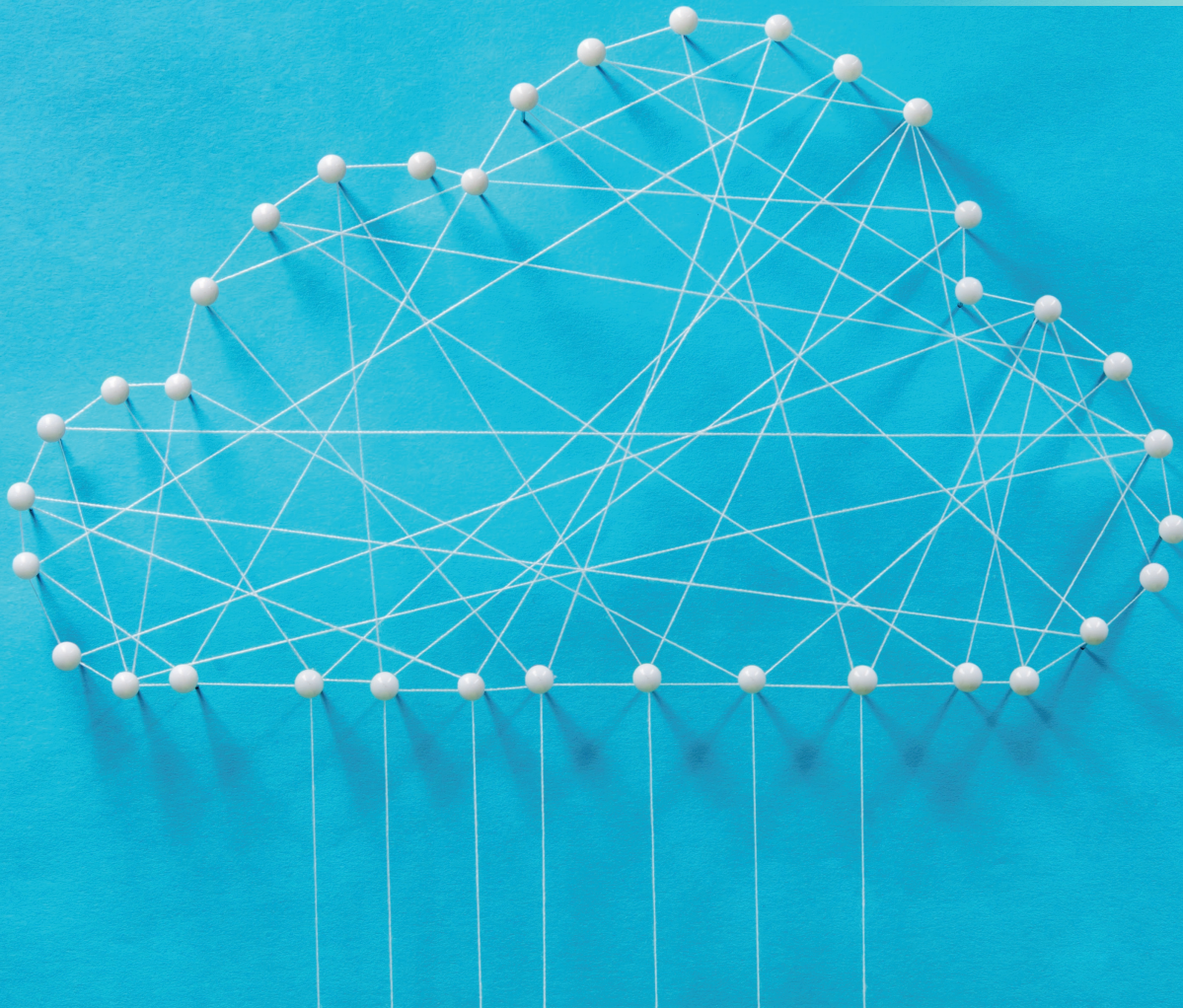


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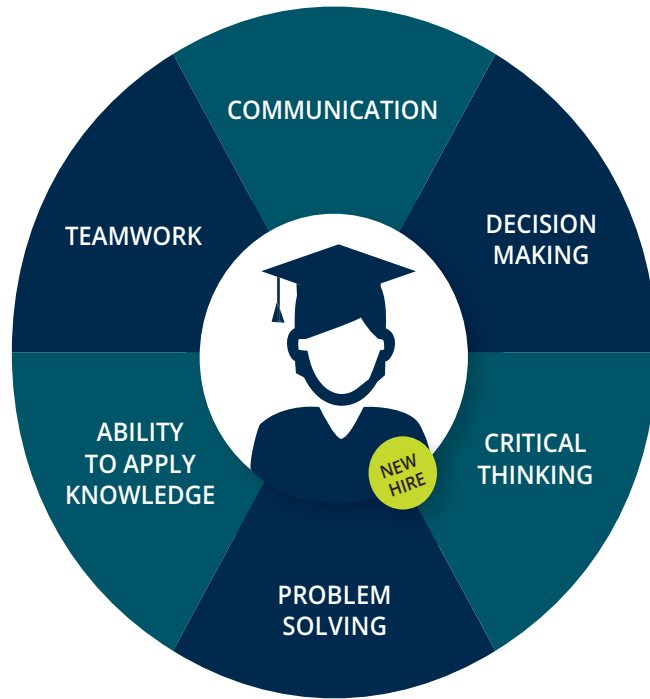
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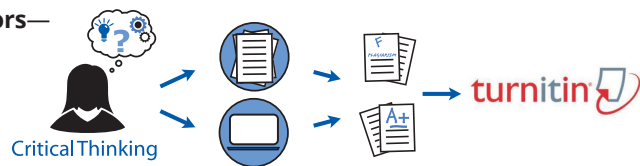
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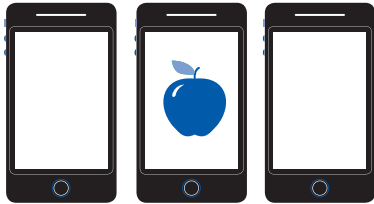
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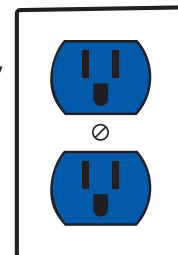
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INFORMATION SYSTEMS TODAY

MANAGING IN THE DIGITAL WORLD

Joseph Valacich

University of Arizona

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City University of Hong Kong



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Dedication

To my mother Mary, you are the best.

—**Joe**

To Birgit for your love and support.

—**Christoph**

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Joseph (Joe) Valacich is an *Eller Professor of MIS* within the Eller College of Management at the University of Arizona, a Fellow of the Association for Information Systems (2009), and the 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 startup organizations.

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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 and emerging technologies, and e-business. He is a prolific scholar, having published more than 200 scholarly articles in numerous prestigious