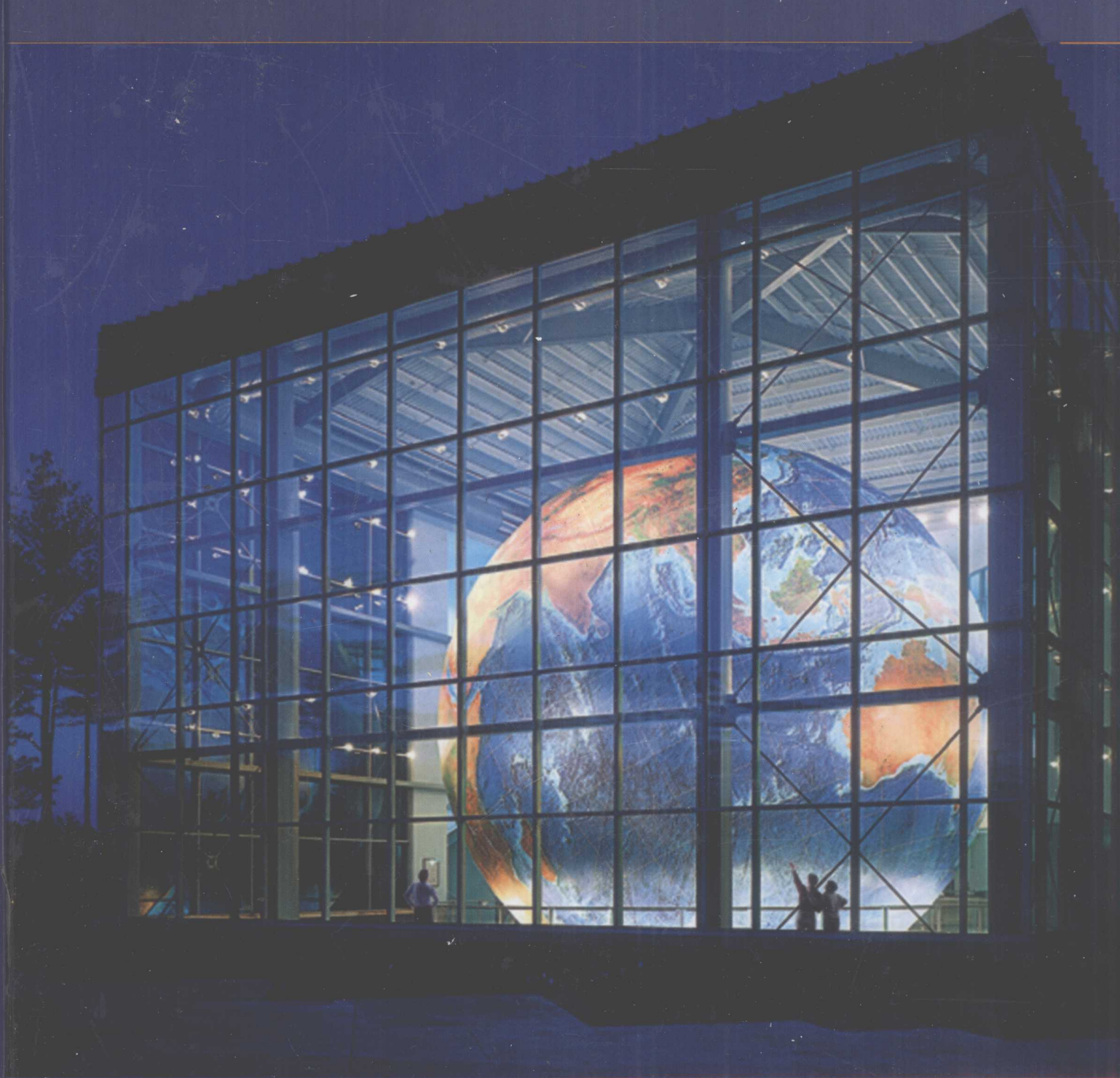
Management Information Systems

Managing Information Technology in the E-Business Enterprise

Fifth Edition



James A. O'Brien

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Fifth Edition

James A. O'Brien

College of Business Administration
Northern Arizona University

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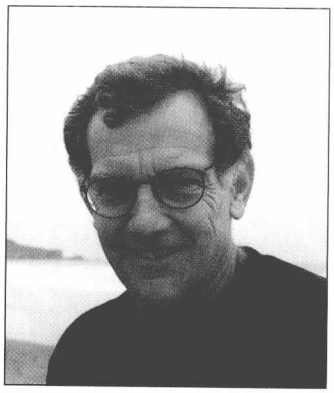
About the Author



