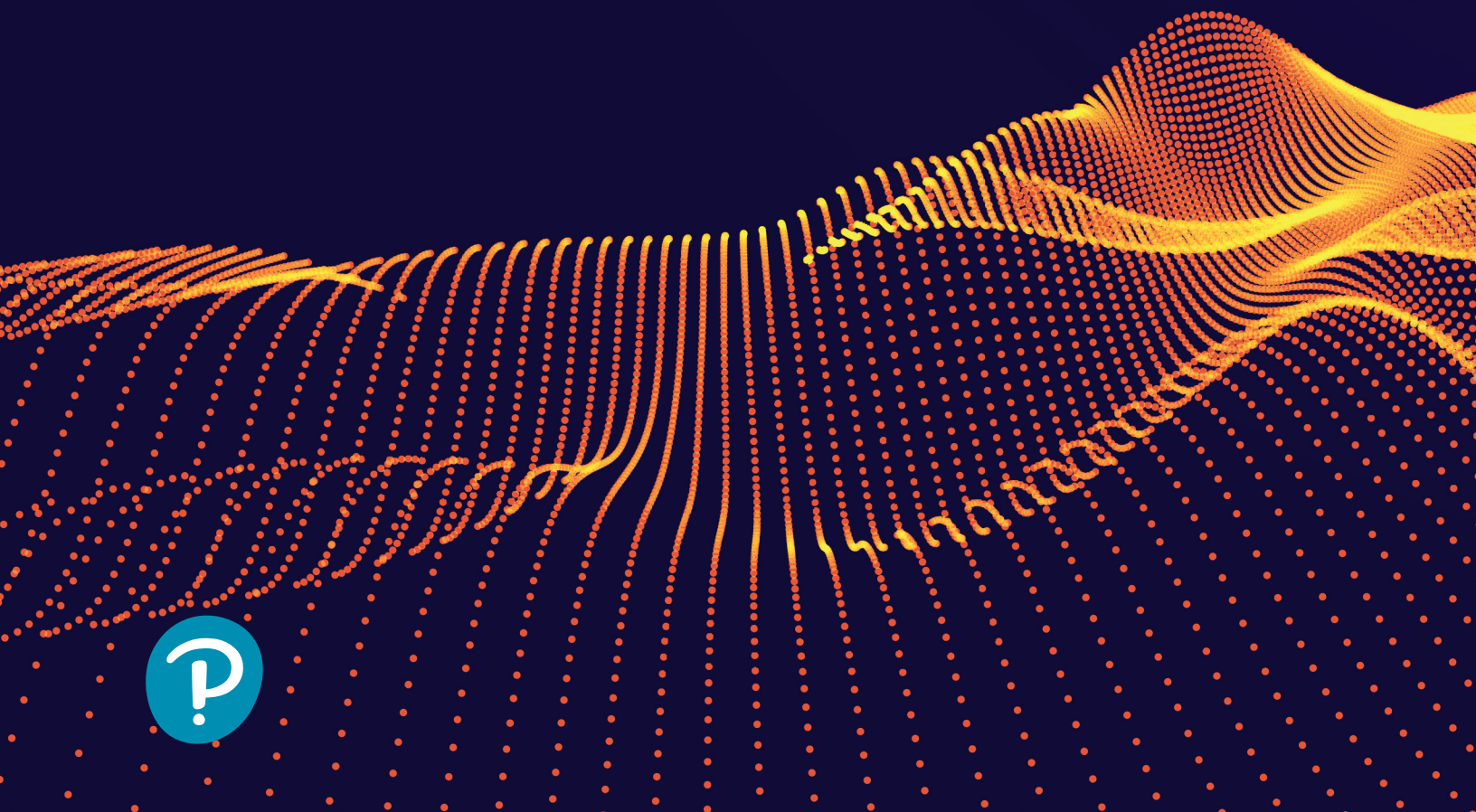
GLOBAL EDITION

Information Systems Today

Managing in the Digital World

NINTH EDITION

Joseph Valacich | Christoph Schneider | Matthew Hashim



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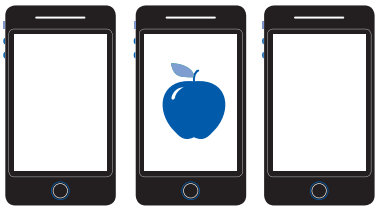