journals and conferences, including: *MIS Quarterly*, *Information Systems Research*, *Management Science*, *Academy of Management Journal*, *Journal of MIS*, *Decision Sciences*, *Journal of the AIS*, *Communications of the ACM*, *Organizational Behavior and Human Decision Processes*, and *Journal of Applied Psychology*. He is a coauthor of the leading textbooks *Modern Systems Analysis and Design* (8th ed.) and *Essentials of Systems Analysis and Design* (6th ed.), both published by Pearson.

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Preface 19

- Chapter 1** Managing in the Digital World 30
- Chapter 2** Gaining Competitive Advantage Through Information Systems 76
- Chapter 3** Managing the Information Systems Infrastructure and Services 118
- Chapter 4** Enabling Business-to-Consumer Electronic Commerce 166
- Chapter 5** Enhancing Organizational Communication and Collaboration Using Social Media 210
- Chapter 6** Enhancing Business Intelligence Using Big Data and Analytics 252
- Chapter 7** Enhancing Business Processes Using Enterprise Information Systems 298
- Chapter 8** Strengthening Business-to-Business Relationships via Supply Chain and Customer Relationship Management 334
- Chapter 9** Developing and Acquiring Information Systems 372
- Chapter 10** Securing Information Systems 418
- Technology Briefing** Foundations of Information Systems Infrastructure 470

