


Management Information Systems

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Managing the Digital Firm

Kenneth C. Laudon

Jane P. Laudon



Management Information Systems

MANAGING THE DIGITAL FIRM

FOURTEENTH EDITION

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New York University

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



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Meet the New Mobile Workers
UPS Competes Globally with Information Technology
Home Depot Renovates Itself with New Systems and Ways of Working

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Should a Computer Grade Your Essays?

Chapter 3: Information Systems, Organizations, and Strategy

Should T.J. Maxx Sell Online?
Nike Becomes a Technology Company
Identifying Market Niches in the Age of Big Data
Who's The World's Top Retailer? Walmart and Amazon Duke It Out

Chapter 4: Ethical and Social Issues in Information Systems

Content Pirates Sail the Web
Edward Snowden: Traitor or Protector of Privacy?
Big Data Gets Personal: Behavioral Targeting
Facebook Privacy: There Is No Privacy

Chapter 5: IT Infrastructure and Emerging Technologies

Portugal Telecom Offers IT Infrastructure for Sale
Wearable Computers Go to Work
Is It Time for Cloud Computing?
The Pleasures and Pitfalls of BYOD

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

Better Data Management Helps the Toronto Globe and Mail Reach Its Customers
Driving ARI Fleet Management with Real-Time Analytics
American Water Keeps Data Flowing
Does Big Data Bring Big Rewards?

Chapter 7: Telecommunications, the Internet and Wireless Technology

Wireless Technology Makes Dundee Precious Metals Good as Gold
The Battle Over Net Neutrality
Monitoring Employees on Networks: Unethical or Good Business?
Google, Apple, and Facebook Struggle for Your Internet Experience

Chapter 8: Securing Information Systems

The 21st Century Bank Heist
Target Becomes the Target for Massive Data Theft
BYOD: It's Not So Safe
The Looming Threat of Cyberwarfare

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

ACH Food Companies Transforms Its Business with Enterprise Systems
Scotts Miracle-Gro Cultivates Supply Chain Proficiency
Graybar Goes for Customer Analytics
Vodafone: A Giant Global ERP Implementation

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

Pinterest: How Much Is a Picture Worth?
Can Pandora Succeed with Freemium?
Will Mobile Technology Put Orbitz in the Lead?
Cultivating Customers the Social Way

Chapter 11: Managing Knowledge

Jaguar Land Rover Transforms with New Design and Manufacturing Technology
Is 3-D Printing a Game-Changer?
Facial Recognition Systems: Another Threat to Privacy?
What's Up with IBM's Watson?

Chapter 12: Enhancing Decision Making

Germany Wins the World Cup with Big Data at Its Side
Big Data Make Cities Smarter
America's Cup: The Tension between Technology and Human Decision Makers
How Much Does Data-Driven Planting Help Farmers?

Chapter 13: Building Information Systems

New Systems Help Work Flow More Smoothly at Moen
Datacard Group Redesigns the Way It Works
The Challenge of Mobile Application Development
SourceGas Goes for Better Workforce Scheduling Systems

Chapter 14: Managing Projects

Harrah's Cherokee Casino Wins with Sound Project Management
New York's CityTime: An IS Project Goes Awry
Britain's National Health Service Jettisons Choose and Book System
A Shaky Start for Healthcare.Gov

Chapter 15: Managing Global Systems

New Systems Help Fiat Become a Global Powerhouse
E-Commerce Russian-Style
South Korea's Restricted Internet
Unilever's Push Toward Unified Global Systems

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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. 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 14th edition features all new opening, closing and Interactive Session cases. The text, figures, tables, and cases have been updated through October 2014 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.
- New Video Cases collection: 39 video cases (2 or more per chapter) and 18 additional instructional videos covering key concepts and experiences in the MIS world.
- Learning Tracks: 47 Learning Tracks for additional coverage of selected topics.
- Video Cases and Chapter Cases are listed at the beginning of each chapter.

NEW TOPICS

- **Social, Mobile, Local:** New e-commerce content in Chapter 10 describing how social tools, mobile technology, and location-based services are transforming marketing and advertising.

