store selling physical products. While this iconic vision of e-commerce is still very powerful and the fastest growing form of retail sales 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. Information systems and technologies are the foundation of this new services-based e-commerce.

Likewise, the management of business firms has changed: With new mobile smartphones, high-speed wireless Wi-Fi networks, and wireless laptop and tablet computers, remote salespeople on the road are only seconds away from their managers' questions and oversight. 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, private social networks, wikis and blogs are becoming important corporate tools for communication, collaboration, and information sharing.

THE 13TH EDITION: THE COMPREHENSIVE SOLUTION FOR THE MIS CURRICULUM

Since its inception, this text has helped to 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. This book is now part of a complete learning package that includes the core text and an extensive offering of supplemental materials on the Web.

The core text consists of 15 chapters with hands-on projects covering essential topics in MIS. An important part of the core text is the Video Case Study

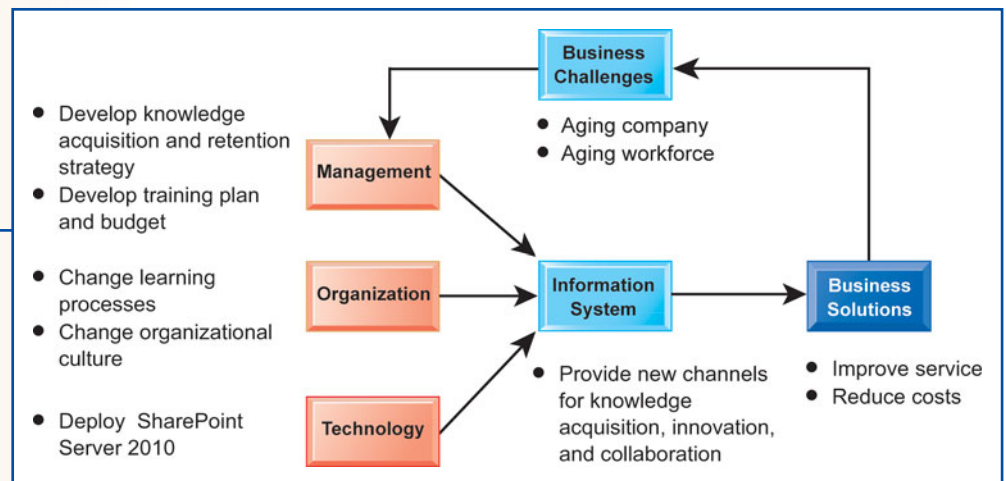
and Instructional Video package: 30 video case studies (2 per chapter) plus many instructional videos that illustrate business uses of information systems, explain new technologies, and explore concepts. Video cases are keyed to the topics of each chapter.

In addition, for students and instructors who want to go deeper into selected topics, there are over 40 online Learning Tracks that cover a variety of MIS topics in greater depth.

MyMISLab provides more in-depth coverage of chapter topics, career resources, additional case studies, supplementary chapter material, and data files for hands-on projects.

THE CORE TEXT

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



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

Chapter Organization

Each chapter contains the following elements:

- 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 management, organization, and technology model used throughout the text
- A series of learning objectives
- Two Interactive Sessions with Case Study Questions
- A Learning Tracks section identifying supplementary material in MyMISLab
- A Review Summary section keyed to the 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 raised by the broader themes of the chapter
- 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 pointer to the chapter's video cases
- 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 learn about how real business firms use information systems, and to apply chapter concepts

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 (2012) 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 Starbucks, Google, Groupon, Facebook, Disney World, Amazon, Walmart, L'Oreal, and Procter & Gamble.

Interactivity

There's no better way to learn about MIS than by doing MIS. We provide different kinds of hands-on projects where students can work with real-world business scenarios and data, and learn first hand 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 (30 videos in all) that explain how business firms and managers are using information systems, describe new management practices, 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, there are many Instructional Videos that 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 focused on management, organizations, or technology using real-world companies to illustrate chapter concepts and issues.

INTERACTIVE SESSION: ORGANIZATIONS

BURTON SNOWBOARDS SPEEDS AHEAD WITH NIMBLE BUSINESS PROCESSES

When we hear “snowboarding”, we tend to think of snow-covered slopes, acrobatic jumps, and high-flying entertainment. We don’t usually think of improving business process efficiency. But snowboarding is business for Burton Snowboards, an industry pioneer and market leader. Founded in 1977 by Jake Burton Carpenter and headquartered in Burlington, Vermont, Burton designs, manufactures, and markets equipment, clothing, and related accessories for snowboarders. Today, Burton is a global enterprise that serves customers in 27 countries and has offices in Japan, Austria, and throughout the United States.

At its peak, Burton controlled over 40 percent of the U.S. snowboarding market, and it remains the market leader amidst a growing number of competitors. Now, as Burton continues to expand into a global company, it has a new set of problems: improving its systems for inventory, supply chain, purchasing, and customer service.