Acronyms 519

Glossary 521

Name Index 541

Organization Index 542

Subject Index 545

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Preface 19

Chapter 1	Managing in the Digital World	30
	MANAGING IN THE DIGITAL WORLD: Open Innovation	30
	Information Systems Today	32
	The Emergence of the Digital World	32
	Globalization and Societal Issues in the Digital World	35
	■ COMING ATTRACTIONS: Memory Crystals	35
	Five IT Megatrends That Shape the Digital Future	38
	■ WHO'S GOING MOBILE: Wearable Technologies	38
	■ GREEN IT: The Green Internet of Things	44
	Information Systems Defined	44
	Data: The Root and Purpose of Information Systems	46
	Hardware, Software, and Telecommunications Networks: The Components of Information Systems	46
	People: The Builders, Managers, and Users of Information Systems	47
	■ SECURITY MATTERS: Ransomware	52
	Organizations: The Context of Information Systems	53
	■ WHEN THINGS GO WRONG: Technology Addiction	56
	The Dual Nature of Information Systems	57
	Case in Point: An Information System Gone Awry: Outages Outrage Gamers	57
	Case in Point: An Information System That Works: FedEx	57
	Information Systems for Competitive Advantage	58
	■ ETHICAL DILEMMA: The Social and Environmental Costs of the Newest Gadgets	59
	IS Ethics	60
	Information Privacy	60
	Intellectual Property	64
	The Need for a Code of Ethical Conduct	65
	■ INDUSTRY ANALYSIS: Business Career Outlook	66
	Key Points Review	67
	• Key Terms	67
	• Review Questions	68
	• Self-Study Questions	68
	• Problems and Exercises	69
	• Application Exercises	70
	• Team Work Exercise	70
	• Answers to the Self-Study Questions	71
	■ APPLE	72
	■ HEALTHCARE IS	73

Chapter 2	Gaining Competitive Advantage Through Information Systems	76
	MANAGING IN THE DIGITAL WORLD: Startups and New Business Models	76
	Enabling Organizational Strategy through Information Systems	78
	Organizational Decision-Making Levels	78
	Organizational Functional Areas	80

Information Systems for Automating: Doing Things Faster	81
Information Systems for Organizational Learning: Doing Things Better	83
Information Systems for Supporting Strategy: Doing Things Smarter	84
Identifying Where to Compete: Analyzing Competitive Forces	84
Identifying How to Compete: Choosing a Generic Strategy	85
Identifying How to Compete: Resources and Capabilities	86
■ GREEN IT: The Electric Navy	87
Identifying How to Compete: Analyzing the Value Chain	88
The Role of Information Systems in Value Chain Analysis	88
The Technology/Strategy Fit	89
Business Models in the Digital World	89
■ WHO'S GOING MOBILE: Digital Nomads	90
Revenue Models in the Digital World	90
■ WHEN THINGS GO WRONG: The Pains of Uber in China	93
Platform-Based Business Models and the Sharing Economy	93
Service-Based Business Models	95
■ ETHICAL DILEMMA: The Ethics of the Sharing Economy	96
Valuing Innovations	97
The Need for Constant IS Innovation	99
Successful Innovation Is Difficult	100
Open Innovation	101
Organizational Requirements for Innovation	102
■ COMING ATTRACTIONS: The CITE Project	103
The Innovation Process	103
■ SECURITY MATTERS: The Bangladesh SWIFT Theft	106
Startups and Crowdfunding	106
■ INDUSTRY ANALYSIS: Education	108
Key Points Review	109
• Key Terms	109
• Review Questions	110
• Self-Study Questions	110
• Problems and Exercises	111
• Application Exercises	112
• Team Work Exercise	112
• Answers to the Self-Study Questions	112
■ LINKEDIN	113
■ STREAMING VIDEO	114

Chapter 3 Managing the Information Systems Infrastructure and Services 118

■ MANAGING IN THE DIGITAL WORLD: From Google to Alphabet	118
The IS Infrastructure	120
■ WHO'S GOING MOBILE: Mobile Payments Are Transforming Developing Countries	122
Applications and Databases Supporting Business Processes	124
■ ETHICAL DILEMMA: Putting People's Lives Online	125
IS Infrastructure Components	126
Hardware	126
System Software	128
Storage	130
■ COMING ATTRACTIONS: Making Death Optional?	130
Networking	131
■ GREEN IT: Alphabet Renewables	137
Data Centers	139