James A. O'Brien is an adjunct professor of Computer Information Systems in the College of Business Administration at Northern Arizona University. He completed his undergraduate studies at the University of Hawaii and Gonzaga University and earned an M.S. and Ph.D. in Business Administration from the University of Oregon. He has been coordinator of the CIS area at Northern Arizona University, professor of Finance and Management Information Systems and chairman of the Department of Management at Eastern Washington University, and a visiting professor at the University of Alberta, the University of Hawaii, and Central Washington University.

Dr. O'Brien's business experience includes working in the Marketing Management Program of the IBM Corporation, as well as serving as a financial analyst for the General Electric Company. He is a graduate of General Electric's Financial Management Program. He has also served as an information systems consultant to several banks and computer services firms.

Jim's research interests lie in developing and testing basic conceptual frameworks used in information systems development and management. He has written eight books, including several that have been published in multiple editions, as well as in Chinese, Dutch, French, Japanese, or Spanish translations. He has also contributed to the field of information systems through the publication of many articles in business and academic journals, as well as through his participation in academic and industry associations in the field of information systems.

Preface

An E-Business Enterprise Perspective

The transformation of business caused by E-business and E-commerce applications of the Internet and related technologies demonstrates that information systems and information technology are essential ingredients for business survival and success. Thus, this new Fifth Edition is designed for business students who are or will be managers, entrepreneurs, and business professionals in today's E-business enterprises. The goal of this text is to help business students learn how to use and manage information technologies to revitalize business processes, conduct electronic commerce, improve business decision making, and gain competitive advantage. Thus, it places a major emphasis on the role of the Internet, intranets, extranets, and other Internet technologies in providing a technology platform for electronic business, commerce, and collaboration within and among internetworked enterprises and global markets.

This is the E-business enterprise perspective that this text brings to the study of information systems. Of course, as in all my texts, this edition:

- Loads the text with **real world cases,** examples, and exercises about real people and companies in the business world.
- Organizes the text around a simple **five-area framework** that emphasizes the IS knowledge a business end user needs to know.
- Distributes and integrates IS foundation theory throughout the text instead of concentrating it in several early chapters.
- Places a major emphasis on the strategic role of information technology in gaining competitive advantage, supporting electronic business operations and decision making, and enabling electronic commerce and enterprise collaboration.

