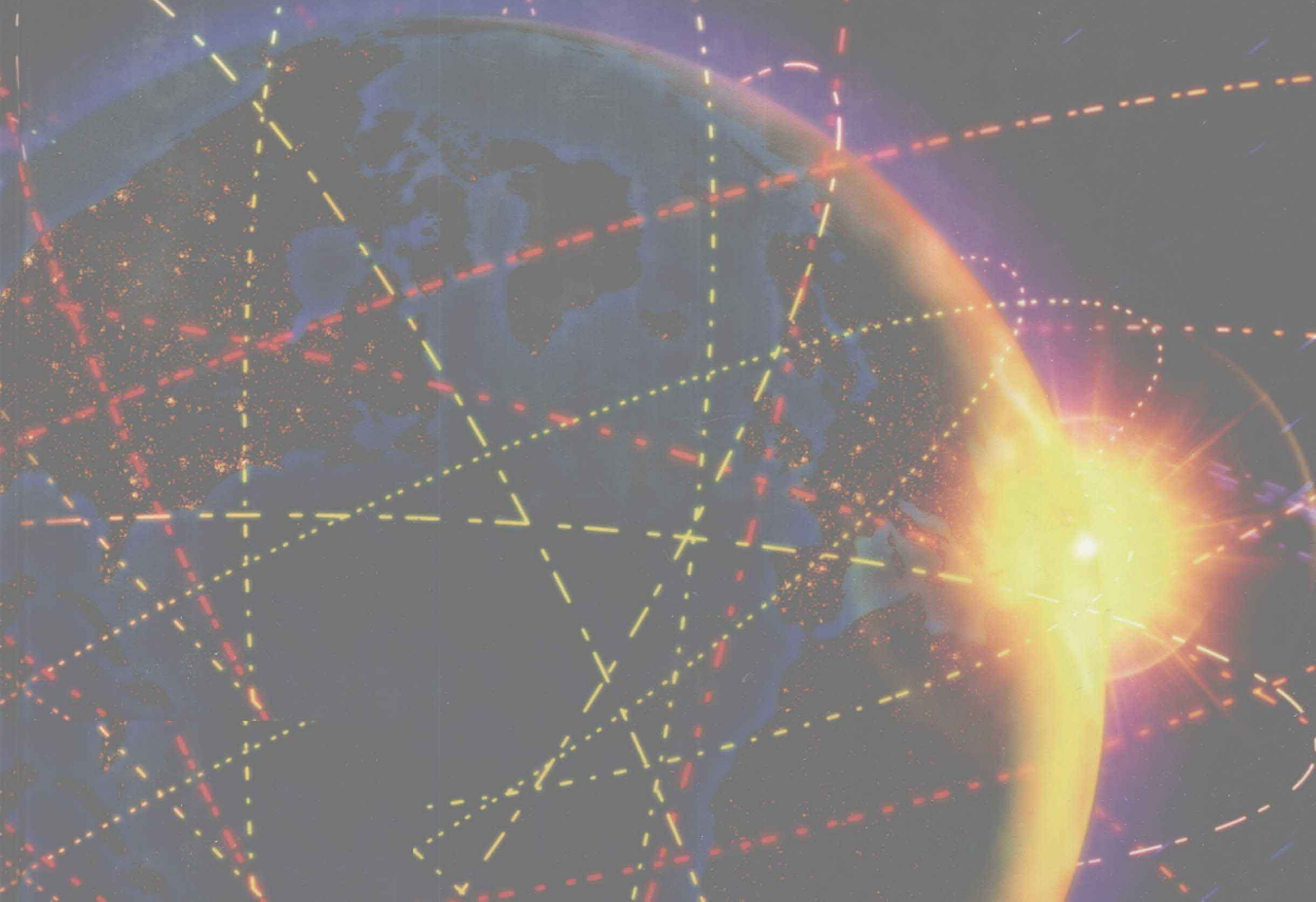


Sixth Edition

MANAGEMENT INFORMATION SYSTEMS

Managing Information
Technology in the
Business Enterprise

James A. O'Brien



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James A. O'Brien

*College of Business Administration
Northern Arizona University*



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MANAGEMENT INFORMATION SYSTEMS:

MANAGING INFORMATION TECHNOLOGY IN THE BUSINESS ENTERPRISE

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To your love, happiness, and success

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 professor and 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

A Business and Managerial Perspective

This new Sixth Edition is designed for business students who are or who will soon become business professionals in the fast changing business world of today. The goal of this text is to help business students learn how to use and manage information technologies to revitalize business processes, improve business decision making, and gain competitive advantage. Thus it places a major emphasis on up-to-date coverage of the essential role of Internet technologies in providing a platform for business, commerce, and collaboration processes among all business stakeholders in today's networked enterprises and global markets.

This is the business and managerial 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 professional needs to know.
- Places a major emphasis on the strategic role of information technology in providing business professionals with tools and resources for managing business operations, supporting decision making, enabling enterprise collaboration, and gaining competitive advantage.

Audience

This text is designed for use in undergraduate or introductory MBA courses in Management Information Systems that 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 Sixth Edition has been updated with many new topics and real world examples and reorganized to provide students and instructors with a superb teaching-learning resource about the business uses and managerial challenges of information technology.

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.

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.

All New! Real World Cases are provided for every chapter. These cases relate concepts in the book to real companies.

SECTION I Customer Relationship Management: The Business Focus

Introduction

Today, customers are in charge. It is easier than ever for customers to comparison shop and, with a click of the mouse, to switch companies. As a result, customer relationships have become a company's most valued asset. These relationships are worth more than the company's products, stores, factories, web addresses, and even employees. Every company's strategy should address how to find and retain the most profitable customers possible [8].

The primary business value of customer relationships today is indisputable. That's why we emphasized in Chapter 2 that becoming a customer-focused business was one of the top business strategies that can be supported by information technology. Thus, many companies are implementing customer relationship management (CRM) business initiatives and information systems as part of a customer-focused or customer-centric strategy to improve their chances for success in today's competitive business environment. In this section, we will explore basic CRM concepts and technologies, as well as examples of the benefits and challenges faced by companies that have implemented CRM systems as part of their customer-focused business strategy. Let's start with a real world example.

Analyzing Mitsubishi Motor Sales

Read the Real World Case on Mitsubishi Motor Sales on the next page. We can learn a lot about the many ways companies are implementing customer relationship management systems. See Figure 6.1.

Mitsubishi Motor Sales realized their business lacked a customer focus and decided to change that through a customer relationship management initiative. The CRM project involved acquiring and installing the hardware, software, network, and

FIGURE 6.1

Greg O'Neill is executive vice president and general manager of Mitsubishi Motor Sales of America and led the implementation of their customer relationship management initiative.



Source: Mark Robert Halper.

REAL WORLD CASE 1

Mitsubishi Motor Sales: Implementing Customer Relationship Management Systems

Until the late 1990s, Mitsubishi Motor Sales of America Inc. (www.mitsubiscars.com) was only about cars, and its approach to retail customer service reflected that. "There were more than 16 toll-free customer service numbers that callers had to navigate to find information on topics ranging from financing to sales to repairs. "We were fragmented in our approach, and we clearly lacked a customer focus," says Greg O'Neill, executive vice president and general manager.

Mitsubishi decided to change that. In the spring of 1999, as part of a companywide shift to an increased focus on customers, executives challenged the call center to provide "one voice and one set of ears for the customer," says CIO Tony Romero. That was the beginning of a continuing drive toward improved customer service through a customer relationship management (CRM) initiative that would eventually engage multiple departments and 18 vendors.

