Introduction to Information Systems

An Internetworked Enterprise Perspective

Second Alternate Edition

James A. O'Brien

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James A. O'Brien
College of Business Administration
Northern Arizona University

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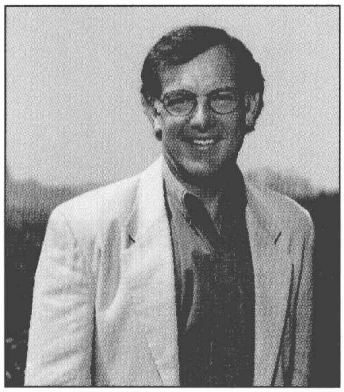
To all who read these words
May you love the Light within you
And in everyone you meet
And everything you experience

About the Author



James A. O'Brien is a 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 Dutch, French, or Japanese 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

Introducing Information Systems to Business Students

This text is an introduction to information systems and information technology for today's business students, who will be tomorrow's managers, entrepreneurs, and business professionals. The goal of this text is to help business students learn how to use and manage information technology to revitalize business processes, improve managerial decision making, and gain competitive advantage. Thus, it places a major emphasis on the role of the Internet, intranets, extranets, and other information technologies in providing a technology platform for electronic commerce and collaboration within and among internetworked enterprises and global markets.

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

- Loads the text with real world cases and problems about real people and companies in the business world.
- Organizes the text around a simple five-level 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 providing competitive advantage, supporting business operations and managerial decision making, and enabling electronic commerce and enterprise collaboration.

About the Text

This new alternate edition is a major revision that retains these important features, while significantly updating all coverage of IS technology and its business and managerial applications. In addition, this edition includes a new chapter on the strategic use of information technology for competitive advantage, and two new chapters on the business use of the Internet, intranets, and extranets, and their role in electronic commerce and enterprise collaboration in an internetworked enterprise. Major revisions have been made to the organization of topics in many chapters, and new hands-on application exercises have been added to end-of-chapter materials. Finally, this edition provides all new Real World Cases and Problems in every chapter.

This text is designed for use in undergraduate courses in Management Information Systems, which are required in many Business Administration or Management programs as part of the common body of knowledge required of 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.

An Information Systems Framework

This text provides a teaching-learning resource that 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:

- **Foundation Concepts.** Basic information systems concepts about the components and the operations, managerial, and strategic roles of information

systems (Chapter 1). Other behavioral, managerial, and technical concepts are presented where appropriate in other chapters.

- **Technology.** Major concepts, developments, and managerial implications involved in computer hardware, software, database management, and telecommunications technologies (Chapters 2, 3, 4, and 5). Other technologies used in computer-based information systems are discussed where appropriate in selected chapters.
- **Applications.** How the Internet, intranets, extranets, and other information technologies are used in modern information systems to support electronic commerce, enterprise collaboration, business operations, managerial decision making, and strategic advantage (Chapters 6, 7, 8, 9, and 10).
- **Development.** Developing information system solutions to business problems using a variety of approaches to application development and implementing change with IT (Chapter 11).
- **Management.** The challenges of managing information systems technologies, activities, and resources, including global IT management, and security and ethical challenges (discussed in many chapters, but emphasized in Chapters 12 and 13).

Real World Cases, Problems, and Exercises

This text makes extensive use of up-to-date "real world" case studies and problems. 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 two real world case studies and four real world problems in each chapter that apply specifically to that chapter's contents, and a continuing case at the end of each module. In addition, each chapter contains several Application Exercises, including two hands-on spreadsheet or database software assignments in Chapters 2 through 12, and several Internet assignments in Chapters 5, 6, and 7. The purpose of this variety of assignment options is to give instructors and students many opportunities to apply each chapter's material to real world situations.

Electronic Commerce and Enterprise Collaboration

This edition contains two new chapters that emphasize how the Internet, intranets, and extranets are revolutionizing the technological infrastructure and tools that enable internetworked enterprises to engage in electronic commerce and enterprise collaboration. This is demonstrated, not only in the chapter text material, but in the Real World Cases and Problems and Application Exercises in these chapters, the Continuing Real World Case at the end of each module, and in all of the other chapters of the text. Examples include real world cases and problems in electronic commerce like Federal Express, Virtual Vineyards, Peapod, Fashionmall.com, ESPNet SportsZone, Yahoo!, and Amazon.com, and enterprise collaboration examples like Battelle Pacific Northwest National Laboratory, Fruit of the Loom, ARCO Alaska, Parker Compumotor, LSI Logic, Microsoft, and Silicon Graphics.