Audience

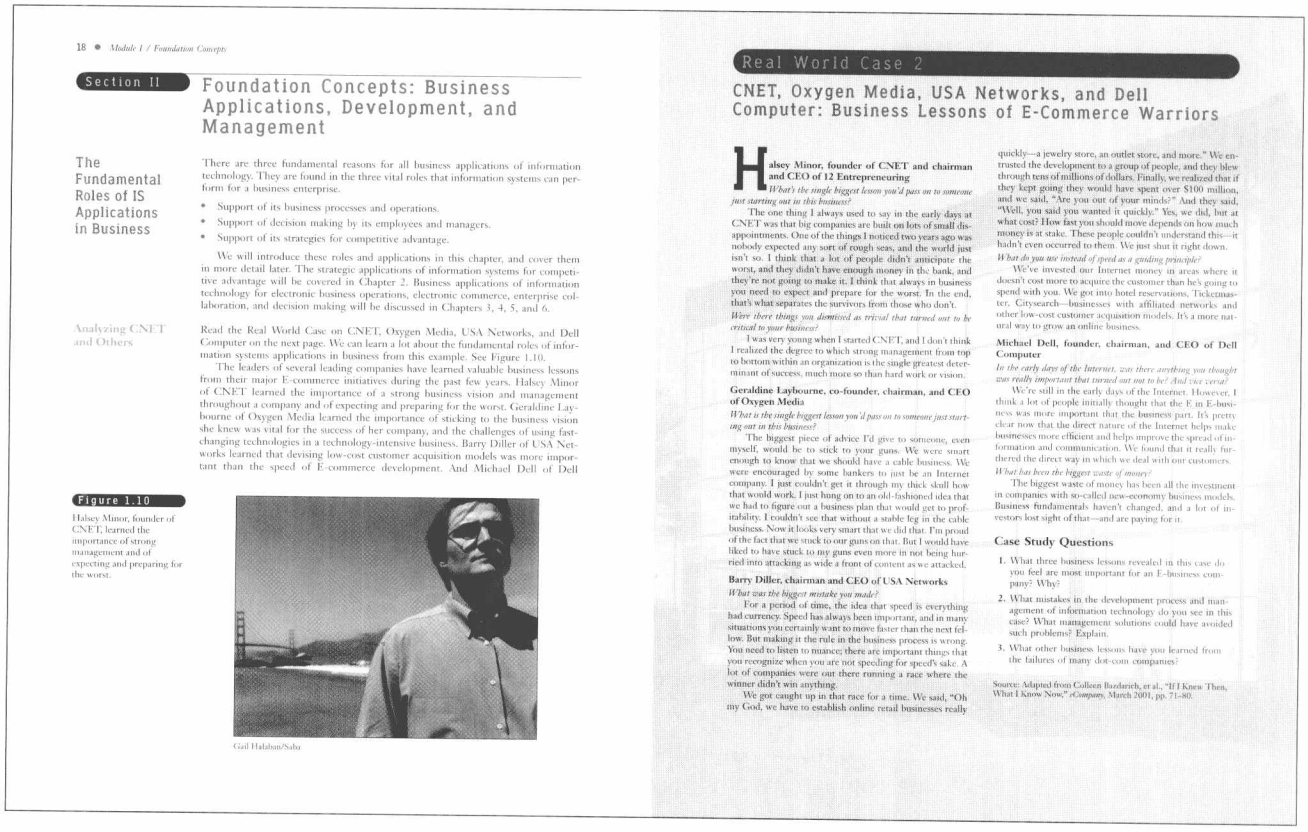
This text is designed for use in undergraduate or introductory MBA courses in Management Information Systems, which are required in many Business Administration or Management programs as part of the common body of knowledge for all business majors. Thus, this edition treats the subject area known as Information Systems (IS), Management Information Systems (MIS), or Computer Information Systems (CIS) as a major functional area of business that is as important to management education as are the areas of accounting, finance, operations management, marketing, and human resource management.

Key Features

The new Fifth Edition is the most comprehensive revision of this text since it was first published. Most chapters have been significantly "E-engineered," that is, text material has been radically restructured, eliminated, and augmented with new E-business and E-commerce topics and real world examples to provide students with a solid E-business foundation for their studies and work in business.

All New Real World Cases and Examples

This text provides all new up-to-date real world case studies. These are not fictional stories, but actual situations faced by business firms and other organizations as reported in current business and IS periodicals. This includes five real world case studies in each chapter that apply specifically to that chapter's contents.



18 • *Module I / Foundation Concepts*

Section II

Foundation Concepts: Business Applications, Development, and Management

The Fundamental Roles of IS Applications in Business

There are three fundamental reasons for all business applications of information technology. They are found in the three vital roles that information systems can perform for a business enterprise.

- Support of its business processes and operations.
- Support of decision making by its employees and managers.
- Support of its strategies for competitive advantage.

We will introduce these roles and applications in this chapter, and cover them in more detail later. The strategic applications of information systems for competitive advantage will be covered in Chapter 2. Business applications of information technology for electronic business operations, electronic commerce, enterprise collaboration, and decision making will be discussed in Chapters 3, 4, 5, and 6.

Analyzing CNET and Others

Read the Real World Case on CNET, Oxygen Media, USA Networks, and Dell Computer on the next page. We can learn a lot about the fundamental roles of information systems applications in business from this example. See Figure 1.10.