Issues Associated with Managing the IS Infrastructure	140
Rapid Obsolescence and Shorter IT Cycles	140
Big Data and Rapidly Increasing Storage Needs	143
Demand Fluctuations	143
Increasing Energy Needs	144
Cloud Computing	144
■ WHEN THINGS GO WRONG: Old and Dirty Energy Drives Global Internet Growth	145
What Is Cloud Computing?	145
Managing the Cloud	149
Advanced Cloud Applications	152
■ SECURITY MATTERS: Car Hacking	154
Green Computing	157
■ INDUSTRY ANALYSIS: Movie Industry	158
Key Points Review	159
• Key Terms	159
• Review Questions	160
• Self-Study Questions	160
• Problems and Exercises	161
• Application Exercises	162
• Team Work Exercise	162
• Answers to the Self-Study Questions	163
■ DBS SINGAPORE MOVES TO THE CLOUD	163
■ THE DARK WEB	164

Chapter 4	Enabling Business-to-Consumer Electronic Commerce	166
	■ MANAGING IN THE DIGITAL WORLD: Taobao and the World of E-commerce	166
	E-Commerce and E-Government	168
	Types of Electronic Commerce	168
	E-government	169
	E-finance	170
	Business-To-Consumer E-Commerce	171
	■ COMING ATTRACTIONS: The AI Hedge Fund	172
	E-tailing: Capabilities and Opportunities	174
	Benefits of E-tailing	177
	■ ETHICAL DILEMMA: The Ethics of Reputation Management	178
	Drawbacks of E-tailing	179
	Electronic Commerce Websites and Internet Marketing	179
	Designing Websites to Meet Online Consumers' Needs	180
	■ SECURITY MATTERS: Too Small to Be Hacked?	180
	Internet Marketing	182
	■ WHEN THINGS GO WRONG: Buying Likes	186
	Mobile Commerce, Consumer-To-Consumer EC, and Consumer-To-Business EC	187
	C2C EC	189
	C2B EC	190
	Securing Payments and Navigating Legal Issues in EC	191
	Securing Payments in the Digital World	191
	■ GREEN IT: Green Online Shopping	192
	■ WHO'S GOING MOBILE: Mobile Payments	193
	Legal Issues in EC	196
	■ INDUSTRY ANALYSIS: Retailing	199

Key Points Review 200 • Key Terms 200 • Review Questions 201 • Self-Study Questions 201 • Problems and Exercises 202 • Application Exercises 203 • Team Work Exercise 203 • Answers to the Self-Study Questions 204

■ **WEB ANALYTICS** 205

■ **ROCKET INTERNET—CLONING BUSINESS MODELS** 206

Chapter 5 Enhancing Organizational Communication and Collaboration Using Social Media 210

MANAGING IN THE DIGITAL WORLD: Facebook 210

The Need for Communication and Collaboration 212

Virtual Teams 212

Groupware 213

Videoconferencing 214

■ **GREEN IT: Green IT Fueling Renewable Energy** 216

Intranets and Employee Portals 216

The Evolving Web 218

■ **COMING ATTRACTIONS: Dissolvable Electronics** 219

Evolving Web Capabilities 219

Evolving Social Interaction 220

The Evolving Workspace 221

Future Web Capabilities 221

Social Media and the Enterprise 222

Enhancing Communication Using Social Media 222

Enhancing Cooperation with Social Media 225

■ **SECURITY MATTERS: Terrorism Is Winning the Social Media Battle** 228

Enhancing Collaboration with Social Media 229

■ **WHO'S GOING MOBILE: Going SoLoMo: Yelp** 231

Enhancing Connection with Social Media 233

■ **ETHICAL DILEMMA: Anonymity, Trolling, and Cyberharassment** 235

Managing Social Media Applications in the Enterprise 236

Organizational Issues 236

■ **WHEN THINGS GO WRONG: Crowdfunding Failures** 238

Downsides and Dangers of using Social Media Applications 239

■ **INDUSTRY ANALYSIS: Online Travel** 241

Key Points Review 242 • Key Terms 242 • Review Questions 243 • Self-Study Questions 243 • Problems and Exercises 244 • Application Exercises 244 • Team Work Exercise 245 • Answers to the Self-Study Questions 246

■ **LIVING IN A BUBBLE: FACEBOOK, NEWSFEEDS, AND JOURNALISM** 246

■ **LIKE FARMING AND CLICKBAIT** 247

Chapter 6 Enhancing Business Intelligence Using Big Data and Analytics 252

MANAGING IN THE DIGITAL WORLD: Intelligence Through Drones 252

Enhancing Organizational Decision Making 254

Why Organizations Need Business Intelligence and Advanced Analytics 254

■ **GREEN IT: Big Data, Internet of Things, and Analytics Fuel Greener Facilities** 257