Stocking and managing inventory is a difficult problem for Burton, whose inventory changes dramatically depend on product line updates and the time of the year. Burton takes feedback from its

SAP Enterprise Resource Planning (ERP) software. Rather than buying new software to solve IT problems, Burton decided that it would explore basic functionalities of SAP ERP software that it had not used yet. Often, Burton could resolve problems this way without adding new layers of complexity to its IT infrastructure, and the company gained proficiency with SAP enterprise software in the process. Burton aims for a standard, traditional version of software whenever possible, realizing that with more bells and whistles comes increased maintenance costs and steeper learning curves to understanding the software.

SAP analysts helped Burton identify the top five transactions that were the most critical to its business operations and that needed optimization from a systems standpoint. Burton had to identify unnecessarily complicated processes, backlogs, and design gaps in the flow of its business processes. For example, the available-to-promise process was taking hours to complete. (Available to promise, in response to customer order inquiries, reports on available quantities of a requested product and delivery due dates.) Burton wanted to

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

CASE STUDY QUESTIONS

1. Analyze Burton using the value chain and competitive forces models.
2. Why are the business processes described in this case such an important source of competitive advantage for Burton?
3. Explain exactly how these process improvements enhance Burton’s operational performance and decision making.

- **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.

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

Management Decision Problems

1. Dealerships for Subaru and other automobile manufacturers keep records of the mileage of cars they sell and service. Mileage data are used to remind customers of when they need to schedule service appointments, but they are used for other purposes as well. What kinds of decisions does this piece of data support at the local level and at the corporate level? What would happen if this piece of data were erroneous, for example, showing mileage of 130,000 instead of 30,000? How would it affect decisionmaking? Assess its business impact.
2. Applebee’s is the largest casual dining chain in the world, with over 1800 locations throughout the U.S. and also in 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 on how to improve menus and profitability?

Item	Store N	Sales Region	Item Description	Unit Price	Units Sold	Week Ending	Click to Add
1	1	South	2005 17" Monitor	\$229.00	28	10/27/2012	
2	1	South	2005 17" Monitor	\$229.00	30	11/24/2012	
3	1	South	2005 17" Monitor	\$229.00	9	12/29/2012	
4	1	South	3006 101 Keyboard	\$19.95	30	10/27/2012	
5	1	South	3006 101 Keyboard	\$19.95	35	11/24/2012	
6	1	South	3006 101 Keyboard	\$19.95	39	12/29/2012	
7	1	South	6050 PC Mouse	\$8.95	28	10/27/2012	
8	1	South	6050 PC Mouse	\$8.95	3	11/24/2012	
9	1	South	6050 PC Mouse	\$8.95	38	12/29/2012	
10	1	South	8500 Desktop CPU	\$849.95	25	10/27/2012	
11	1	South	8500 Desktop CPU	\$849.95	27	11/24/2012	
12	1	South	8500 Desktop CPU	\$849.95	33	12/29/2012	
13	2	South	2005 17" Monitor	\$229.00	8	10/27/2012	
14	2	South	2005 17" Monitor	\$229.00	8	11/24/2012	
15	2	South	2005 17" Monitor	\$229.00	10	12/29/2012	
16	2	South	3006 101 Keyboard	\$19.95	8	10/27/2012	

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

Improving Decision Making: Using Web Tools to Configure and Price an Automobile

Software skills: Internet-based software

Business skills: Researching product information and pricing

In this exercise, you will use software at car Web sites 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 Web site of CarsDirect (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 Web site of the manufacturer, in this case Ford (www.ford.com). Compare the information available on Ford's Web site 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.

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

- **Collaboration and Teamwork Projects.** Each chapter features a collaborative project that encourages students working in teams to use Google Sites, Google Docs, and 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 seeks to improve business education primarily by accrediting university business programs. As a 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. On the Laudon Web site is a more inclusive and detailed assessment matrix that identifies the learning objectives of each chapter and points to all the available assessment tools for ensuring students in fact do achieve the learning objectives. Because each school is different and may have different missions and learning objectives, no single document can satisfy all situations. The authors will provide custom advice on how to use this text in their colleges with different missions and assessment needs. Please e-mail the authors or contact your local Pearson Prentice Hall 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 Web site 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. There are over 40 Learning Tracks available to instructors and students. A Learning Tracks section at the end of each chapter directs students to short essays or additional chapters in MyMISLab. 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 provide additional hands-on software instruction. The 13th Edition includes new Learning Tracks on E-Commerce Payment Systems, LAN Topologies, and the Occupational and Career Outlook for Information Systems Majors 2012–2018.

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. The test bank includes multiple-choice questions on content, but also includes many questions that require analysis, synthesis, and evaluation skills.
- **New Annotated Interactive PowerPoint Lecture Slides.** The authors have prepared a comprehensive collection of over five hundred PowerPoint slides to be used in lectures. Ken Laudon uses many of these slides 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.