The leaders of several leading companies have learned valuable business lessons from their major E-commerce initiatives during the past few years. Halsey Minor of CNET learned the importance of a strong business vision and management throughout a company and of expecting and preparing for the worst. Geraldine Laybourne of Oxygen Media learned the importance of sticking to the business vision she knew was vital for the success of her company, and the challenges of using fast-changing technologies in a technology-intensive business. Barry Diller of USA Networks learned that devising low-cost customer acquisition models was more important than the speed of E-commerce development. And Michael Dell of Dell

Figure 1.10

Halsey Minor, founder of CNET, learned the importance of strong management and of expecting and preparing for the worst.

Gail Halaban/Saba

Real World Case 2

CNET, Oxygen Media, USA Networks, and Dell Computer: Business Lessons of E-Commerce Warriors

Halsey Minor, founder of CNET and chairman and CEO of 12 Entrepreneuring

What's the single biggest lesson you'd pass on to someone just starting out in this business?

The one thing I always used to say in the early days at CNET was that big companies are built on lots of small disappointments. One of the things I noticed two years ago was nobody expected any sort of rough seas, and the world just isn't so. I think that a lot of people didn't anticipate the worst, and they didn't have enough money in the bank, and they're not going to make it. I think that always in business you need to expect and prepare for the worst. In the end, that's what separates the survivors from those who don't.

Were there things you dismissed as trivial that turned out to be critical to your business?

I was very young when I started CNET, and I don't think I realized the degree to which strong management from top to bottom within an organization is the single greatest determinant of success, much more so than hard work or vision.

Geraldine Laybourne, co-founder, chairman, and CEO of Oxygen Media

What is the single biggest lesson you'd pass on to someone just starting out in this business?

The biggest piece of advice I'd give to someone, even myself, would be to stick to your guns. We were smart enough to know that we should have a cable business. We were encouraged by some bankers to just be an Internet company. I just couldn't get it through my thick skull how that would work. I just hung on to an old-fashioned idea that we had to figure out a business plan that would get to profitability. I couldn't see that without a stable leg in the cable business. Now it looks very smart that we did that. I'm proud of the fact that we stuck to our guns on that. But I would have liked to have stuck to my guns even more in not being hurried into attacking as wide a front of content as we attacked.

Barry Diller, chairman and CEO of USA Networks

What was the biggest mistake you made?

For a period of time, the idea that speed is everything had currency. Speed has always been important, and in many situations you certainly want to move faster than the next fellow. But making it the rule in the business process is wrong. You need to listen to nuance; there are important things that you recognize when you are not speeding for speed's sake. A lot of companies were out there running a race where the winner didn't win anything.

We got caught up in that race for a time. We said, "Oh my God, we have to establish online retail businesses really quickly—a jewelry store, an outlet store, and more." We entrusted the development to a group of people, and they blew through tens of millions of dollars. Finally, we realized that if they kept going they would have spent over $100 million, and we said, "Are you out of your minds?" And they said, "Well, you said you wanted it quickly." Yes, we did, but at what cost? How fast you should move depends on how much money is at stake. These people couldn't understand this—it hadn't even occurred to them. We just shut it right down.

What do you use instead of speed as a guiding principle?

We've invested our Internet money in areas where it doesn't cost more to acquire the customer than he's going to spend with you. We got into hotel reservations, Ticketmaster, Citysearch—businesses with affiliated networks and other low-cost customer acquisition models. It's a more natural way to grow an online business.

Michael Dell, founder, chairman, and CEO of Dell Computer

In the early days of the Internet, was there anything you thought was really important that turned out not to be? And vice versa?

We're still in the early days of the Internet. However, I think a lot of people initially thought that the E in E-business was more important that the business part. It's pretty clear now that the direct nature of the Internet helps make businesses more efficient and helps improve the spread of information and communication. We found that it really furthered the direct way in which we deal with our customers.

What has been the biggest waste of money?

The biggest waste of money has been all the investment in companies with so-called new-economy business models. Business fundamentals haven't changed, and a lot of investors lost sight of that—and are paying for it.

Case Study Questions

1. What three business lessons revealed in this case do you feel are most important for an E-business company? Why?
2. What mistakes in the development process and management of information technology do you see in this case? What management solutions could have avoided such problems? Explain.
3. What other business lessons have you learned from the failures of many dot-com companies?

Source: Adapted from Colleen Bazdarich, et al., "If I Knew Then, What I Know Now," *eCompany*, March 2001, pp. 71–80.