- **Big Data:** Chapter 6 on Databases and Information Management updated 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:** 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 Interactive Session on using cloud services. Cloud computing 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 13 (cloud-based systems development).
- **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.
- Consumerization of IT and BYOD
- Internet of Things
- Visual Web
- Location analytics
- Location-based services (geosocial, geoadvertising, geoinformation services)
- Building an e-commerce presence
- Wearable computers
- Mobile application development, mobile and native apps
- Operational intelligence
- Expanded coverage of business analytics including big data analytics
- Software-defined networking
- 3-D printing
- Quantum computing
- Two-factor authentication
- Ransomware
- Chief data officer
- MOOCs

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, 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 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.

New Business Models. For instance, the emergence of online video stores like Netflix for streaming, and Apple iTunes for downloading, has forever changed how premium video is distributed, and even created. Netflix in 2013 attracted 30 million subscribers to its DVD rental and streaming movie business. Netflix now accounts for 90 percent of streaming premium movies and TV shows, and consumes an estimated 33 percent of Internet bandwidth in the United States. Netflix has moved into premium TV show production with *House of Cards*, and *Arrested Development*, challenging cable networks like HBO, and potentially disrupting the cable channels 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 will generate an estimated \$470 billion in revenues in 2014, and is estimated to grow to nearly \$700 billion in 2018. Amazon's revenues grew 21 percent to \$74 billion in 2013, despite a slowly expanding economy growing at 2 percent annually, while offline retail grew by only 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, 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 a selling physical products. While 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: 60 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. 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 rather than 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 organizations and business firms demonstrate these characteristics, they are 21st Century digital firms.

THE 14TH 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. 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 Package, and Learning Tracks.

The core text consists of 15 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: 39 video case studies (2-3 per chapter) plus 18 instructional videos that illustrate business uses of information systems, explain new technologies, and explore concepts. Videos are keyed to the topics of each chapter.