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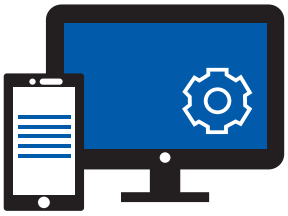

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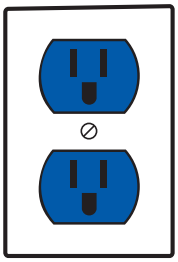

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NINTH EDITION
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INFORMATION SYSTEMS TODAY

MANAGING IN THE DIGITAL WORLD

Joseph Valacich
University of Arizona

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IESE Business School

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University of Arizona

Pearson

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Dedication

To Jackie, thank you for your love and support.
—Joe

To Birgit for your love and support.
—Christoph

To my wonderful wife Allie, and my four amazing children.
—Matt

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About the Authors

Joseph (Joe) Valacich is the *Eller Professor of MIS* within the Eller College of Management at the University of Arizona and a co-founder, Chairman, and Chief Science Officer (CSO) of Neuro-ID, Inc. He was previously on the faculty at Indiana University, Bloomington, and Washington State University, Pullman. He has had visiting faculty appointments at City University of Hong Kong, Buskerud College (Norway), the Helsinki School of Economics and Business, the Norwegian University of Life Sciences, and Riga Technical University (Latvia). He received a PhD degree from the University of Arizona (MIS) and MBA and BS (Computer Science) degrees from the University of Montana. Prior to his academic career, Dr. Valacich worked in the software industry in Seattle in both large and start-up organizations.

Dr. Valacich has served on various national task forces designing model curricula for the information systems discipline, including *IS '97, IS 2002*, and *IS 2010: The Model Curriculum and Guidelines for Undergraduate Degree Programs in Information Systems,* where he was co-chairperson. He also served on the task force that designed *MSIS 2000* and *2006: The Master of Science in Information Systems Model Curriculum.* He served on the executive committee, funded by the National Science Foundation, to define the *IS Program Accreditation Standards* and served on the board of directors for CSAB (formally the Computing Sciences Accreditation Board) representing the Association for Information Systems (AIS). He was the general conference co-chair for the 2003 International Conference on Information Systems (ICIS) and the 2012 Americas Conference on Information Systems (AMCIS); both were held in Seattle. He is the Honorary Conference Chair for ICIS 2021 in Austin, Texas.

Dr. Valacich has conducted numerous corporate training and executive development programs for organizations, including AT&T, Boeing, Dow Chemical, EDS, Exxon, FedEx, General Motors, Microsoft, and Xerox. He has served in a variety of editorial roles within various academic journals and conferences. His primary research interests include human-computer interaction, deception detection, technology-mediated collaboration, mobile technologies, and e-business. He is a prolific scholar, having published more than 250 scholarly articles in numerous prestigious journals and conferences, including *MIS Quarterly*, *Information Systems Research*, *Management Science*, *Academy of Management Journal*, *The Accounting Review*, *Journal of MIS*, *Decision Sciences*, *Journal of the AIS*, *Communications of the ACM*, *Organizational Behavior and Human Decision Processes*, *Journal of Applied Psychology*, and many others. He is a coauthor of the leading textbooks *Modern Systems Analysis and Design* (9th ed.) and *Information Systems Project Management: A Process Approach* (2nd ed.).

Dr. Valacich has multiple issued and pending patents focusing on the analysis of fine-grained human-computer interaction data to infer user intent, confidence, and emotional state. Software based on this work, commercialized by Neuro-ID, is being used by many of the world's leading online platforms, processing millions of customer interactions per month. He is a *Senior Member of the National Academy of Inventors* (2020), a *Distinguished Alumnus of the University of Montana* (2012), and a *Fellow of the Association for Information Systems* (2009). In 2016, Dr. Valacich was awarded the University of Arizona, Tech Launch Arizona, *Innovation & Impact Award* for Information Technology discovery. Throughout his career, he has also won numerous teaching, service, and research awards.