In addition, each chapter contains several application exercises, including two hands-on spreadsheet or database software assignments and new Internet-based real world assignments in most chapters. Also, many new highlighted in-text real world examples have been added to illustrate concepts in every chapter. The purpose of this variety of learning and assignment options is to give instructors and students many opportunities to apply each chapter's material to real world situations.

Boeing and Analog Devices: IT Failure and Success

The Boeing Company embarked on a major business process reengineering campaign in 1994, buying off-the-shelf enterprise resources planning (ERP) software to replace hundreds of mainframe legacy systems used to manufacture commercial aircraft. For example, Boeing bought Baan's manufacturing, finance, purchasing, and distribution ERP software suite; Metaphase's product data management package; CIMLINC's Linkage for process planning; and Trilogy's SalesBUILDER for configuration management, along with other software packages.

Fast-forward to late 1998, when Boeing announced lousy financial results and major layoffs. It predicted a pathetic pretax profit margin of only 1 to 3 percent for its commercial aircraft group by the year 2000, up from 0 percent in 1998. A precipitous decline in airplane orders by Asian airlines is the culprit according to the company. But Wall Street analysts and others watching the company say production inefficiencies, poor planning, and a host of other internal failures bear part of the responsibility for the dismal margin and poor financial results, according to articles about the project in, among others, *The New York Times* and *The Wall Street Journal.*

However, other ERP implementations have proved their worth through the positive results achieved. The ERP implementation at chip maker Analog Devices, Inc., for instance, helped the company weather tough times in 1998, when declining prices drove down revenues and otherwise put pressure on the entire semiconductor industry. Analog has continued to show progress in reducing costs in a variety of areas, including production, staffing, and inventory. Bottom line: If the right combination of ERP software, business processes, and managerial expertise are working together, there should be a substantial financial return, as there was for Analog [11].

New Chapters on Electronic Business and Commerce

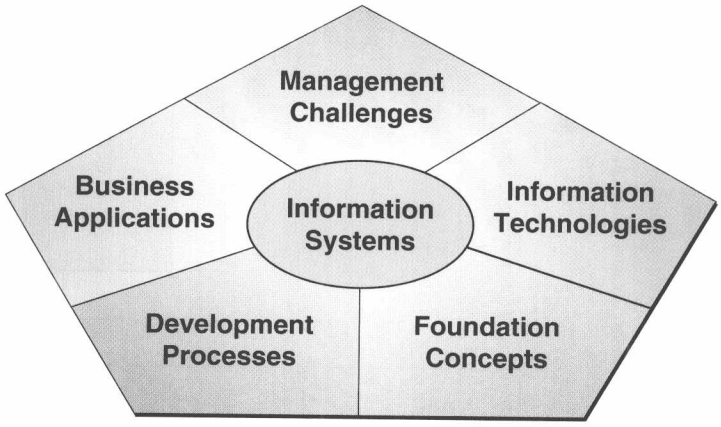
This edition contains many thoroughly *E-engineered* chapters that emphasize how Internet and Web technologies provide the technological infrastructure and business tools that enable internetworked enterprises to engage in electronic business and commerce. This is demonstrated, not only in the text materials in Chapters 4 and 5, but in other chapters and Real World Cases and examples in the text. Examples include Kepler's Books and Magazines, Pepsi Cola Company, Uniglobe.com and Allfirst Bank, Siebel Systems and Telstra Corporation, Alcoa and Cisco Systems, Solectron Electronics, Hitachi Semiconductor and Dell Computer, eBay, Inc., Florist.com, Wal-mart, Kmart, Kingfisher and HMV, and Raytheon and Deere & Co., to name a few.

An Information Systems Framework

This text reduces the complexity of an introductory course in information systems by using a conceptual framework that organizes the knowledge needed by business students into five major areas (see Figure 1):

Figure 1

The five-area information systems framework.