MYMISLAB

MyMISLab is a Web-based assessment and tutorial tool that provides practice and testing while personalizing course content and providing student and class assessment and reporting. Your course is not the same as the course taught down the hall. Now, all the resources that instructors and students need for course success are in one place—flexible and easily organized and adapted for an individual course experience. Visit www.mymislab.com to see how you can teach, learn, and experience MIS.

CAREER RESOURCES

The Instructor's Resource section of the Laudon Web site also provides 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 resume or job application or used as a learning assessment tool for instructors.

INSTRUCTIONAL SUPPORT MATERIALS

Instructor Resource Center

Most of the support materials described in the following sections are conveniently available for adopters on the online Instructor Resource Center (IRC). The IRC includes the Image Library (a very helpful lecture tool), Instructor's Manual, Lecture Notes, Test Item File and TestGen, and PowerPoint slides.

Image Library

The Image Library is an impressive resource to help instructors create vibrant lecture presentations. Almost every figure and photo in the text is provided and organized by chapter for convenience. These images and lecture notes can be imported easily into PowerPoint to create new presentations or to add to existing ones.

Instructor's Manual

The Instructor's Manual features not only answers to review, discussion, case study, and group project questions, but also in-depth lecture outlines, teaching objectives, key terms, teaching suggestions, and Internet resources.

Test Item File

The Test Item File is a comprehensive collection of true-false, multiple-choice, fill-in-the-blank, and essay questions. The questions are rated by difficulty level and the answers are referenced by section. The Test Item File also contains questions tagged to the AACSB learning standards. An electronic version of the Test Item File is available in TestGen, and TestGen conversions are available for BlackBoard or WebCT course management systems. All TestGen files are available for download at the Instructor Resource Center.

PowerPoint Slides

Electronic color slides created by the authors are available in PowerPoint. The slides illuminate and build on key concepts in the text.

Video Cases and Instructional Videos

Instructors can download the video cases from MyMISLab at www.mymislab.com. See page xxviii for a list of video cases and instructional videos available at the time of publication.

Learning Track Modules

Over 40 Learning Tracks provide additional coverage topics for students and instructors. See page xxix for a list of the Learning Tracks available for this edition.

Video Cases and Instructional Videos

Chapter	Video
Chapter 1: Information Systems In Global Business Today	Case 1: UPS Global Operations with the DIAD IV Case 2: Google: Google Data Center Efficiency Best Practices
Chapter 2: Global E-business and Collaboration	Case 1: IS in Action: Walmart's Retail Link Supply Chain Case 2: Salesforce.com: The Emerging Social Enterprise Case 3: How FedEx Works: Inside the Memphis Super Hub Instructional Video 1: US Foodservice Grows Market with Oracle CRM on Demand
Chapter 3: Information Systems, Organizations, and Strategy	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 Strategy 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: Privacy: Social Network Data Mining Case 3: Data Mining for Terrorists and Innocents. Instructional Video 1: The Right to be Forgotten
Chapter 5: IT Infrastructure: and Emerging Technologies	Case 1: ESPN: Getting to eXtreme Scale On the Web Case 2: Salsesforce.com: Managing by Smartphone Case 3: Hudson's Bay Company and IBM: Virtual Blade Platform Instructional Video 1: Google and IBM Produce Cloud Computing Instructional Video 2: 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: Data Warehousing at REI: Understanding the Customer 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: Unified Communications Systems: Virtual Collaboration With Lotus Sametime Instructional Video 1: CNN Telepresence
Chapter 8: Securing Information Systems	Case 1: Stuxnet and Cyber Warfare Case 2: Cyber Espionage: The Chinese Threat Case 3: UBS Access Key: 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 Video Statement on Hacking SONY Instructional Video 4: Dick Hardt: Identity 2.0
Chapter 9: Achieving Operational Excellence and Customer Intimacy: Enterprise Applications	Case 1: Workday: Enterprise Software as a Service Case 2: Evolution Homecare Manages Patients with Microsoft CRM Case 3: Sinosteel Strengthens Business Management with ERP Applications Instructional Video 1: Zara's: Wearing Today's Fashions With Supply Chain Management
Chapter 10: E-commerce: Digital Markets, Digital Goods	Case 1: Deals Galore at Groupon Case 2: Etsy: A Marketplace and Community Case 3: Ford AutoXchange B2B Marketplace
Chapter 11: Managing Knowledge	Case 1: How IBM's Watson Became a Jeopardy Champion Case 2: Alfresco: Open Source Document Management and Collaboration Case 3 L'Oréal: Knowledge Management Using Microsoft SharePoint Instructional Video 1: Analyzing Big Data: IBM Watson: Watson After Jeopardy Instructional Video 2: Teamwork and Collaboration: John Chambers on Collaboration vs. Command and Control in Web 2.0 Instructional Video 3: FreshDirect's Secret Sauce: Customer Data From the Website Instructional Video 4: Oracle's Mobile Business Intelligence App
Chapter 12: Enhancing Decision Making	Case 1: FreshDirect Uses Business Intelligence to Manage Its Online Grocery Case 2: Business Intelligence: Decision Making at the Cincinnati Zoo
Chapter 13: Building Information Systems	Case 1: IBM: SaaS Business Process Management Case 2: IBM Helps the City of Madrid With Real-Time BPM Software Instructional Video 1: IBM BPM Business Process Management Customer Story: Besthome Store Instructional Video 2: Workflow Management: Visualized
Chapter 14: Managing Projects	Case 1: Blue Cross Blue Shield: Smarter Computing Project Case 2: NASA: Project Management Challenges Instructional Video: Software Project Management in 15 Minutes
Chapter 15: Managing Global Systems	Case 1 Daum Runs Oracle Apps on Linux Case 2: Lean Manufacturing and Global ERP: Humanetics and Global Shop Case 3: Monsanto, Cisco ANS, and Microsoft SharePoint