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

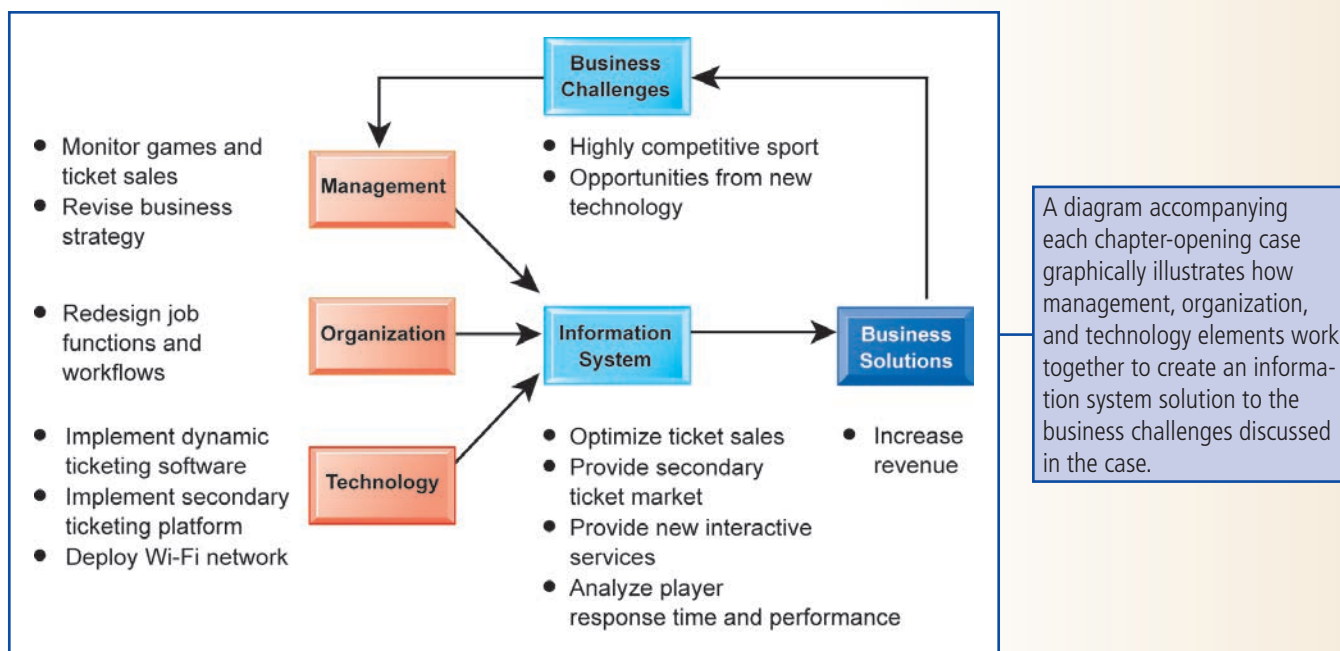
THE CORE TEXT

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 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 management, 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 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 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 (2014) 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 where 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, 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 18 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.

INTERACTIVE SESSION: MANAGEMENT

TARGET BECOMES THE TARGET FOR MASSIVE DATA THEFT

Target, the second-largest discount retail chain in the United States, is known for trendy styles at low prices. In late 2013, it also became known as the target for one of the largest data thefts in history. Sometime before Thanksgiving 2013, hackers installed malware in Target's security and payments system designed to steal every credit card used at the company's 1,797 U.S. stores when customers were paying for their purchases. When customers' credit and debit cards were being swiped at Target's point-of-sale devices, the malware captured the shopper's card number, and stored it on a Target server controlled by the hackers. From there the stolen credit card numbers were transmitted first to three staging point servers spread around the U.S. and then into computers in Russia. Experts believe that the hack at Target was part of a broader campaign aimed at least half a dozen major retailers, including Neiman Marcus, Michael's Arts and Crafts Store, and Easton-Bell Sports.

The malware used in these attacks includes a RAM scraper, which enables cybercriminals to capture encrypted data as the data travel through the computer's live memory, where the data appear as plain text. Once injected into retailers' computer

malware detection platform. FireEye software isolates incoming Web traffic and looks for suspicious activity. Target's team of security specialists in Bangalore monitor its computers around the clock. If Bangalore notices anything suspicious, Target's security operations center in Minneapolis is notified.

FireEye spotted the malware at work and alerted Bangalore, which then notified the Target security team in Minneapolis. The security breach could have been stopped there without human intervention, but the data theft continued until mid-December. The FireEye system has an option to automatically delete malware as it is detected. It's possible that Target's security team turned that function off so that it would have the final decision on what to do. Target's security team claimed it knew about the hacker activity, but that it was insufficient to warrant immediate follow-up. Target's security team sees numerous threats each week and is able to prioritize on only a limited number of them at its monthly steering committee meetings.

The intruders had initially gained access to Target's systems by stealing the credentials of a Pennsylvania refrigeration and heating company called Fazio Mechanical Services to get inside

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

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. List and describe the security and control weaknesses at Target that are discussed in this case.
2. What management, organization, and technology factors contributed to these problems? How much was management responsible?
3. What was the business impact of Target's data losses on Target and its customers?
4. What solutions would you suggest to prevent these problems?

- **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 provides additional hands-on projects for each chapter.
- **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.

Management Decision Problems

- 12-7** 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 decision making? Assess its business impact.
- 12-8** Applebee's is the largest casual dining chain in the world, with over 1,800 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?