- **Foundation Concepts.** Fundamental business information systems concepts including trends, components, and roles of information systems (Chapter 1) and competitive advantage concepts and applications (Chapter 2). Other behavioral, managerial, and technical concepts are presented where appropriate in selected chapters.
- **Business Applications.** How the Internet, intranets, extranets, and other information technologies are used in E-business enterprises to support electronic business and commerce, team and enterprise collaboration, and business decision making (Chapters 3, 4, and 5).
- **Development Processes.** Developing and implementing E-business strategies and systems using several strategic planning and application development approaches (Chapters 7 and 8).
- **Management Challenges.** The challenges of E-business technologies and strategies, including security and ethical challenges and global IT management (discussed in many chapters, but emphasized in Chapters 9 and 10).
- **Information Technologies.** A review of major concepts, developments, and managerial implications involved in computer hardware, software, telecommunications networks, and data resource management technologies (Chapters 11, 12, 13, and 14). Other technologies used in computer-based information systems are discussed where appropriate in selected chapters.

Strategic, International, and Ethical Dimensions

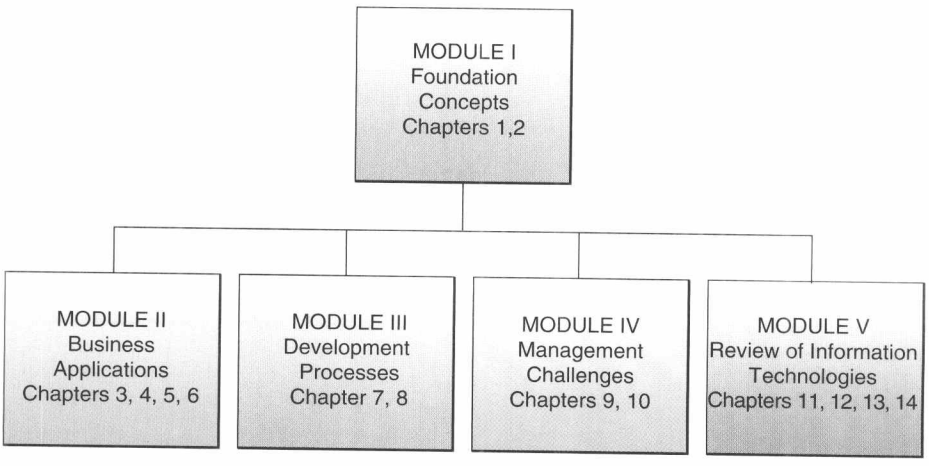
This text also contains substantial text material and cases reflecting the strategic, international, and ethical dimensions of information systems. This can be found not only in Chapters 2, 9, and 10, but also in all other chapters of the text. This is especially evident in many real world cases and examples, such as General Electric Company, McDonald's and American Express, Oracle Corporation, E*Trade Bank, France Telecom, Siemens AG, Accel Partners, Merrill Lynch, University of Washington, the FBI and Resource Technologies, Visa, American Express, and GM, Axciom, Inc., TRW, Toyota, and Cendant, and many, many others. These examples repeatedly demonstrate the strategic and ethical challenges of managing E-business technologies for competitive advantage in global business markets and in the global information society in which we all live and work.

Modular Structure of the Text

The text is organized into five modules that reflect the five major areas of the framework for information systems knowledge mentioned earlier. See Figure 2. Also each chapter is organized into two distinct sections. This is done to avoid proliferation

Figure 2

The modular organization of the text.



of chapters, as well as to provide better conceptual organization of the text and each chapter. This organization increases instructor flexibility in assigning course material since it structures the text into modular levels (i.e., modules, chapters, and sections) while reducing the number of chapters that need to be covered.

Each chapter starts with Chapter Highlights and Learning Objectives and ends with a Summary, Key Terms and Concepts, a Review Quiz tied directly to the Key Terms and Concepts, Discussion Questions, and Application Exercises. Real World Cases are placed at the beginning of the two sections of each chapter (with a brief analysis), and at the end of each chapter, to help students understand the chapter material in the context of examples from the real world of business.