Today, Mitsubishi has one call center and an outsourced service provider that handles the most basic calls. The cost per call has decreased by about two-thirds, and that savings alone paid for the system in 18 months, according to Rich Donohoe, director of customer relations. The system saves agents time and uncertainty and enabled the call center to handle 38 percent more volume in 2001 than in 2000, with an even staffing level. Meanwhile, the company's customer satisfaction rate rose by 8 percent, according to a survey by J. D. Power and Associates.

Mitsubishi's call center project team included members from its sales, marketing, finance, and IT departments, all of which contributed resources as needed. Early on, the team members established some rules of the road. First, they would selectively choose best-of-breed CRM software components, not the integrated CRM suites that seemed intent on force-fitting Mitsubishi's needs into faced product offerings. But that required a constant struggle to keep 18 vendors heading in the same direction.

The team members also decided to implement changes slowly, adding a technology only when all employees were using the last one implemented. This approach allowed call center agents to get comfortable with the new technology over time. To accommodate the deliberate, modular approach, all products had to pass the "three S" test: Is it simple? Does it satisfy? Is it scalable? "If we couldn't answer yes to all three, we didn't do it," says Greg Stahl, Mitsubishi's director of advertising.

The journey began in earnest in June 1999, when Mitsubishi chose to outsource its most basic level customer calls to Baltimore-based Sitel Corp. Within two months, Mitsubishi's 18 toll-free customer numbers and the multiple call centers behind them were consolidated, and call center software from Sibel Systems was implemented. Also, as part of the companywide customer focus, a new customer-centric database was consolidated in-house the next year. The database

became the engine powering the call center, but unfortunately, dirty data were a major stumbling block. The project stalled for months as the data were cleaned and updated.

In early 2001, a digital phone switch from Avaya Inc. was installed that allowed flexible skills-based call routing. Callers to the single toll-free number were routed based on menu choices. About half the callers get the information they needed from an interactive voice response unit, which can answer fairly sophisticated queries without live contact. Simple calls went to Sitel, and the rest were routed to call center agents with the appropriate skills. In March 2001, graphical user interface upgrades put 11 screens' worth of customer information on one screen of call center agents. And Smart Scripts workflow software from Sibel provided agents with decision-tree scripts and automated customer correspondence.

In May 2001, Mitsubishi managers began listening to outsourced service calls, and they could see agents' screens with Avaya IP Agent software. The next month, the company started using workforce management software from Blue Pumpkin Software to hourly forecast call center coverage. Then NiceLog software from Nice Systems was installed to record agents' voice and screen activity for quality assurance and training.

Aside from happier customers, the benefits to call center employees include career growth and higher pay. Previously, agents in separate call centers handled specific areas: accounts, vehicles, titles, or retailer queries. Now the silos are gone and agents can learn new skills in multiple areas, greatly increasing call center flexibility. The workforce management software schedules training time during lulls, and agents who learn multiple skills earn more money. Call center turnover, which has traditionally been more than 20 percent, was about 7 percent last year.

O'Neill says the executive team members regularly listen in on service calls to get a feel for customer concerns, and they act on what they hear. "That build up of information has driven more early marketing decisions and made us more effective earlier on than I could have ever thought," O'Neill says. "That's been a huge dividend."

Case Study Questions

1. What are the key application components of Mitsubishi's CRM system? What is the business purpose of each of them?
2. What are the benefits to a business and its customers of a CRM system like Mitsubishi's?
3. Do you approve of Mitsubishi's approach to acquiring and installing its CRM system? Why or why not?

Source: Adapted from "Driven to Better Service," *Computerworld*, July 8, 2002, pp. 40-41. Reprinted with permission from Computerworld.

Key Features

Coverage of e-Business and e-Commerce

Strategic, International, and Ethical Coverage

The book profiles companies like Cisco Systems to emphasize the continued importance of the Internet on business strategy.

Recently coined, yet already clichéd, the expression “e-business is business” speaks the truth . . .