Databases: Providing Inputs into Business Intelligence and Advanced Analytics 257

- **WHEN THINGS GO WRONG:** Twitter Fever—Look Before You Tweet 261
- **COMING ATTRACTIONS:** Emotion Aware Gaming 267
- Business Intelligence and Advanced Analytics 267**
 - Business Intelligence 268
 - **WHO'S GOING MOBILE:** Identifying Malaria Hotspots 273
 - Advanced Analytics 273
 - **ETHICAL DILEMMA:** Orwellian Internet of Things 275
 - **SECURITY MATTERS:** Hacktivists Versus Fembots: The Ashley Madison Case 281
- Knowledge Management and Geographic Information Systems 282**
 - Knowledge Management Systems 282
 - Geographic Information Systems 285
 - **INDUSTRY ANALYSIS:** Healthcare 288
- Key Points Review 289 • Key Terms 289 • Review Questions 290 • Self-Study Questions 290 • Problems and Exercises 291 • Application Exercises 292 • Team Work Exercise 293 • Answers to the Self-Study Questions 293
- **DATA ANALYTICS IN HEALTHCARE 293**
- **GATHERING SOCIAL INTELLIGENCE 294**

Chapter 7 Enhancing Business Processes Using Enterprise Information Systems 298

- **MANAGING IN THE DIGITAL WORLD:** Amazon.com 298
- Core Business Processes and Organizational Value Chains 300**
 - Core Business Processes 300
 - Organizational Activities Along the Value Chain 302
 - **GREEN IT:** Why Your Enterprise Systems Should Be in the Cloud 305
 - Value Systems: Connecting Multiple Organizational Value Chains 307
- Enterprise Systems 307**
 - The Rise of Enterprise Systems 308
 - Supporting Business Processes 309
 - **ETHICAL DILEMMA:** Too Much Intelligence? RFID and Privacy 310
 - **COMING ATTRACTIONS:** The Internet of Things Will Transform ERP and Organizations 313
- Enterprise Resource Planning 316**
 - Responding to Compliance and Regulatory Demands 317
 - Choosing an ERP System 317
 - **SECURITY MATTERS:** To Update or Not to Update, *That Shouldn't Be the Question* 318
 - Enabling Business Processes Using ERP Core Components 319
 - ERP Installation 322
 - ERP Limitations 322
- Achieving Enterprise System Success 322**
 - **WHO'S GOING MOBILE:** Big ERP Systems Embracing Small Mobile Devices 323
 - Secure Executive Sponsorship 323
 - Get Help from Outside Experts 324
 - Thoroughly Train Users 324
 - Take a Multidisciplinary Approach to Implementations 324
 - Evolve the Implementation 324
 - **WHEN THINGS GO WRONG:** Software Error Frees Prisoners Early and Is Linked to Killings 325

■ **INDUSTRY ANALYSIS: The Automobile Industry** 326

Key Points Review 327 • Key Terms 327 • Review Questions 328 • Self-Study Questions 328 • Problems and Exercises 329 • Application Exercises 330 • Team Work Exercise 330 • Answers to the Self-Study Questions 330

■ **SOFTWARE AS A SERVICE: ERP BY THE HOUR** 331

■ **TH MILK VIETNAM ADOPTS CLOUD ERP** 332

Chapter 8 Strengthening Business-to-Business Relationships via Supply Chain and Customer Relationship Management 334

MANAGING IN THE DIGITAL WORLD: Walmart 334

Supply Chain Management 336

What Is a Supply Chain? 336

Business-to-Business Electronic Commerce: Exchanging Data in Supply Networks 336

Managing Complex Supply Networks 339

Benefits of Effectively Managing Supply Chains 340

Optimizing the Supply Chain Through Supply Chain Management 342

■ **WHEN THINGS GO WRONG: SpaceX Rocket Failure due to Supply Chain Failure** 343