Learning Track Modules

Chapter	Learning Tracks
Chapter 1: Information Systems in Global Business Today	How Much Does IT Matter? Information Systems and Your Career The Mobile Digital Platform
Chapter 2: Global E-Business and Collaboration	Systems From a Functional Perspective IT Enables Collaboration and Teamwork Challenges of Using Business Information Systems Organizing the Information Systems Function Occupational and Career Outlook for Information Systems Majors 2012-2018
Chapter 3: Information Systems, Organizations, and Strategy	The Changing Business Environment for IT
Chapter 4: Ethical and Social Issues in Information Systems	Developing a Corporate Code of Ethics for IT
Chapter 5: IT Infrastructure and Emerging Technologies	How Computer Hardware Works How Computer Software Works Service Level Agreements The Open Source Software Initiative Comparing Stages in IT Infrastructure Evolution Cloud Computing
Chapter 6: Foundations of Business Intelligence: Databases and Information Management	Database Design, Normalization, and Entity-Relationship Diagramming Introduction to SQL Hierarchical and Network Data Models
Chapter 7: Telecommunications, the Internet, and Wireless Technology	LAN Topologies Broadband Network Services and Technologies Cellular System Generations Wireless Applications for Customer Relationship Management, Supply Chain Management, and Healthcare Introduction to Web 2.0
Chapter 8: Securing Information Systems	The Booming Job Market in IT Security The Sarbanes-Oxley Act Computer Forensics General and Application Controls for Information Systems Management Challenges of Security and Control Software Vulnerability and Reliability
Chapter 9: Achieving Operational Excellence and Customer Intimacy: Enterprise Applications	SAP Business Process Map Business Processes in Supply Chain Management and Supply Chain Metrics Best-Practice Business Processes in CRM Software
Chapter 10: E-commerce: Digital Markets, Digital Goods	E-Commerce Challenges: The Story of Online Groceries Build an E-Commerce Business Plan Hot New Careers in E-Commerce E-commerce Payment Systems
Chapter 11: Managing Knowledge	Challenges of Knowledge Management Systems
Chapter 12: Enhancing Decision Making	Building and Using Pivot Tables
Chapter 13: Building Information Systems	Unified Modeling Language Primer on Business Process Design and Documentation Primer on Business Process Management
Chapter 14: Managing Projects	Capital Budgeting Methods for Information Systems Investments Information Technology Investments and Productivity Enterprise Analysis (Business Systems Planning) and Critical Success Factors

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PART ONE

Organizations, Management, and the Networked Enterprise

Chapter 1

Information Systems in Global
Business Today

Chapter 2

Global E-business and Collaboration

Chapter 3

Information Systems,
Organizations, and Strategy

Chapter 4

Ethical and Social Issues in
Information Systems

Part One introduces the major themes of this book, raising a series of important questions: What is an information system and what are its management, organization, and technology dimensions? Why are information systems so essential in businesses today? Why are systems for collaboration and social business so important? How can information systems help businesses become more competitive? What broader ethical and social issues are raised by widespread use of information systems?

Chapter 1

Information Systems in Global Business Today

LEARNING OBJECTIVES

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

1. How are information systems transforming business, and what is their relationship to globalization?
2. Why are information systems so essential for running and managing a business today?
3. What exactly is an information system? How does it work? What are its management, organization, and technology components?
4. What are complementary assets? Why are complementary assets essential for ensuring that information systems provide genuine value for an organization?
5. What academic disciplines are used to study information systems? How does each contribute to an understanding of information systems? What is a sociotechnical systems perspective?