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

Store N	Sales Region	Item N	Item Descriptio	Unit Pric	Units Sol	Week Ending	Click to Add
1	1 South	2005 17"	Monitor	\$229.00	28	10/27/2014	
2	1 South	2005 17"	Monitor	\$229.00	30	11/24/2014	
3	1 South	2005 17"	Monitor	\$229.00	9	12/29/2014	
4	1 South	3006 101	Keyboard	\$19.95	30	10/27/2014	
5	1 South	3006 101	Keyboard	\$19.95	35	11/24/2014	
6	1 South	3006 101	Keyboard	\$19.95	39	12/29/2014	
7	1 South	6050	PC Mouse	\$8.95	28	10/27/2014	
8	1 South	6050	PC Mouse	\$8.95	3	11/24/2014	
9	1 South	6050	PC Mouse	\$8.95	38	12/29/2014	
10	1 South	8500	Desktop CPU	\$849.95	25	10/27/2014	
11	1 South	8500	Desktop CPU	\$849.95	27	11/24/2014	
12	1 South	8500	Desktop CPU	\$849.95	33	12/29/2014	
13	2 South	2005 17"	Monitor	\$229.00	8	10/27/2014	
14	2 South	2005 17"	Monitor	\$229.00	8	11/24/2014	
15	2 South	2005 17"	Monitor	\$229.00	10	12/29/2014	
16	2 South	3006 101	Keyboard	\$19.95	8	10/27/2014	

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

- 3-11** 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.

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 back 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 e-mail 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 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 47 Learning Tracks 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 provide additional hands-on software instruction. The 14th Edition includes new Learning Tracks on Building an E-Commerce Web Site, E-commerce Payment Systems including Bitcoin, Fourth Generation Languages, and 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. 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 fifty PowerPoint slides to be used in your lectures. Many of these slides are the same as used by Ken Laudon 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 resume or job application or used as a learning assessment tool for instructors.

INSTRUCTOR RESOURCES

At the Instructor Resource Center, 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 Track Modules

At the Instructor Resource Center, www.pearsonhighered.com/irc, instructors can download 47 Learning Tracks providing additional coverage topics for students and instructors. See page xxx 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 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: Salesforce.com: The Emerging Social Enterprise Case 3: How FedEx Works: Inside the Memphis 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 Corporate Strategy for a Small Business Instructional Video 1: SAP BusinessOne ERP: From Orders to Final Delivery and Payment

Video Cases and Instructional Videos (Continued)

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 and Emerging Technologies	Case 1: ESPN.com: Getting to eXtreme Scale On the Web Case 2: Salesforce.com: Managing by Smartphone Case 3: Case 3: Acxicom's Strategic Advantage: IBM's 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: 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 (ZTIC) 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: GSMS Protects Products and 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: Managing Knowledge	Case 1: How IBM's Watson Became a Jeopardy Champion Case 2: Alfresco: Open Source Document Management and Collaboration Instructional Video 1: Analyzing Big Data: IBM's Watson: After Jeopardy Instructional Video 2: Teamwork and Collaboration: John Chambers on Collaboration vs. Command and Control
Chapter 12: Enhancing Decision Making	Case 1: FreshDirect Uses Business Intelligence to Manage Its Online Grocery. Case 2: Business Intelligence Helps the Cincinnati Zoo Instructional Video 1: FreshDirect's Secret Sauce: Customer Data From the Website Instructional Video 2: A Demonstration of Oracle's Mobile Business Intelligence App
Chapter 13: Building Information Systems	Case 1: IBM: BPM in a SaaS Environment 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
Chapter 14: Managing Projects	Case 1: Blue Cross Blue Shield: Smarter Computing Project Case 2: NASA Project Management Challenges Instructional Video 1: Software Project Management in 15 Minutes, Part 1 Instructional Video 1: Software Project Management in 15 Minutes, Part 2
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 Uses Cisco and Microsoft to Manage Globally

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

Learning Track Modules (Continued)

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	Broadband Network Services and Technologies Cellular System Generations Wireless Applications for Customer Relationship Management, Supply Chain Management, and Healthcare Introduction to Web 2.0 LAN Topologies
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 Building an E-commerce Web Site
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 Fourth Generation Languages
Chapter 14: Managing Projects	Capital Budgeting Methods for Information Systems Investments Enterprise Analysis (Business Systems Planning) and Critical Success Factors Information Technology Investments and Productivity

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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?

Information Systems in Global Business Today

CHAPTER 1

LEARNING OBJECTIVES

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

1. How are information systems transforming business, and why are they so essential for running and managing a business today?
2. What is an information system? How does it work? What are its management, organization, and technology components and why are complementary assets essential for ensuring that information systems provide genuine value for organizations?
3. What academic disciplines are used to study information systems and how does each contribute to an understanding of information systems?