Developing an SCM Strategy 344

■ **GREEN IT: Nike's Green Supply Chain** 345

Supply Chain Planning 345

Supply Chain Execution 346

Supply Chain Visibility and Analytics 349

Customer Relationship Management 349

■ **COMING ATTRACTIONS: Augmenting Supply Chain Success** 350

■ **SECURITY MATTERS: Disclosing the Customer Data of the Most Vulnerable** 353

Developing a CRM Strategy 353

Architecture of a CRM System 354

■ **WHO'S GOING MOBILE: Developing a Mobile CRM App for Customers** 358

■ **ETHICAL DILEMMA: When Algorithms Discriminate** 362

Ethical Concerns with CRM 363

■ **INDUSTRY ANALYSIS: Manufacturing** 363

Key Points Review 364 • Key Terms 364 • Review Questions 365 • Self-Study Questions 365 • Problems and Exercises 366 • Application Exercises 367 • Team Work Exercise 367 • Answers to the Self-Study Questions 367

■ **SUPPLY CHAIN HAVOC** 368

■ **EFFICIENTLY DELIVERING PRODUCTS OVER THE "LAST MILE"** 369

Chapter 9 Developing and Acquiring Information Systems 372

MANAGING IN THE DIGITAL WORLD: The Maker Movement 372

Making the Business Case 374

Business Case Objectives 374

The Productivity Paradox 374

Making a Successful Business Case 376

■ **GREEN IT: Project Natick—Microsoft's Underwater Data Centers** 378

- **COMING ATTRACTIONS: Harvesting Human Energy** 380
 - Presenting the Business Case 382
- **ETHICAL DILEMMA: Ethical App Development** 384
- The Systems Development Process** 385
 - Custom Versus Off-the-Shelf Software 385
 - Open Source Software 386
 - Systems Integration: Combining Custom, Open Source, and Off-the-Shelf Systems 387
 - IS Development in Action 387
 - The Role of Users in the Systems Development Process 389
 - Systems Development Controls 389
 - Steps in the Systems Development Process 389
 - **WHO'S GOING MOBILE: Creating Mobile Apps** 390
 - Phase 1: Systems Planning and Selection 390
 - Phase 2: Systems Analysis 391
 - Phase 3: Systems Design 394
 - Phase 4: Systems Implementation and Operation 395
 - Repeating the SDLC: Systems Maintenance 397
 - **SECURITY MATTERS: Mobile Cybercrime** 399
 - Other Approaches to Designing and Building Systems 399
- Acquiring Information Systems** 401
 - External Acquisition 401
 - **WHEN THINGS GO WRONG: Top Security Threats** 402
 - Outsourcing Systems Development 406
 - **INDUSTRY ANALYSIS: Broadcasting** 408
 - Key Points Review 409 • Key Terms 409 • Review Questions 410 • Self-Study Questions 410 • Problems and Exercises 411 • Application Exercises 412 • Team Work Exercise 412 • Answers to the Self-Study Questions 413
 - **NEXT GENERATION IDENTIFICATION: FBI, ICE DATABASES EXPAND AND JOIN FORCES** 414
 - **BIG DATA, HADOOP, MAP REDUCE** 415

Chapter 10 Securing Information Systems 418

- **MANAGING IN THE DIGITAL WORLD: Not So "Anonymous"—Activists, Hacktivists, or Just Plain Criminals?** 418
- Computer Crime** 420
 - Hacking and Cracking 420
 - Types of Computer Criminals and Crimes 420
 - **GREEN IT: Anonymous Protests the Killing of Dolphins and Whales in Japan** 424
 - Computer Viruses and Other Destructive Code 425
 - **WHEN THINGS GO WRONG: The Bug That Almost Killed the Internet** 430
 - Cyberharassment, Cyberstalking, and Cyberbullying 432
 - Software Piracy 432
 - Cybersquatting 434
 - Laws Against Computer Crime 434
- Cyberwar and Cyberterrorism** 435
 - **WHO'S GOING MOBILE: Backdoors in Every Mobile Phone?** 436
 - Cyberwar 436
 - Cyberterrorism 437

- **ETHICAL DILEMMA: Ethics and Cyberwar: Just Because We Can, Should We?** 440

Managing Information Systems Security 440

Assessing Risks 442

Developing a Security Strategy 444

Implementing Controls and Training 446

- **SECURITY MATTERS: Back to the Future: Analog May Be the Future of Securing Critical Infrastructure** 447