Christoph Schneider is an Assistant Professor in the Department of Information Systems at IESE Business School in Barcelona, Spain. He previously held faculty appointments at Boise State University and City University of Hong Kong. He earned a Swiss Higher Diploma in Hotel Management at the University Centre César Ritz in Brig, Switzerland, a BA in Hotel and Restaurant Administration at Washington State University, and a PhD in Business Administration (Management Information Systems) at Washington State University. His teaching interests include organizational transformation, the management of information systems, digital marketing, and web design.

Dr. Schneider is an active researcher. His primary research interests include human–computer interaction, electronic commerce, and computer-mediated collaboration. His research has appeared in peer-reviewed journals, such as *Information Systems Research*, *Management Information Systems Quarterly*, *Management Science*, and *IEEE Transactions on Professional Communication*; further, he has presented his research at various international conferences, such as the International Conference on Information Systems, the European Conference on Information Systems, and the Hawaii International Conference on System Sciences. He serves as a member of the International Steering Committee of the International Conference on Information Systems Development (ISD) and as senior editor at *Information Systems Journal*. He is a coauthor of the leading textbook *Information Systems Project Management: A Process Approach* (2nd ed.).

Matthew (Matt) Hashim is an Associate Professor in the Department of Management Information Systems within the Eller College of Management at the University of Arizona. He received his PhD in Management (MIS) from Purdue University, MBA (MIS) from California State University, Fresno, and BS in MIS and Accounting from California Polytechnic State University, San Luis Obispo. Prior to pursuing his academic career, Dr. Hashim worked in both large and start-up organizations in the Silicon Valley and Central California. Students and college administrators have recognized his efforts in the classroom with several teaching awards. His teaching interests include information security, the management of information systems, and systems analysis and design.

Dr. Hashim is primarily interested in research contexts that shed light on the intersection of information security problems and human behavior. Topic areas include information privacy, digital piracy, password security, and social engineering problems. He uses methods such as experimental and behavioral economics to understand and manipulate security behaviors in these contexts. He also uses econometric techniques to explore the economic effects of information technologies. His research has been published in peer-reviewed journals such as *Information Systems Research*, *Journal of Management Information Systems*, and *Decision Support Systems*. His work has been presented at major conferences and workshops such as the Workshop on Experimental and Behavioral Economics in Information Systems, Workshop on Information Systems and Economics, Workshop on Information Technologies and Systems, Workshop on the Economics of Information Security, INFORMS Conference on Information Systems and Technology, and the Hawaii International Conference on System Sciences. He co-founded the Workshop on Experimental and Behavioral Economics in Information Systems and has served in various leadership roles with the INFORMS eBusiness Section.

Brief Contents

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Contents

TECHNOLOGY BRIEFING

Preface

Approach

Information systems have become *pervasive. Digital density* is increasing with more connected devices providing ever greater amounts of connected data, enabling new interactions and business models. *Mobile devices, social media,* and *cloud computing* have transformed organizations and society. Organizations see the possibilities of the *Internet of Things*, in that not only computers but various sensors, motors, actuators, or even cameras can generate a wealth of potentially useful data. Businesses face unprecedented opportunities, but also challenges, through the ability to utilize *Big Data*. What does all this mean? What are the catalysts of these concepts and of all this change? More important, how can organizations thrive in today's dynamic and highly competitive marketplace? The answer to these and many similar questions is that the increase in digital density is driving innovation, new business models, and hypercompetition. It is little wonder that teaching an introductory course on information systems has never been more crucial—or more challenging.

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

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

Audience

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

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

What's New to the Ninth Edition

Our primary goal for *Information Systems Today,* Ninth Edition, was to emphasize the importance of information systems to all business students as digital density continues to increase within organizations and society. Most notably, we extensively examine how this increase in digital density is transforming individuals, organizations, and society. Given this clear focus, we are better able to identify those topics most critical to students and future business professionals. Consequently, we have made substantial revisions to the basic content of the chapters and pedagogical elements as well as introduced several new elements that we believe help achieve this goal. New or expanded chapter topics include the following:

- An extensively revised chapter—Chapter 1, "Managing in the Digital World"—focuses not only on defining what an information system consists of but also provides new content on the effects of increasing digital density and the API economy.
- An extensively revised chapter—Chapter 2, "Gaining Competitive Advantage Through Information Systems"—provides extended content on platform-based business models and new content describing how the lean startup approach plays a key part in enabling different types of innovation and innovative business models.
- A revised chapter—Chapter 3, "Managing the Information Systems Infrastructure and Services"—provides extended content on APIs and organizations' needs to adapt agile mindsets and approaches.
- A revised chapter—Chapter 4, "Enabling Business-to-Consumer Electronic Commerce"—provides updated content related to e-commerce involving the end consumer as well as new and expanded coverage of fintech, content marketing, and voice commerce.
- A revised chapter—Chapter 5, "Enhancing Organizational Communication and Collaboration Using Social Media"—centers around various topics related to the need for organizational communication and provides updated content on how individuals and organizations use both traditional communication and collaboration tools and social media for communication, collaboration, cooperation, and connection.
- An extensively revised chapter—Chapter 6, "Enhancing Business Intelligence Using Big Data, Analytics, and Artificial Intelligence"—provides extended coverage on business intelligence and advanced analytics and greatly expanded content on machine learning, predictive modeling, artificial intelligence, unstructured data analytics, and spatial decision support.
- A revised chapter—Chapter 8, "Strengthening Business-to-Business Relationships via Supply Chain and Customer Relationship Management"—provides updated content on business-to-business electronic commerce and emerging concepts (such as blockchain) in supply chain management.
- A revised chapter—Chapter 9, "Developing and Acquiring Information Systems"—provides updates to various topics and extended content on prototyping and agile methodologies.
- A revised chapter—Chapter 10, "Securing Information Systems"—provides an update to all topics and deeper coverage on industrial espionage and cyberterrorism.
- A revised Technology Briefing provides an update to all topics and deeper coverage on Internet of Things technologies. The Technology Briefing provides the foundations for a deeper understanding of the topics introduced in Chapter 3 and is intended for use in more technically oriented courses. Each section of this briefing was designed to stand alone—it can be read with or without the other sections.

In addition to the changes within the main chapter content, we have also added a new feature to each chapter—Digital Density. This element presents topics related to the increasing digital density throughout the world, highlighting opportunities as well as threats arising from this rapid change. For example, we discuss how increasing digital density can increase the digital divide and how increasing digital density can aid in contact tracing during pandemics.

Beyond the chapter content and features, we have also made substantial changes and refinements to the end of each chapter. In particular, we carefully revised many of the end-of-chapter problems and exercises to reflect content changes and new material. Further, we have carefully updated the end-of-chapter cases about contemporary organizations and issues to illustrate the complexities of the digital world. Each case mirrors the primary content of its chapter to better

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

Our goal has always been to provide only the information that is relevant to all business students, nothing more and nothing less. We believe that we have again achieved this goal with *Information Systems Today,* Ninth Edition. We hope you agree.

Key Features

As authors, teachers, developers, and managers of information systems, we understand that for students to best learn about information systems with this book, they must be motivated to learn. To this end, we have included many unique features to help students quickly and easily assess the true value of information systems and their impact on everyday life. We show how today's professionals are using information systems to help modern organizations become more efficient and competitive. Our focus is on the application of technology to real-world, contemporary situations. Next, we describe each of the features that contribute to that focus.

Pedagogy—A Multitiered Approach

Each chapter provides a list of learning objectives to lay the foundation for the chapter content, followed by an opening case to highlight how contemporary organizations are utilizing information systems to gain competitive advantage, streamline organizational processes, or improve customer relationships or how information systems fuel societal change. In addition, throughout each chapter, various short pedagogical elements are presented to highlight key information systems issues and concepts in a variety of contexts. These elements help to show students the broader organizational and societal implications of various topics. At the end of each chapter, the Key Points Review repeats the learning objectives and describes how each objective was achieved; a variety of questions and exercises helps students assess their understanding of the chapter material and encourages them to synthesize and apply the concepts learned. A list of references appears at the end of each chapter.