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CHAPTER CASES

The San Francisco Giants Win Big with Information Technology
Meet the New Mobile Workers
UPS Competes Globally with Information Technology
Home Depot Renovates Itself with New Systems and Ways of Working

VIDEO CASES

UPS Competes Globally with the DIAD
Google Data Center Efficiency Best Practices
Instructional Videos:
Green Energy Efficiency in a Data Center Using Tivoli (IBM)
Tour IBM's Raleigh Data Center

THE SAN FRANCISCO GIANTS WIN BIG WITH INFORMATION TECHNOLOGY

The San Francisco Giants are one of the oldest U.S. baseball teams, and one of the most successful as well. They have won the most games of any team in the history of American baseball and any North American professional sports team. The Giants have captured 23 National League pennants and appeared in 20 World Series competitions—both records in the National League. Their most recent triumph was winning the 2014 World Series. 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 produced by the system on player speed and response time, such as how quickly an outfielder comes in for a ball or reacts to line drives, will enable the Giants to make player data analysis much more precise. In some cases, it will provide 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 amount 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 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. The Giants have sold out 100 percent of their home games since October 2010, and have increased season ticket sales from 21,000 in 2010 to 29,000 in 2012.

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 where season ticket holders can resell tickets they are not using over the Internet. The Giants's 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.

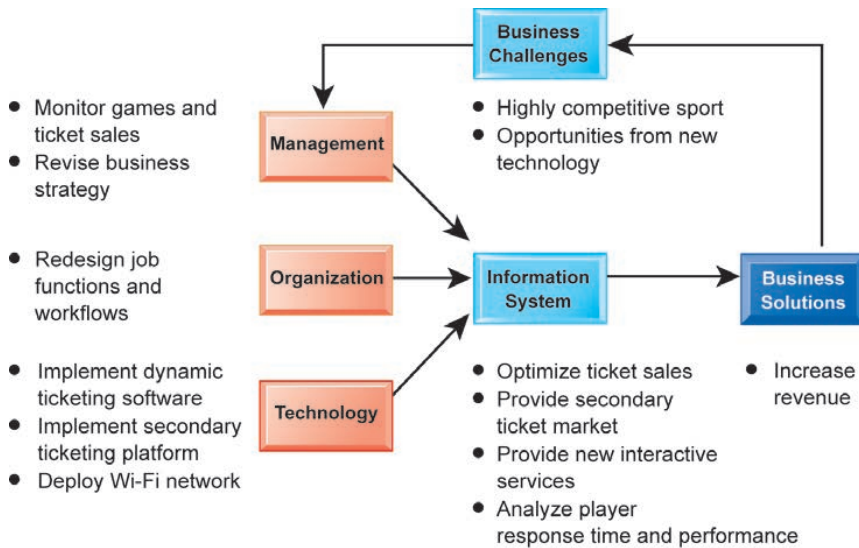
The Giants have also taken advantage of wireless technology to enhance their fans' experience. A network extends from the seats to the concession stands to areas outside the stadium, and is one of the largest public wireless networks in the world. The stadium, AT&T Park, has a giant high-speed wireless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

Sources: <http://www.sportvision.com/baseball/fieldfx>, accessed January 16, 2014; <http://www.sanfranciscogiants.mlb.com>, accessed February 12, 2014; Kenneth Corbin, "Federal CIOs Look to Speed Tech Development Cycle," CIO, December 17, 2013; 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.

The 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 in order to stay in business. Major league baseball is also a business where 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 raised by this case and this chapter. 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.