- **COMING ATTRACTIONS: Can You Become Your Password?** 453

Monitoring Security 456

- **INDUSTRY ANALYSIS: Cybercops Track Cybercriminals** 459

Key Points Review 460 • Key Terms 460 • Review Questions 461 • Self-Study Questions 461 • Problems and Exercises 462 • Application Exercises 464 • Team Work Exercise 464 • Answers to the Self-Study Questions 465

- **SINGPASS E-GOVERNMENT SECURITY** 466

- **CHINA'S GREAT (FIRE) WALL** 467

TECHNOLOGY BRIEFING

Foundations of Information Systems Infrastructure 470

Foundational Topics in IS Hardware 471

Input Technologies 471

Processing: Transforming Inputs into Outputs 473

Output Technologies 477

Foundational Topics in IS Software 478

System Software 479

Programming Languages and Development Environments 479

Foundational Topics in Networking 485

Evolution of Computer Networking 485

Types of Networks 487

Packet Switching 490

Network Standards and Protocols 490

Network Technologies 494

The Internet 500

Foundational Topics in Database Management 506

Relational Database Design 506

Advanced Database Models 511

Key Points Review 511 • Key Terms 512 • Review Questions 513 • Self-Study Questions 514 • Problems and Exercises 515 • Answers to the Foundational Hardware Self-Study Questions 517 • Answers to the Foundational Software Self-Study Questions 517 • Answers to the Foundational Networking Self-Study Questions 517 • Answers to the Foundational Database Self-Study Questions 517

Acronyms 519

Glossary 521

Name Index 541

Organization Index 542

Subject Index 545

Approach

Information systems have become *pervasive*. *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 this dynamic and highly competitive marketplace? The answer to these and many similar questions is that information systems and related information technologies are 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*, Eighth 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. 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*, Eighth 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, Eighth 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, Eighth 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 Eighth Edition

Our primary goal for *Information Systems Today*, Eighth Edition, was to emphasize the importance of information systems to all business students as the role of information technology and systems continues to expand within organizations and society. Most notably, we extensively

examine how five big megatrends—mobile, social media, the Internet of Things, cloud computing, and Big Data—are 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 globalization and societal issues in the digital world as well as the role of five IT megatrends in fueling and addressing these issues.
- An extensively revised chapter—Chapter 2, “Gaining Competitive Advantage Through Information Systems”—provides new content describing how information systems play 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 updated content on the need for a reliable, adaptable, and scalable infrastructure to support the needs of today’s organizations as well as on essential infrastructure concepts related to hardware, software, storage, networking and the Internet, data centers, and cloud computing.
- 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 e-finance, fintech, and related issues.
- 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 and Analytics”—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 supply chain management as well as customer relationship management (CRM).
- A revised chapter—Chapter 9, “Developing and Acquiring Information Systems”—provides updates to various topics and extended content on alternative system development 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 covers foundational concepts related to various information 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 two new features to each chapter—Green IT and Security Matters. Green IT presents environmental issues arising from the use of information systems. For example, in Chapter 4, we discuss the environmental impacts of online shopping. Security Matters presents some current issues and threats arising from the ubiquitous use of information systems. For example, in Chapter 5, we discuss how hacktivists challenged the extramarital dating website Ashley Madison.

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*, Eighth Edition. We hope you agree.

Key Features

As authors, teachers, developers, and managers of information systems, we understand that in order for students to best learn about information systems with this book, they must be motivated to learn. To this end, we have included a number of 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.com'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

Green IT Case

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 new 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 U.S. Navy is using alternative energy sources to address power consumption of its fleets

- 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 the Internet of Things, Big Data, and analytics fuel greener facilities
- 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 Anonymous protests the killing of dolphins and whales in Japan

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 new 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 hacktivists challenged the extramarital dating website Ashley Madison
- How companies have to weigh the benefits and dangers of not updating ERP systems
- How VTech's attackers disclosed the customer data of 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
- CITE—a city-sized test lab for innovations
- Extending the human lifetime indefinitely
- Using artificial intelligence to manage hedge funds
- Dissolvable electronics to fight bacteria
- Emotion aware gaming
- Transforming ERP and organizations using the Internet of Things
- Reducing supply chain problems using augmented reality
- Harvesting human energy
- Using brainwaves to verify people's identities

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 Twitter can quickly disseminate *mis*information, with unforeseen consequences