OPENING CASE—MANAGING IN THE DIGITAL WORLD. Each chapter begins with an opening case describing a real-world company, technology, and/or issue to spark students' interest in the chapter topic. We have chosen engaging cases that relate to students' interests and concerns by highlighting why information systems have become central for managing in the digital world. Each opening case includes a series of associated questions the students will be able to answer after reading the chapter contents. The organizations, technologies, or issues highlighted in these cases are as follows:

- The rise of open innovation
- How information systems fuel startups and new business models
- Google's meteoric rise and its transition to Alphabet
- How Chinese e-commerce company Taobao became a leader in the world of e-commerce
- How Facebook has emerged as one of the most successful and powerful social media sites
- Intelligence through drones
- Amazon's use of its sophisticated infrastructure to automate the supply chain for both large and small customers
- How Walmart became a leader in managing its global supply chains
- The rise of the maker movement
- How the hacking group "Anonymous" uses various tactics to further its ideological goals

NEW! DIGITAL DENSITY Increasing digital density has effects in all industries and all areas of society. Related to each chapter's content, this new feature examines topics related to increasing digital density throughout the world. The topics discussed are as follows:

- How increasing digital density amplifies the effects of the digital divide
- How information systems support the lifestyle of the digital nomads
- How digital density aids in contact tracing during pandemics
- The rise of digital payments
- Leveraging data to go SoLoMo: Yelp

- Using machine learning to outsmart superbugs
- Managing businesses on the road using mobile ERP
- Developing mobile CRM apps for customers
- Malicious software development
- Backdoors in mobile phones

GREEN IT Climate change and resource scarcity are among the most pressing issues societies face. To highlight the role of information systems in this context, each chapter includes a Green IT case. This feature discusses important issues related to the environmental impacts of information systems as well as how information systems can be used to reduce negative environmental impacts. The Green IT cases are embedded in the text of the chapter and highlight concepts from the surrounding chapter material. The issues and organizations highlighted in these cases are as follows:

- Green IT and the Internet of Things
- How the Internet of Things and Artificial Intelligence fuel environmental sustainability
- How Alphabet uses renewably energy to power its data centers
- The environmental impacts of online shopping
- How green IT is fueling the use of renewable energy
- How smart cities support sustainability
- Why your ERP system should be in the cloud
- How Nike builds a greener supply chain
- How companies are trying to reduce the carbon footprint of modern data centers
- How prioritization of cloud services can increase efficiency

SECURITY MATTERS With information systems becoming ever more ubiquitous, security is of growing concern, not only for organizations but also for individuals. While we dedicate an entire chapter to issues surrounding securing information systems, this feature presents some current issues and threats. The topics discussed in this element are as follows:

- How computer criminals use ransomware to extort money from organizations and everyday people
- How attackers use the SWIFT system to conduct virtual bank robberies
- How attackers can remotely hack into a car's onboard systems
- How even small companies are not immune from being targeted
- How terrorism is winning the social media battle
- How deepfakes pose a threat to society
- How companies must weigh the benefits and dangers of not updating ERP systems
- How hacking customer data can protect the most vulnerable
- How attackers use mobile malware to steal online banking users' login credentials
- How analog may be the future of securing critical infrastructure

COMING ATTRACTIONS We worked to ensure that this book is contemporary. We cover literally hundreds of different current and emerging technologies throughout the book. This feature, however, focuses on innovations that are likely to soon have an impact on organizations or society. The topics discussed are as follows:

- Storing the history of humankind in memory crystals
- Augmented shopping
- How gaming PCs and grid technologies help fight diseases
- Using artificial intelligence to manage hedge funds
- Neural implants
- Emotion aware technology
- Transforming ERP and organizations using the Internet of Things
- Reducing supply chain problems using augmented reality
- Harvesting human energy
- Can we eliminate passwords?

WHEN THINGS GO WRONG Textbooks don't usually describe what not to do, but this can be very helpful to students. This feature enables students to learn about a real-world situation in which information systems did not work or were not built or used well. The topics and issues discussed are as follows:

- The negative effects of technology addiction
- The pains of Uber in China
- Dirty data centers and the environmental impact of cloud computing
- How companies are trying to rig "likes" to gain reputation on social networking sites
- Crowdfunding failures
- How social media can quickly disseminate *mis*information, with unforeseen consequences
- How the COVID-19 pandemic exposed the need for COBOL coders
- The chicken sandwich war of 2019
- How user interface design inconsistency led to suicide
- How the "heartbleed" bug almost killed the internet

ETHICAL DILEMMA Ethical business practices are now a predominant part of contemporary management education and practice. This feature examines contemporary dilemmas related to the chapter content and highlights the implications of these dilemmas for managers, organizations, and society. Discussion questions are provided to seed critical thinking assignments or class discussions. The topics discussed are as follows:

- The social and environmental costs of the newest gadgets
- The ethics of the sharing economy
- The ethics of publishing street photography on the web
- The ethics of reputation management
- Anonymity, trolling, and cyberharassment
- The Orwellian Internet of Things
- How Amazon is building an ecosystem of your personal data
- Using CRM systems to target or exploit consumers
- Ethical app development
- The ethics of cyberwar

INDUSTRY ANALYSIS Every industry is being transformed by the effects of increasing digital density. To give students a feel for just how pervasive and profound these changes are, each chapter presents an analysis of a specific industry to highlight the new rules for operating in the digital world. Given that no industry or profession is immune from these changes, each Industry Analysis highlights the importance of understanding information systems for *every* business student, not only for information systems majors. Chapter 1 examines how the digital world is transforming the opportunities for virtually all business professions. Subsequent chapters examine how globalization and the digital world have forever transformed various industries, including education, entertainment, retail, travel, health care, automobile, manufacturing, broadcasting, and law enforcement. Clearly, we are in a time of tremendous change, and understanding this evolution will better equip students to not only survive but also thrive in the digital world.

END-OF-CHAPTER MATERIAL Our end-of-chapter material is designed to accommodate various teaching and learning styles. It promotes learning beyond the book and the classroom. Elements include the following:

- ***Key Terms***—Highlight key concepts within the chapter.
- ***Review Questions***—Test students' understanding of basic content.
- ***Self-Study Questions***—Enable students to assess whether they are ready for a test.
- ***Problems and Exercises***—Push students deeper into the material and encourage them to synthesize and apply it.
- ***Application Exercises***—Challenge students to solve two real-world management problems using spreadsheet and database applications from a running case centered on a university travel agency. Student data files referenced within the exercises are available on the book's website: http://www.pearsonglobaleditions.com/.

- ***Team Work Exercise***—Encourage students to keep up with, discuss, visualize, and present interesting, important trends and forecasts related to internet usage within a variety of contexts.

We have extensively updated these elements to reflect new chapter content and the natural evolution of the material.

END-OF-CHAPTER CASES To test and reinforce chapter content, we present two current real-world cases at the end of each chapter. Like the Opening Cases of each chapter, these cases are taken from the news and are contemporary. However, these are longer and more substantive than the Opening Cases. Sources for these cases include *BusinessWeek*, *CIO* magazine, *InformationWeek*, *Wired*, and various websites. They are followed by discussion questions that help the student apply and master the chapter content. The organizations, products, and issues highlighted in these cases are as follows:

- Apple's rise, fall, and reemergence as a global technology giant
- How electronic health records are transforming healthcare
- How LinkedIn provides a professional networking platform through which users can consume content as well as create value
- How streaming video is disrupting the movie rental and TV broadcasting industries
- How Singapore Bank DBS continues its digital innovations
- How the dark web fuels illegal activities
- How web analytics are providing unprecedented insights into online consumer behavior
- How Rocket Internet aims to become a European internet giant by cloning business models
- How algorithms determine news feeds
- How scammers use like farming and clickbait to game Facebook's newsfeed algorithms
- How the world of intelligence-gathering has changed, with a stronger focus on cybersecurity and increase in digital capabilities
- How companies gather social intelligence through social media
- How software as a service has enabled small and medium-sized organizations to utilize enterprise resource planning (ERP) systems
- How Amazon's order fulfillment fuels technological unemployment
- How natural disasters disrupt global supply chains
- How companies attempt to use information systems to efficiently deliver products to the "last mile"
- How the Federal Bureau of Investigation and Department of Homeland Security joined forces in developing a comprehensive database of biometric information to better track and apprehend criminals
- How Hadoop and MapReduce fuel the use and analysis of Big Data
- How SingPass gives the residents of Singapore access to e-government services
- How China limits information exchange within its society through its "great firewall"

Organization

The content and organization of this book are based on our own teaching as well as on feedback from reviewers and colleagues throughout the field. Each chapter builds on the others to reinforce key concepts and allow for a seamless learning experience. Essentially, the book has been structured to answer three fundamental questions:

1. What are contemporary information systems, and how are they being used in innovative ways?
2. Why are information systems so important and interesting?
3. How best can we build, acquire, manage, and safeguard information systems?