Contrary to popular opinion, e-business is not synonymous with e-commerce. E-business is much broader in scope, going beyond transactions to signify use of the Net, in combination with other network technologies and forms of electronic communication, to enable any type of business activity [1].

Today, businesses of all sizes and types are using Internet technologies to enable all kinds of business activities. That’s what e-business really is. The new Sixth Edition recognizes that Internet-enabled business processes are becoming so fundamentally pervasive in business that the term “e-business” is becoming redundant in many instances. Therefore this edition has significantly reduced its use of that term, while concentrating the e-business coverage that today’s business students need into two chapters on e-business applications and one chapter on e-commerce.

This edition refocuses its coverage of e-business and e-commerce applications and issues with a restructured introductory chapter on functional and cross-functional e-business systems (Chapter 5), a new chapter on enterprise e-business systems (Chapter 6), and a highly praised introductory chapter on electronic commerce (Chapter 7). The text material and real world cases and examples in these chapters provide students with a solid e-business foundation for their studies and work in business.

This edition also contains substantial text material and real world cases and examples reflecting strategic issues and uses of information technology for competitive advantage (Chapter 2), ethical and security issues and challenges (Chapter 11), and international and global business issues and practices (Chapter 12). These chapters demonstrate the strategic and ethical challenges of managing information technology for competitive advantage in today’s dynamic global business markets.

Cisco Systems: e-Business and e-Commerce Leader

Top telecom manufacturer Cisco Systems uses 36 manufacturing plants, of which it owns but two. One of them is downstairs from the San Jose office of Randy Pond, Senior Vice President for Operations. The rest belong to top contract manufacturers like Jabil Circuit and Solectron. It’s “virtual manufacturing,” Pond says, made possible by a “suite of Internet-based tools and processes that lets me manage an extended enterprise I don’t own as if I do own it.”

The key, says Pond, is “real-time data on a real-time basis so my partners know what goes on in my business every single day.” As much as possible, Cisco and a partner work with the same stream of e-business information, doubling its value. Every day Cisco compiles its inventory, forecast for each model, order backlog, and thirteen weeks of daily data about parts and subassemblies; every day its partner compiles data on in-process inventory, cycle time by process step, optimal lot size, and yield; every night computers combine the Internet data streams into a river of information; every morning everyone knows what to build that day.

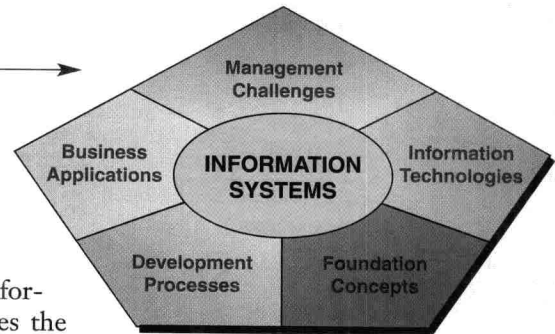
Cisco works the other end of the process—e-commerce—the same way. Eighty-seven percent of Cisco’s sales are entered directly from the Net and available instantaneously. Except for commodity parts, Cisco’s e-business supply chain is as visible and as live as a televised football game. Validation and testing are also Internet-based. Autotest, a homemade tool, tests machines as they are built and won’t print a packing label for a machine unless every test has been done and passed. Another tool checks a customer’s order as he enters it, to make sure that he hasn’t asked for incompatible gear.

The benefits of real-time e-business add up to about \$400 million a year, by Pond’s reckoning, plus up to a \$1 billion saving in capital costs—from equipment Cisco doesn’t carry on its books, improved utilization by suppliers, and minimal inventory [18].

Key Features

An Information Systems Framework

O'Brien uses a five-arch IS framework to reduce the complexity of MIS. On each chapter opener the appropriate area is highlighted depending on what is being covered in that chapter.