Changes to This Edition

As stated earlier, besides providing all new Real World Cases, this edition represents a comprehensive E-business revision of the text. This includes a major restructuring of the text's organization and sequence of chapters to better support its new E-business orientation. For example, the four chapters on hardware, software, data resource management, and telecommunications networks have been moved to an optional Review of Information Technologies module as Chapters 11, 12, 13, and 14. The chapter on strategic advantage has been brought forward to the Foundation Concepts module as Chapter 2, while coverage of systems development has been moved to a new module on Development Processes as Chapter 8. Highlights of other changes made to the Fourth Edition are found in the following Fifth Edition chapters:

Chapter 1: ***Foundations of Information Systems in Business***
This chapter features a complete reorganization and major changes in content to present an overview of topics in the five areas of IS knowledge of the text. Much of the material formerly in Chapters 1 and 2 has been eliminated or concentrated in this chapter. Thus, Section I covers foundation concepts in information systems and technologies, and Section II presents concepts in E-business applications, the IS development process, and management challenges of IT.

Chapter 2: ***Competing with Information Technology***
This was Chapter 12 in the previous edition. It was moved to the Foundation Concepts module at the urging of reviewers to emphasize the vital importance of using IT for competitive advantage. The strategic use of Internet technologies and E-business concepts are major content additions, along with revising previous coverage and replacing many in-text real world examples.

Chapter 3: ***The Internetworked E-Business Enterprise***
Section I of this chapter features new topics and thoroughly revised content on E-business applications and the business use and value of the Internet. The chapter includes new material on intranet enterprise portals and technologies, and new in-text real world examples.

Chapter 4: ***Electronic Business Systems***
This chapter has been completely E-engineered to provide students with two solid sections on E-business. Section I on E-business systems features major new content on cross-functional integrated enterprise applications, including enterprise application integration (EAI), enterprise resource planning (ERP), and customer relationship management (CRM), and supply chain management (SCM). Section II contains updated coverage of more traditional E-business applications that support activities in the functional areas of business. Much of the coverage of transaction processing systems formerly in Chapter 10 has now been concentrated in the treatment of online transaction processing (OLTP) in Section I.

Chapter 5: *Electronic Commerce Systems*
This chapter is a complete rewrite and expansion of the former edition's section on electronic commerce. Section I emphasizes the fundamental components and processes of E-commerce systems, while Section II explores key applications and issues in E-commerce, including B2C and B2B marketplaces, requirements for success, and clicks and bricks strategies.

Chapter 6: *E-Business Decision Support*
The focus of Section I of this chapter has been revised to emphasize the major trends and changes occurring in E-business decision support, which is empowering business professionals and knowledge workers (not just managers and executives) with Web-enabled decision support tools. The chapter also features new material on using data mining and enterprise portals for decision support, and new in-text real world examples.

Chapter 7: *Developing E-Business Strategies*
This chapter is a thorough revision of the material on IS planning and change management formerly in Chapter 14. Both chapter sections contain much new material and real world examples that emphasize the major changes needed in developing and implementing E-business strategies before new E-business applications can be successfully developed.

Chapter 8: *Developing E-Business Solutions*
This chapter (formerly Chapter 3), is thoroughly revised and reorganized at the urging of reviewers to stress an E-business systems development perspective, including prototyping, user interface, Web design, and end user development topics (Section I), and E-business system implementation (Section II). Most of the section on the systems approach, including the hypothetical case study example of Auto Shack Stores, has been moved to the text's online learning center.

Chapter 9: *Security and Ethical Challenges of E-Business*
This chapter is completely E-engineered to stress security, ethical, and societal challenges faced by E-businesses, including computer crime in Section I. Section II is a new, completely rewritten treatment that focuses on methods of E-business security management to counter the threats to E-business and E-commerce introduced in Section I.

Chapter 10: *Enterprise and Global Management of E-Business Technology*
The first section of this chapter is a completely E-engineered and new treatment of the impact of E-business on managers, organizations, and the management of information technologies and the IS function, eliminating much previous material that focused on more traditional approaches. Section II retains its global IT management structure, but includes new treatment and in-text real world examples on cultural and political challenges, E-business strategies, and data and Internet access issues in global E-business.

Chapter 11: *Computer Hardware*
Coverage of computer hardware has been updated and revised, including added content on information appliances and thin clients, and elimination of technical details on CPU components.

Chapter 12: *Computer Software*
Updated coverage of computer software, including business application software, the Windows 2000 and Linux operating systems, and the XML language.

Chapter 13: *Data Resource Management*
Includes new content on data resource management, data warehouses, and data mining, and new in-text real world examples.