The ordering and content of our chapters were also significantly influenced by the "IS 2010 Curriculum Guidelines for Undergraduate Degree Programs in Information Systems"[1]; these guidelines, written by prominent information systems scholars, define the information systems core body of knowledge for all business students. By design, the content of *Information Systems Today,* Ninth Edition, carefully follows these guidelines, and we are, therefore, very confident that our book provides a solid and widely agreed-on foundation for any introductory information systems course.

[1] Topi, H., Valacich, J., Wright, R. T., Kaiser, K., Nunamaker Jr., J. F., Sipior, J. C., & de Vreede, G. J. (2010). IS 2010: Curriculum guidelines for undergraduate degree programs in information systems. *Communications of the Association for Information Systems, 26*(18).

The chapters are organized as follows:

- ***Chapter 1: Managing in the Digital World***—Information systems are fueling change in the digital world. Here, we help students understand what information systems are, the pressing issues societies in the digital world are facing, how increasing digital density influences organizations and society, and how information systems have become a vital part of modern organizations. We walk the student through the technology, people, and organizational components of an information system, and lay out types of jobs and career opportunities in information systems and in related fields. We also focus on how technology is creating countless ethical concerns.
- ***Chapter 2: Gaining Competitive Advantage Through Information Systems***—Given the rapid advancement of new technologies, we explain why and how companies are continually looking for innovative ways to use information systems for competitive advantage, and how information systems support organizations' business strategies. Here, we discuss how companies from GE to Uber can use information systems for automation, organizational learning, and strategic advantage by creating new and innovative business models, and how the lean startup methodology can help organizations deal with a rapidly increasing number of nimble competitors.
- ***Chapter 3: Managing the Information Systems Infrastructure and Services***—With the ever-increasing complexity of maintaining a solid information systems infrastructure, it becomes increasingly important for organizations such as Google to design a reliable, robust, and secure infrastructure. Here, we provide an overview of the essential information systems infrastructure components and describe why they are necessary for satisfying an organization's informational needs and successfully building new business models. We also examine the rapid evolution toward the delivery of infrastructure capabilities through a variety of cloud-based services.
- ***Chapter 4: Enabling Business-to-Consumer Electronic Commerce***—Perhaps nothing has changed the landscape of business more than the use of the internet for electronic commerce. Here, we describe how firms such as Amazon, Dell, or Taobao; governments; financial services providers; and fintech startups use the internet to conduct commerce in cyberspace. Further, we describe the requirements for successful e-commerce websites and discuss internet marketing and mobile commerce as well as consumer-to-consumer and consumer-to-business e-commerce. Finally, we discuss fintech developments and legal issues in e-commerce.
- ***Chapter 5: Enhancing Organizational Communication and Collaboration Using Social Media***—Social media have forever changed how people interact. In addition to enabling various business opportunities, social media have also enabled companies to better harness the power and creativity of their workforce. Here, we provide an overview of traditional communication and collaboration tools and examine how different social media can enhance communication, collaboration, cooperation, and connection not only within organizations but also between organizations and their customers. Further, we discuss the importance of carefully managing the use of social media within organizations. Finally, using examples such as Twitter and Facebook, we describe how companies can deal with potential pitfalls associated with social media.
- ***Chapter 6: Enhancing Business Intelligence Using Big Data, Analytics, and Artificial Intelligence***—A key to effective management in a global, highly competitive, and rapidly changing environment is high-quality and timely information to support decision making in order to realize the strategic goals of the organization. Here, we first describe the need for enhanced decision making and explain how databases serve as a foundation for gaining business intelligence. We then discuss concepts related to business intelligence and advanced analytics, including data mining, machine learning, and predictive modeling. Finally, we discuss how knowledge management and geographic information systems help organizations make better business decisions.
- ***Chapter 7: Enhancing Business Processes Using Enterprise Information Systems***—Enterprise systems have become a critical technology in a broad range of organizations, both large and small, to integrate information and span organizations' boundaries to better connect a firm with customers, suppliers, and other partners. Here, we focus on foundational concepts related to enterprise systems, walking students through various core

business processes, and then examine how enterprise resource planning systems can be applied to improve these processes and organizational performance.