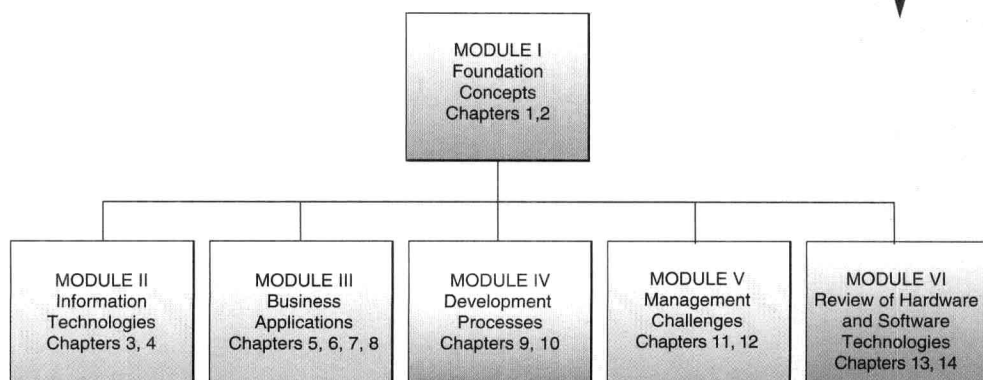


This text reduces the complexity of a course in management information systems by using a conceptual framework that organizes the knowledge needed by business students into five major areas (see Figure 1):

- **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.
- **Information Technologies.** Includes major concepts, developments, and managerial issues involved in telecommunications network and data resource management technologies (Chapters 3 and 4). A review of computer hardware (Chapter 13) and computer software (Chapter 14) technologies is provided in Module VI. Other technologies used in business information systems are discussed where appropriate in selected chapters.
- **Business Applications.** How businesses use Internet and other information technologies to support their business processes, e-business and e-commerce initiatives, and business decision making (Chapters 5, 6, 7, and 8).
- **Development Processes.** Developing and implementing business/IT strategies and systems using several strategic planning and application development approaches (Chapters 9 and 10).
- **Management Challenges.** The challenges of business/IT technologies and strategies, including security and ethical challenges and global IT management (discussed in many chapters, but emphasized in Chapters 11 and 12).

Modular Structure of the Text

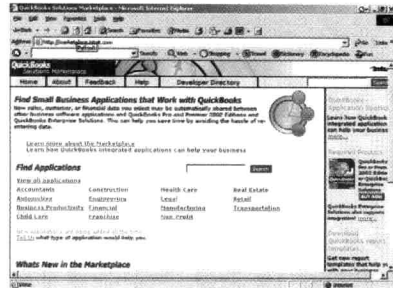
The text is organized into modules that reflect the five major areas of the framework for information systems knowledge mentioned earlier. See Figure 2. Also, each chapter is organized into two distinct sections. This is done to avoid proliferation of chapters, as well as to provide better conceptual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



Key Features

176 • Module III / Business Applications

FIGURE 5.26
The QuickBooks Solutions Marketplace provides online application software services from Intuit and their many business partners.



Source: Courtesy of Intuit.