Chapter 14: *Telecommunications and Networks*
Updated coverage of telecommunications network content, including trends, the Internet, fiber optics and wireless technologies, P2P networks, and bandwidth alternatives. Coverage of business applications of telecommunications and the Internet has been moved to Chapter 3.

Teaching and Learning Resources

New to this edition, E-Tutor, authored by Ali Reza Montazemi of McMasters University, is an electronic tutor available free on CD-ROM that helps students master basic key concepts before advancing to more complex topics. E-Tutor is an interactive electronic product, with content from the textbook embedded into a software shell, that provides learning sessions in coordination with sections and subsections from the textbook. It has the flexibility to allow students to work through the material at their own pace. A **presentation manager Instructor CD-ROM** is available to adopters and offers the following resources for course presentation and management:

- An Instructor's Resource Manual, authored by Margaret Trenholm-Edmunds of Mount Allison University, contains suggestions for using the book in courses of varying lengths, detailed chapter outlines with teaching suggestions for use in lectures, and answers to all end-of-chapter questions, application exercises, and problems and case study questions. Teaching tips for incorporating the video clips are included for many chapters.
- A Test Bank, authored by Margaret Trenholm-Edmunds of Mount Allison University, containing true-false, multiple choice, fill-in-the-blank, and short essay questions.
- Computerized/Network Testing with Brownstone Diploma software is fully networkable for LAN test administration; tests also can be printed for standard paper delivery or posted to a website for student access.
- Slide shows in Microsoft PowerPoint, authored by Margaret Trenholm-Edmunds of Mount Allison University, are available for each chapter to support classroom discussion of chapter concepts and real world cases.
- Data/solutions files, authored by James N. Morgan of Northern Arizona University, for the database and spreadsheet application exercises in the text are included.
- Video clips are available that highlight how specific companies apply and use information technology.

The McGraw-Hill/Irwin Information Systems Video Library contains 14 10- to 12-minute videos on numerous companies demonstrating use of a variety of IT like intranets, multimedia, or computer-based training systems, and concepts like client/server computing and business process reengineering. This library is available free to adopters. For further information, visit www.mhhe.com/business/mis/videos or contact your local McGraw-Hill/Irwin sales representative. A video lecture guide for all 14 videos is included in the Instructor's Resource Manual.

Digital Solutions

- Website/OLC—The book's website at http://www.mhhe.com/business/mis/obrien/obrien5e provides resources for instructors and students using the text. The Online Learning Center (OLC) builds on the book's pedagogy and features with self-assessment quizzes, extra material not found in the text, Web links, and other resources for students and instructors.
- Pageout—our Course Website Development Center. Pageout offers a syllabus page, website address, Online Learning Center content, online quizzing, gradebook, discussion forum, and student Web page creation.

Packaging Options

The McGraw-Hill/Irwin *Advantage*, O'Leary, and Laudon Interactive computing series are collections of software application manuals and interactive computer-based training products for Microsoft Office. In addition, we offer several paperback Internet literacy books or CDs, perfect for introducing the World Wide Web, E-mail, and Web page design to students. These texts and CDs are available for discounted packaging options with any McGraw-Hill/Irwin title. For more about our discount options, contact your local McGraw-Hill/Irwin sales representative or visit our website at www.mhhe.com/it.

In addition, a software casebook—*Application Cases in MIS: Using Spreadsheet and Database Software and the Internet*, fourth edition, by James N. Morgan of Northern Arizona University—is available to supplement the hands-on exercises in this edition. This optional casebook contains an extensive number of hands-on cases, many of which include a suggested approach for solving each case with the Internet, spreadsheet, or database management software packages to develop solutions for realistic business problems.

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Acknowledging the Real World of Business

The unique contribution of the hundreds of business firms and other computer-using organizations that are the subject of the real world cases, exercises, and examples in this text is gratefully acknowledged. The real-life situations faced by these firms and organizations provide the readers of this text with a valuable demonstration of the benefits and limitations of using the Internet and other information technologies to enable electronic business and commerce, and enterprise communications and collaboration in support of the business processes, managerial decision making, and strategic advantage of the E-business enterprise.

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