- ***Chapter 8: Strengthening Business-to-Business Relationships via Supply Chain and Customer Relationship Management***—Two additional types of enterprise systems—supply chain management systems and customer relationship management systems—are being used to facilitate various business processes between suppliers and customers. Here, we begin by introducing business-to-business electronic commerce. Next, we examine how supply chain management systems can support the effective management of supply networks, and how emergent technologies have the potential to transform how supply chains are managed. Finally, we examine customer relationship management systems and their role in attracting and retaining customers and, using examples from companies such as Dell, discuss how organizations can integrate social media in their CRM efforts.
- ***Chapter 9: Developing and Acquiring Information Systems***—Nearly every organization needs to develop or acquire information systems. Here, we begin by describing how to formulate and present the business case to build or acquire a new information system. We then walk the student through the traditional systems development approach and explain how agile development approaches can help organizations become more nimble in developing systems when requirements are unclear and rapidly changing. Finally, we examine the steps followed when acquiring an information system from an outside vendor.
- ***Chapter 10: Securing Information Systems***—With the pervasive use of information systems, new dangers have arisen for organizations, and the interplay between threats, vulnerabilities, and potential impacts has become a paramount issue within the context of global information management. Here, we contrast several types of computer crime and discuss the growing significance of cyberwar and cyberterrorism. We then highlight the primary threats to information systems security and explain how systems can be compromised and safeguarded. We conclude this chapter with a discussion of the role of auditing, information systems controls, and the Sarbanes–Oxley Act. Note that some instructors may choose to introduce this chapter prior to the discussion of the information systems infrastructure in Chapter 3.
- ***Technology Briefing***—In addition to these 10 chapters, we include a Technology Briefing that focuses on foundational concepts regarding hardware, software, networking and the internet, and databases. While Chapter 3, "Managing the Information Systems Infrastructure and Services," provides a more managerial focus to these enabling technologies, this foundational material provides a more in-depth examination of these topics. By delivering this material as a Technology Briefing, we provide instructors the greatest flexibility in how and when they can apply it.

Available in MyLab MIS

- **MIS Video Exercises**—videos illustrating MIS concepts, paired with brief quizzes that assess students, comprehension of the concepts covered in each video.
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Instructor Resources

At the Instructor Resource Center, http://www.pearsonglobaleditions.com/. 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 https://support.pearson.com/getsupport 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
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1 Managing in the Digital World

Preview

In the past decades, technology has progressed tremendously, and the digital connection of people, things, and organizations has accelerated exponentially. Not only has this increasing digital density helped organizations from Apple to Zappos to better manage their organizations, provide high-quality goods and services, or gain or sustain competitive advantage over rivals, it has also contributed to tremendous changes in all areas of society. Our objective for this chapter is to help you understand the role of information systems as we continue to move further into the digital world, the role of information systems in current issues faced by societies in the digital world, and the role of increasing digital density in influencing the digital future. We then highlight what information systems are, how they have evolved to become a vital part of modern organizations, and why this understanding is necessary for you to become an effective manager in the digital world. We conclude by discussing ethical issues associated with the use of information systems.

MANAGING IN THE DIGITAL WORLD:

Open Innovation

Where do good ideas come from? An eccentric inventor toiling alone? A secretive lab filled with researchers in white coats? Views of innovation are shifting away from these traditional stereotypes. For decades, corporations funded internal research and development units and tightly controlled both the inputs and outputs of these operations. Opportunities to interact with customers were limited, and the possibility of spending months or years and millions of dollars developing products that no one wanted was a real threat. New technologies are enabling a shift in the way innovation occurs.

Traditionally, universities would conduct basic and applied research, but the results of this research only sometimes would make their way to the private sector. Corporations would fund their own research and development operations, often at great expense. Such operations took years to set up and were often highly constrained in the types of research they could carry out. Programs of research were evaluated against business plans that had been studied, reviewed, and approved by multiple layers of management. The time and complexity involved in these bureaucratic processes often left the actual research out of date and out of touch with the realities of the marketplace and actual customer wants and needs. The resulting products would often fail in the market due to being years late or no longer being relevant.

Open innovation is a new approach. Instead of relying on tightly controlled internal research projects, companies