- a. Check out the QuickBooks Solutions Marketplace at www.marketplace.intuit.com. What is the business value of the software and services they offer?
 - b. Link to the websites of several of the other online application service providers in the QuickBooks Marketplace. Evaluate the business value of two of these more specialized ASPs.
 - c. Would you use or recommend any of the online application services to a small business? Why or why not?
2. eWork Exchange and eLance.com: Online Job-Matching and Auction Sites.
 - Web** Many opportunities await those who troll the big job boards, the free-agent sites, the auction services where applicants bid for projects, and the niche sites for specialized jobs and skills. Examples of top job matching and auction sites are eWork Exchange and eLance.com.
 - eWork Exchange** (www.eworkexchange.com). No more sifting through irrelevant search results. Fill out a list of your skills and let eWork Exchange's proprietary technology find the most suitable projects for you—no bidding required.
 - eLance.com** (www.elance.com). This global auction marketplace covers more than just IT jobs; it runs the gamut from astrology and medicine to corporate work and cooking projects. Register a description of your services or go straight to browsing the listings of open projects—and then start bidding. A feedback section lets both employers and freelancers rate one another.
3. Job Search Databases.
 - DB** Visit websites like Monster.com and others mentioned in the chapter to gather information about available jobs. Look up and record the relevant data for at least 10 current job openings that are of interest to you or that meet criteria provided by your instructor.
 - a. Create a database table to store key characteristics of jobs. Include all of the job characteristics shown in the list that follows as fields in your table, but feel free to add additional fields of interest to you. If data are not available for some fields (such as salary range) for a particular job, leave that field blank.
 - b. Write queries that will enable you to retrieve (a) just those jobs in a specified location, and (b) just those jobs in a specified job category.
 - c. Create a report that groups jobs by Location and sorts jobs within each group by Job category.

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.

Application Exercises

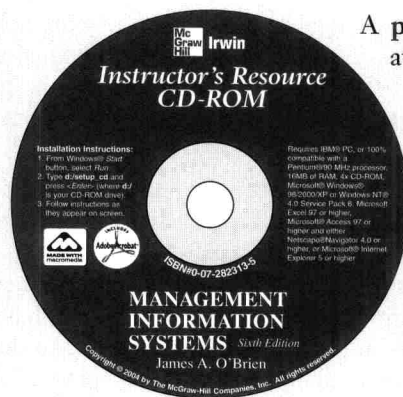
Each chapter contains application exercises in the end-of-chapter material. These exercises allow students to use Access in order to acquire some hands-on database experience. Data files are provided for these exercises.

Changes to This Edition

Besides providing all new Real World Cases, the Sixth Edition adds a new chapter on Enterprise e-Business Systems and makes other major changes to the Fifth Edition's coverage, many of them suggested by a review panel of 22 professors, that update, reorganize, and refocus its content. Highlights of changes in this edition include:

- Introductory coverage of managerial challenges in Chapter 1 and competitive strategy issues in Chapter 2 has been simplified by reducing the number of topics covered in these early foundation chapters.
- At the suggestion of reviewers, coverage of data resource management (Chapter 3) and telecommunications and networks (Chapter 4) has been significantly restructured and revised and included earlier in the text, so that they provide a technology foundations module that precedes the chapters in the business applications module that follows.
- The former chapter on the internetworked e-business enterprise has been dropped, and its coverage of the Internet, intranets, and extranets revised and moved to the chapter on telecommunications and networks. Coverage of enterprise collaboration systems has been significantly condensed and moved to the introductory chapter on e-business applications.
- Coverage of e-business applications has been revised, restructured, and expanded into two chapters at the suggestion of reviewers. Thus, Chapter 5, Introduction to e-Business Systems, introduces the functional foundations of e-business applications in Section I, followed by introductory coverage of cross-functional enterprise applications in Section II. Chapter 6, Enterprise e-Business Systems, is a new chapter that provides greater coverage of the business value, challenges, and trends in customer relationship management, enterprise resource planning, and supply chain management needed by business students today.
- Coverage of computer hardware (Chapter 13) and computer software (Chapter 14) remains in a final optional review module on hardware and software technologies that can be assigned at the option of the instructor.
- All other chapters have been updated with new text material, and most in-text real world examples that illustrate major topics throughout the text have been replaced with more current examples. In addition, most of the photos and software screen shots in the text have been replaced with updated content.