Interactive Sessions:

Running the Business from the Palm of Your Hand

UPS Competes Globally with Information Technology

CHAPTER OUTLINE

1.1 THE ROLE OF INFORMATION SYSTEMS IN BUSINESS TODAY

How Information Systems Are Transforming Business

What's New in Management Information Systems?
Globalization Challenges and Opportunities: A Flattened World

The Emerging Digital Firm

Strategic Business Objectives of Information Systems

1.2 PERSPECTIVES ON INFORMATION SYSTEMS

What Is an Information System?

Dimensions of Information Systems

It Isn't Just Technology: A Business Perspective on Information Systems

Complementary Assets: Organizational Capital and the Right Business Model

1.3 CONTEMPORARY APPROACHES TO INFORMATION SYSTEMS

Technical Approach

Behavioral Approach

Approach of This Text: Sociotechnical Systems

LEARNING TRACKS MODULES

How Much Does IT Matter?

Information Systems and Your Career

The Mobile Digital Platform

SHORTENING LINES AT DISNEY WORLD: TECHNOLOGY TO THE RESCUE

No one likes standing in line at Orlando's Walt Disney World, least of all parents with several young children in tow. In recent years, the average Magic Kingdom visitor only had time for nine rides because of lengthy waits and crowded restaurants and walkways. Disney's management is unhappy with these long lines as well, and is using information technology to change that experience.

Disney handles over 30 million visitors each year, many of them during peak family vacation times, such as Christmas, Thanksgiving, and summer vacations. Disney has been treating crowd control as a science for a long time, and now it wants to quicken the pace even more. Customers accustomed to video games and smartphones expect entertainment to be immediately available.

Disney World's management would genuinely like to make its guests happier. In order to increase revenue at Disney's theme parks, it must try to wring more expenditures from existing customers. So it's definitely in Disney's interest to invest in giving guests faster and better access to fun if that encourages them to return more often. And if Disney can also increase guests' average number of restaurant or shop visits, this will boost per capita spending as well.

Beneath the Cinderella Castle lies a Disney Operational Command Center, which uses video cameras, digital park maps, computer programs, and other tools to spot gridlock before it forms and immediately launch countermeasures. The center's information systems determine ride capacity in part by analyzing airline bookings, hotel reservations, and historic attendance data. Satellites supply up-to-the-minute weather analysis. Employees monitor flat-screen televisions displaying various Disney attractions outlined in red, yellow, and green. They are constantly on the lookout for ways to speed up lines or make more efficient use of Disney facilities.

As Bob Schlinger, a writer on Disney for the Frommers.com travel site notes, you only have so many options once the bathtub is full. So, for example, if the outline for the Pirates of the Caribbean ride changes from green to yellow, the center might alert managers to launch more boats. Alternatively, managers might choose to dispatch Captain Jack Sparrow or Goofy to entertain people as they wait in line. Video game stations help visitors pass the time at wait areas for rides such as Space Mountain.

If Fantasyland is overcrowded but nearby Tomorrow land has more room, the command center might route a miniparade called "Move it! Shake it! Celebrate it!" into the less-crowded area to attract guests in that direction. Other command center technicians monitor restaurants to see if additional registers need to be opened or if more greeters are required to hand menus to people waiting to order. By using information technology to improve the flow of crowds, the Operational Command Center has managed to raise the average number of daily rides for Disney World visitors to 10.

Disney has started to harness mobile technology. Disney's own mobile application called Mobile Magic provides additional tools for guiding visitors more efficiently, including displaying wait times for rides



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and the ability to locate Disney characters, such as Sleeping Beauty, along with directions to where they are entertaining visitors.

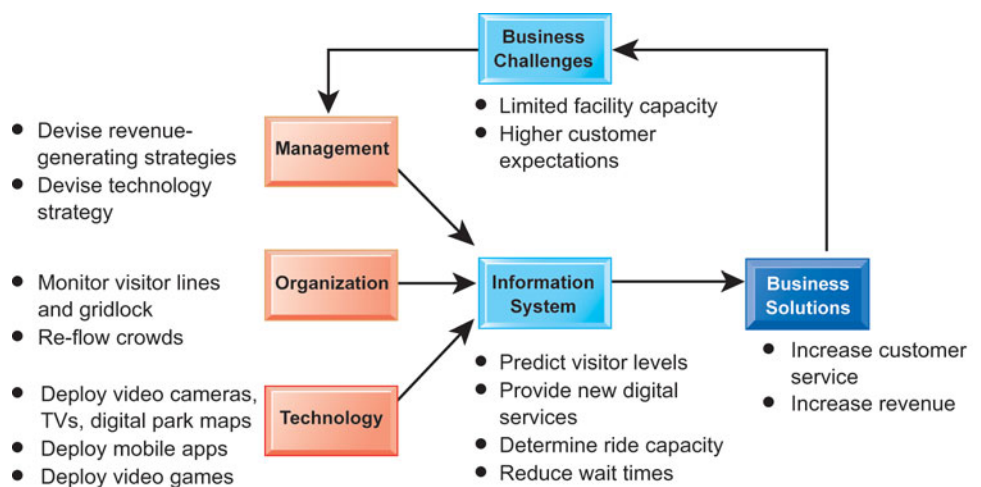
Sources: Chad Storlie, "Walt Disney-Learning from the Military," *Military.com*, January 4, 2011; Jeremy Olson, "Surviving Disney World," *Minneapolis Star-Tribune*, April 4, 2011; www.disneyworld.disney.go.com, accessed September 2, 2012; and Brooks Barnes, "Disney Tackles Major Theme Park Problem: Lines," *The New York Times*, December 27, 2010.