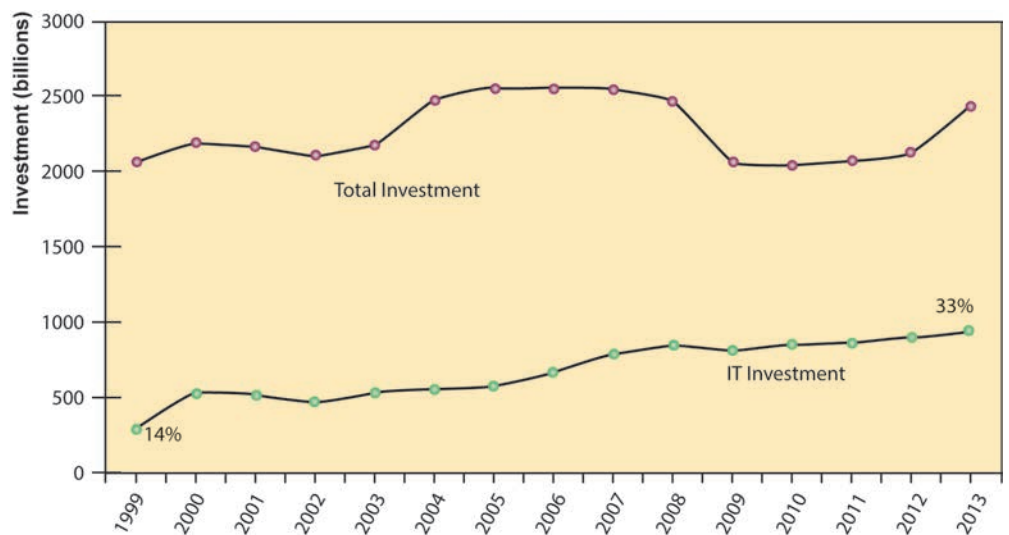
1.1 HOW ARE INFORMATION SYSTEMS TRANSFORMING BUSINESS, AND WHY ARE THEY SO ESSENTIAL FOR RUNNING AND MANAGING A BUSINESS TODAY?

It's not business as usual in America anymore, or the rest of the global economy. In 2014, American businesses will spend an estimated \$817 billion on information systems hardware, software, and telecommunications equipment. In addition, they will spend another \$230 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 1999 and 2013, private business investment in information technology consisting of hardware, software, and communications equipment grew from 14 percent to 33 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. Changes in technology, and new innovative business models, have transformed social life and business practices. Over 247 million Americans have mobile phones (67% of the population), and 167 million of these people access the Internet using smartphones and tablets. 46% of the entire population now use tablet computers whose sales have soared. 172 million Americans use online social networks, 150 million

FIGURE 1.1 INFORMATION TECHNOLOGY CAPITAL INVESTMENT

Information technology capital investment, defined as hardware, software, and communications equipment, grew from 14 percent to 33 percent of all invested capital between 1999 and 2013.

Source: Based on data in U.S. Department of Commerce, Bureau of Economic Analysis, *National Income and Product Accounts*, 2014.

use Facebook, while 48 million use Twitter. Smartphones, social networking, texting, emailing, and Webinars have all become essential tools of business because that's where your customers, suppliers, and colleagues can be found. (eMarketer, 2014).

By June 2014, more than 114 million businesses worldwide had dot-com Internet sites registered (Domain Tools, 2014). Today, 196 million Americans shop online, and 163 million will purchase online. Every day about 90 million Americans go online to research a product or service. (eMarketer, 2014).

In 2013, FedEx moved about 3.5 million packages daily to 220 countries and territories around the world, mostly overnight, and the United Parcel Service (UPS) moved over 16 million packages daily worldwide. Businesses are using information technology 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 print readership continues to decline, more than 168 million people read a newspaper online, and millions more read other news sites. About 83 million people watch a video online every day, 66 million read a blog, and 25 million post to blogs, creating an explosion of new writers and new forms of customer feedback that did not exist five years ago (eMarketer, 2014). Social networking site Facebook attracted 152 million monthly visitors in 2014 in the United States, and over 1 billion worldwide. Google+ has attracted over 130 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.

E-commerce and Internet advertising continue to expand. Google's online ad revenues surpassed \$17 billion in 2013, and Internet advertising continues to

grow at more than 15 percent a year, reaching more than \$43 billion in revenues in 2013 (eMarketer, 2014).