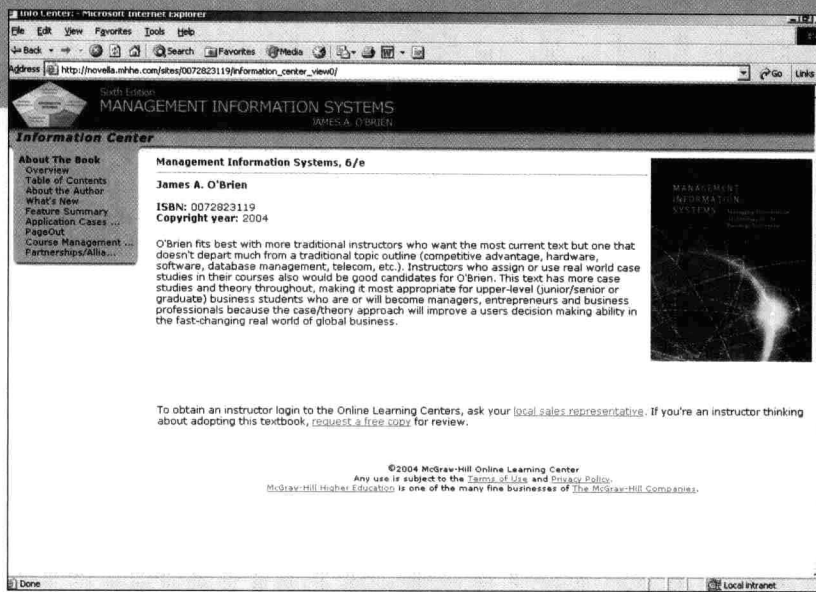
Teaching and Learning Resources



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.
- A **Test Bank**, authored by Queen Booker of the University of Arizona, contains 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 Lanny Wilke of Montana State 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 2002 and 2003 video updates on numerous companies demonstrating use of a variety of IT areas 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 guide for all updates is available on the O'Brien, 6/e website at www.mhhe.com/obrien.



Digital Solutions— Website/OLC

The book's website at <http://www.mhhe.com/obrien> 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.

Digital Solutions—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.

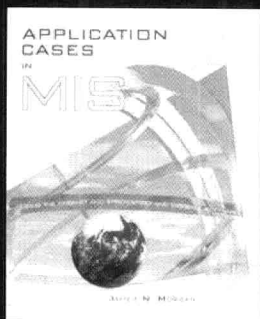
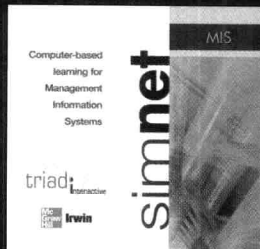
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In addition to application exercises, the *Morgan Application Cases* book can be packaged with the O'Brien text. Jim Morgan also authors the application exercises in the end-of-chapter material, so his casebook complements the text nicely and offers more in-depth coverage of how databases work.

SimNet MIS

Animate the concepts you cover with SimNet MIS. This computer-based training program reinforces concepts using a variety of methods.

- Teach Me mode introduces the skill using text, graphics, and interactivity.
- Show Me mode uses narration and animation to illustrate how the skill is used.
- Let Me Try mode gets students involved with practice in a non-threatening simulated environment.

Concepts covered include:

Types of Information Systems

Using IS for Competitive/Strategic Advantage (with focus on the Value Chain)

Data Warehousing

Data Mining (please note this topic will be written for the SimNet Computer Concepts program, and there is no added cost for this task)

Decision Support Systems

Artificial Intelligence and Expert Systems (please note this topic will be written for the SimNet Computer concepts program, and there is no added cost for this task)

Online Transaction Processing

Types of E-commerce

The Systems Development Life Cycle: Overview (version 1)

The Systems Development Life Cycle: Overview (version 2)

The Systems Development Life Cycle: Overview (version 3)

The Systems Development Life Cycle: Planning

The Systems Development Life Cycle: Scoping

The Systems Development Life Cycle: Analysis

The Systems Development Life Cycle: Alternatives

The Systems Development Life Cycle: Selection

The Systems Development Life Cycle: Design

The Systems Development Life Cycle: Implementation

The Systems Development Life Cycle: Maintenance

Excel

Access

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

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James A. O'Brien
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