The challenges facing Disney World and other theme parks show why information systems are so essential today. There is a limit to the number of people Disney World can handle at one time. In order to keep increasing revenue, Disney needs to find more efficient and productive ways to utilize its existing facilities. In Disney's case, this means encouraging customers to spend more time on the premises and to make repeat visits.

The chapter-opening diagram calls attention to important points raised by this case and this chapter. To increase revenue, Disney management chose to use information technology to improve the customer experience. Disney uses video cameras, television displays, and specialized computer software to calculate visitor capacity, identify gridlock, and launch activities that will help re-flow crowds. In addition to reducing wait times, Disney uses information technology to provide new interactive services, such as video games, to guests waiting in line, and mobile applications to help visitors navigate the theme park more efficiently.

It is also important to note that using information technology for crowd control has changed the way Disney World runs its business. Disney World's systems for managing people in lines changed procedures for ticketing, crowd management, and ordering food from restaurants. These changes had to be carefully planned to make sure they enhanced service, efficiency, and profitability.

Here are some questions to think about: How are information systems improving operations at Disney? Give examples of two management decisions that are facilitated by Disney's information systems.



1.1 THE ROLE OF INFORMATION SYSTEMS IN BUSINESS TODAY

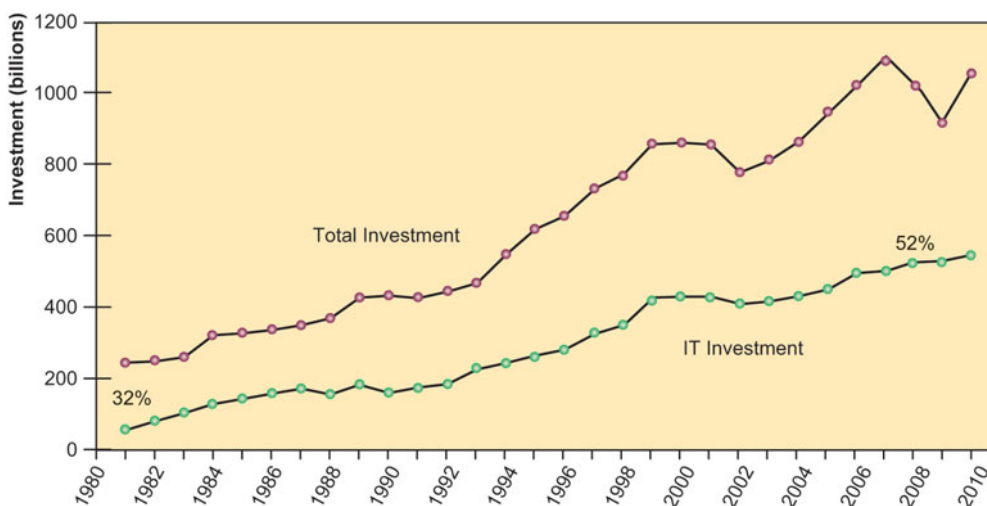
It's not business as usual in America anymore, or the rest of the global economy. In 2012, American businesses will spend over \$540 billion on information systems hardware, software, and telecommunications equipment. In addition, they will spend another \$650 billion on business and management consulting and services—much of which involves redesigning firms' business operations to take advantage of these new technologies. Figure 1.1 shows that between 1980 and 2011, private business investment in information technology consisting of hardware, software, and communications equipment grew from 32 percent to 52 percent of all invested capital.

As managers, most of you will work for firms that are intensively using information systems and making large investments in information technology. You will certainly want to know how to invest this money wisely. If you make wise choices, your firm can outperform competitors. If you make poor choices, you will be wasting valuable capital. This book is dedicated to helping you make wise decisions about information technology and information systems.

HOW INFORMATION SYSTEMS ARE TRANSFORMING BUSINESS

You can see the results of this massive spending around you every day by observing how people conduct business. More wireless cell phone accounts were opened in 2012 than telephone landlines installed. Smartphones, texting, e-mail, and online conferencing have all become essential tools of business. One hundred twenty-two million people in the United States access the Internet using mobile devices in 2012, which is half of the total Internet user population

FIGURE 1.1 INFORMATION TECHNOLOGY CAPITAL INVESTMENT



Information technology capital investment, defined as hardware, software, and communications equipment, grew from 32 percent to 52 percent of all invested capital between 1980 and 2011.