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, business models 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 widespread adoption of the mobile computing 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, 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. 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 “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 mobile platform greatly enhances the accuracy, speed, and richness of decision making.

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 tablet computers 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 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 SMS 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.

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

INTERACTIVE SESSION: MANAGEMENT

MEET THE NEW MOBILE WORKERS

How much of your job can you do from the palm of your hand? Probably more than you think. Today there are many job functions for both rank-and-file employees and their managers that can be performed using mobile phones and tablets, including the iPad, iPhone, and Android mobile devices.

Companies are enhancing their security systems so that mobile users can remotely access corporate systems with confidence. And they are developing more far-reaching applications to take advantage of the stunning mobile and graphic capabilities. Mobile technology is spreading to core work functions, such as marketing materials for pharmaceutical reps, customer account software for service technicians, and apps for farmers to test the quality of cow's milk.

McClendon's Select, a Peoria-based organic family-run farm, relies on iPad for each stage of its operation: planting fields, picking crops, filling orders, loading trucks, delivering to restaurants, and selling products at farmers' markets. Co-owner Sean McClendon uses a wireless camera on his tractor to ensure crop rows are as straight as possible. The mydlinkLite app on his iPad lets him watch the footage as he plows. The farm's planting manager no longer needs to leave the field to handle the careful record-keeping required to maintain an organic certification. Using her iPad connection to the 3G cellular network, she is able to access the Web-based COG Pro management system to update her records of seed types and where and when they're planted.

Before McClendon's went digital, orders were handwritten on a white board, a process that was too time-consuming, error-prone, and costly. Now each employee grabs an iPad when arriving for work in the morning and uses a proprietary app called Picker Entry to generate a list of products to collect in the field based on online orders placed by restaurants and consumers. Using AirPrint technology in the iPad, employees then wirelessly print their orders and head out to the field to pick product. After the employees return from the field, they add inventory that they picked using an iPad. They are able to see all of the restaurants on the screen, tap the restaurant name, and fill the orders right from the iPad.

When employees load those orders on trucks for deliveries, Picker Entry on the iPad replaces a manual process that used to take 30 to 45 minutes. A single tap to the iPad generates a report telling where each

box goes on the truck for restaurant deliveries. One of the main reasons restaurants use McClendon's is because of its order accuracy.

Using handhelds to run the business is not limited to small companies. PepsiCo manufactures and sells brands including Pepsi, Gatorade, Mountain Dew, Tropicana, Quaker, and Frito-Lay worldwide and has nearly 280,000 employees. The company uses a complex web of interlocking distribution systems to move its products from its manufacturing and warehouse facilities onto trucks and then into stores in time to meet customer demand. PepsiCo runs about 17,000 distribution routes each day. The iPhone and iPad help employees of PepsiCo's North America Beverages division ensure that the right products arrive in the right locations as quickly and efficiently as possible.

In the past, PepsiCo drivers and merchandisers began each day by picking up printed schedules with order quantities and tasks to be performed at each outlet, from unloading cases of soda to setting up new product displays. It was difficult to accommodate last-minute changes in orders because communicating with the delivery drivers was difficult when they were on the road.

PepsiCo North America Beverages created a custom in-house app for the iPhone called Power4Merch, which immediately notifies merchandisers when a driver has arrived at a store. The merchandiser's iPhone has an electronic timecard, and he can see his schedule, the store details, the account profiles, and everything he needs to know to service the store.

PepsiCo managers use iPads with custom applications to monitor their teams' performance; pull up pricing, planograms and contracts; and help coordinate deliveries with merchandising. The Manager's Briefcase app provides territory sales managers with electronic versions of all the paperwork and resources they need to manage their teams, including store audits, employee coaching forms, and automated notifications to merchandisers. A manager can make manpower assignments directly on the iPad. The iPad automatically sends a notification to the merchandiser's iPhone informing him he has an additional stop to make, for example. In the past, managers had to spend much of their time on the phone, checking email in the office, and checking paperwork. With the iPad, the manager starts and ends his day with his team.