Source: Based on data in U.S. Department of Commerce, Bureau of Economic Analysis, *National Income and Product Accounts*, 2012.

(eMarketer, 2010). There are 242 million cell phone subscribers in the United States, and nearly 5 billion worldwide (ITU, 2011).

By June 2012, more than 104 million businesses worldwide had dot-com Internet sites registered (Whois, 2012). Today, 184 million Americans shop online, and 150 million have purchased online. Every day about 67 million Americans go online to research a product or service.

In 2012, FedEx moved over 9 million packages daily worldwide (6 million in the United States), mostly overnight, and the United Parcel Service (UPS) moved over 15 million packages daily worldwide. 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. Supply chains have become more fast-paced, with companies of all sizes depending on just-in-time inventory to reduce their overhead costs and get to market faster.

As newspaper readership continues to decline, more than 150 million people read a newspaper online, and millions more read other news sites. About 67 million people watch a video online every day, 76 million read a blog, and 26 million post to blogs, creating an explosion of new writers and new forms of customer feedback that did not exist five years ago (Pew, 2012). Social networking site Facebook attracted 162 million monthly visitors in 2012 in the United States, and over 900 million worldwide. Google+ has attracted over 100 million users in the United States. Businesses are starting to use social networking tools to connect their employees, customers, and managers worldwide. Many Fortune 500 companies now have Facebook pages, Twitter accounts, and Tumblr sites.

Despite the economic slowdown, e-commerce and Internet advertising continue to expand. Google's online ad revenues surpassed \$36 billion in 2011, and Internet advertising continues to grow at more than 10 percent a year, reaching more than \$39.5 billion in revenues in 2012.

New federal security and accounting laws, requiring many businesses to keep e-mail messages for five years, coupled with existing occupational and health laws requiring firms to store employee chemical exposure data for up to 60 years, are spurring the annual growth of digital information at the estimated rate of 5 exabytes annually, equivalent to 37,000 new Libraries of Congress.

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 and discuss these with your professor and other students.

There are three interrelated changes in the technology area: (1) the emerging mobile digital platform, (2) the growing business use of "big data," and (3) the growth in "cloud computing," where more and more business software runs over the Internet.

IPhones, iPads, BlackBerrys, and Android tablets and smartphones are not just gadgets or entertainment outlets. They represent new emerging computing platforms based on an array of new hardware and software technologies.

TABLE 1.1 WHAT'S NEW IN MIS

CHANGE	BUSINESS IMPACT
TECHNOLOGY	
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, or SaaS).
Big data	Businesses look for insights from huge volumes of data from Web traffic, e-mail messages, social media content, and machines (sensors) that require new data management tools to capture, store, and analyze.
A mobile digital platform emerges to compete with the PC as a business system	The Apple iPhone and Android mobile devices are able to download hundreds of thousands of applications to support collaboration, location-based services, and communication with colleagues. Small tablet computers, including the iPad, Google Nexus, and Kindle Fire, challenge conventional laptops as platforms for consumer and corporate computing.
MANAGEMENT	
Managers adopt online collaboration and social networking software to improve coordination, collaboration, and knowledge sharing	Google Apps, Google Sites, Microsoft Windows SharePoint Services, and IBM Lotus Connections are used by over 100 million business professionals worldwide to support blogs, project management, online meetings, personal profiles, social bookmarks, 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 videoconferencing and Web conferencing technologies to reduce travel time, and cost, while improving collaboration and decision making.
ORGANIZATIONS	
Social business	Businesses use social networking platforms, including Facebook, Twitter, and internal corporate social tools, to deepen interactions with employees, customers, and suppliers. Employees use blogs, wikis, e-mail 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.

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. We call these developments the “emerging mobile digital platform.”

Managers routinely use online collaboration and social technologies in order to make better, faster decisions. As management behavior changes, how work gets organized, coordinated, and measured also changes. By connecting employees working on teams and projects, the social network is where works gets 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 allow organizations to 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 Management. Millions of managers rely heavily on the mobile digital platform to coordinate suppliers and shipments, satisfy customers, and manage their employees. A business day without these mobile devices or Internet access would be unthinkable. As you read this case, note how the emerging mobile platform greatly enhances the accuracy, speed, and richness of decision making.

GLOBALIZATION CHALLENGES AND OPPORTUNITIES: A FLATTENED WORLD

In 1492, Columbus reaffirmed what astronomers were long saying: the world was round and the seas could be safely sailed. As it turned out, the world was populated by peoples and languages living in isolation from one another, with great disparities in economic and scientific development. The world trade that ensued after Columbus's voyages has brought these peoples and cultures closer. The "industrial revolution" was really a world-wide phenomenon energized by expansion of trade among nations.

In 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 reduced the economic and cultural advantages of developed countries. Friedman argued that the U.S. and European countries were in a fight for their economic lives, competing for jobs, markets, resources, and even ideas with highly educated, motivated populations in low-wage areas in the less developed world (Friedman, 2007). This "globalization" presents both challenges and opportunities for business firms

A growing percentage of the economy of the United States and other advanced industrial countries in Europe and Asia depends on imports and exports. In 2012, more than 33 percent of the U.S. economy resulted from foreign trade, both imports and exports. In Europe and Asia, the number exceeded 50 percent. Many Fortune 500 U.S. firms derive half their revenues from foreign operations. For instance, 85 percent of Intel's revenues in 2011 came from overseas sales of its microprocessors. Eighty percent of the toys sold in the United States are manufactured in China, while about 90 percent of the PCs manufactured in China use American-made Intel or Advanced Micro Design (AMD) chips.

It's not just goods that move across borders. So too do jobs, some of them high-level jobs that pay well and require a college degree. In the past decade, the United States lost several million manufacturing jobs to offshore, low-wage

INTERACTIVE SESSION: MANAGEMENT

RUNNING THE BUSINESS FROM THE PALM OF YOUR HAND

Can you run your company from the palm of your hand? Perhaps not entirely, but there are many functions today that can be performed using an iPhone, iPad, BlackBerry, or other mobile handheld device.

The BlackBerry used to be the favorite mobile handheld for business because it was optimized for e-mail and messaging, with strong security and tools for accessing internal corporate systems. Now that's changing. Companies large and small are starting to deploy Apple's iPhone and iPad as well as Android mobile devices to conduct more of their work. They are enhancing their security systems so that mobile users can remotely accessing proprietary corporate resources with confidence.

For some, these handhelds have become indispensable. Eric Jackson is a champion kayaker who spends half of each year following competitions and events throughout North America. He's also president of Jackson Kayak, the leading whitewater kayak manufacturer. It's essential that he participate in athletic events, monitor industry trends in the field, and meet directly with dealers and customers. Jackson's strong customer focus has helped the company expand successfully worldwide, with distributors on six continents. With the iPhone and iPad, Jackson claims he can run the entire 120-person company from afar.

Jackson's Wi-Fi-equipped RV connects wirelessly to the company headquarters in Sparta, Tennessee. When Jackson's not on Wi-Fi, he uses his iPad 3G cellular connection. The iPad gives him instant access to his entire operation, so he can analyze customer data, refresh Web site content, or approve new designs. Jackson's iPad includes calendars, e-mail, contact management, and the ability to create and edit documents, spreadsheets, and presentations—all the tools this executive needs to communicate with the home office, dealers, and customers.

Back at the shop, Jackson Kayak's managers and employees find iPad and iPhone equally invaluable. In the factory, Chief Operations Officer John Ratliff can compare Jackson Kayak's manufacturing equipment side-by-side with images of replacement parts on the iPad to make sure he's getting the correct pieces. The iPhone and iPad have become so indispensable that the company outfitted its entire work-

force, from customer service, to design, to quality control, with iPhones. Many have iPads as well.

Using handhelds to run the business is not limited to small companies. General Electric (GE) is one of the world's largest companies, producing aircraft engines, locomotives and other transportation equipment, kitchen and laundry appliances, lighting, electric distribution and control equipment, generators and turbines, and medical imaging equipment. GE is also a leading provider of financial services, aviation, clean energy, media, and health care technology. This giant multinational was an early adopter of mobile technology. GE employees use their iPads to access e-mail, contacts, documents, and electronic presentations. GE's Mobile Center of Excellence has developed dozens of iPhone and iPad applications, including industry-specific diagnostic and monitoring tools and business intelligence tools that help decision makers find patterns and trends in large volumes of data. The company's Transformer Monitoring app helps manage gas turbine inventory and electronic transformers throughout the world, with the ability to zoom in from a global map to a specific transformer and read all of the key performance indicators. A PDS Movement Planner lets service personnel monitor railway tracks and obtain diagnostic information on locomotives.

With operations in 60 countries, Dow Corning offers more than 7,000 products and services for consumer and industrial applications, from adhesives to lubricants, delivered as fluids, solids, gels, and powders. The Roambi Visualizer app lets Dow Corning executives use their iPhones to quickly view and analyze real-time data from their core corporate system, including sales figures, trends, and projections. It presents managers with simple, intuitive dashboards of complex data. According to Executive Vice President and Chief Financial Officer Don Sheets, in 15 seconds he can get a sense of whether there's a financial performance issue he needs to get involved with.

Dow Corning's Analytics App for the iPhone monitors Web site traffic and online sales for the company's XIAMETER brand of standard silicone products. Analytics App interfaces with Google Analytics. When Dow Corning rolls out XIAMETER Web sites across the globe, executives can monitor