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 Chapter 10: *Information Systems for Strategic Advantage,* Chapter 12: *Enterprise and Global Management of Information Technology,* and Chapter 13: *Security and Ethical Challenges of Information Technology,* but in all other chapters of the text. This is especially evident in many real world cases and problems, such as Microsoft versus America Online and IBM/Lotus, AudioNet, Insight and Federal Express, *The Wall Street Journal* Interactive Edition, Uarco, Skyway Systems, GE, IBM, Boeing, and TransCanada, Millipore, Raytheon Aircraft, AMP, Cargill, StarMedia, Ford Motor

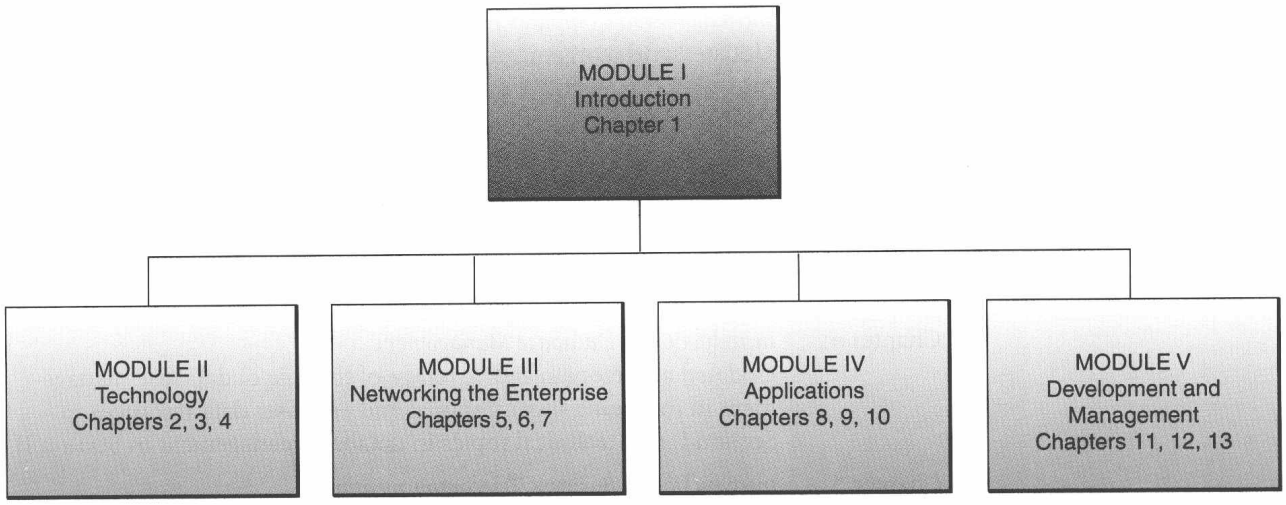


FIGURE 1
The modular structure of the text.

Company, Tommy Hilfiger Corp., Cyber Promotions, MasterCard, Web Communications, Panix, PSI International, and many, many others. These examples repeatedly demonstrate the strategic and ethical challenges of managing information technology 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 according to the five major areas of the framework for information systems knowledge mentioned earlier. Figure 1 illustrates how the text is organized into five modules. 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.

Each chapter starts with a Chapter Outline 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, Real World Problems, Application Exercises, Review Quiz Answers, and Selected References. Real World Cases are also provided at the end of each section and module of the book.

Summary of Changes

Besides providing all new Real World Cases and Problems, this edition represents a major revision of chapter contents. Highlights of the changes made to the first Alternate Edition are found in the following chapters:

Chapter 1: *Introduction to Information Systems in Business*
Section I of this chapter is a major revision that emphasizes the importance of IT in business with an overview of the impact of IT on business developments such as internetworking the enterprise, globalization, reengineering, and competitive advantage. The model of IS components in Section II has been revised to stress the role of network resources, and the overview of the types and roles of information systems has been expanded.

Chapter 2: *Introduction to Computer Hardware*
Updated and reorganized coverage of computer hardware, including moving more technical material to a Technical Note in Section I, and the elimination of Section III on the technical details of instruction execution and data representation.

Chapter 3: *Introduction to Computer Software*
Updated and reorganized coverage of computer software, with application software moved to Section I, and system software moved to Section II.

Chapter 4: *Introduction to Database Management*
Updated and reorganized coverage of the role of database management in managing organizational and end user data resources in Section I, and technical topics in database management in Section II.

Chapter 5: *Introduction to Business Telecommunications*
A major revision and many new topics including business applications and trends in telecommunications, the Internet revolution, intranets, extranets, client/server and other types of networks, and the updating of more technical topics including cellular phone systems, TCP/IP, and bandwidth and switching alternatives.

Chapter 6: *The Internet and Electronic Commerce*
Section I of this new chapter contains text material and business examples on the business use of the Internet including interactive marketing, push versus pull marketing, and the business value and customer value of the Internet. Section II introduces students to fundamental topics and business examples in electronic commerce, including EC technologies, retailing on the Web, supply chain management, EDI, EFT, and electronic payments alternatives.

Chapter 7: *Intranets, Extranets, and Enterprise Collaboration*
Section I of this new chapter reviews topics and business examples of the intranet revolution, including intranet applications and technologies, the role of extranets, and the future of intranets and extranets. Section II covers topics, tools, and examples of team, workgroup, and enterprise collaboration, including groupware tools for electronic communications, electronic conferencing, and cooperative work management.

Chapter 8: *Information Systems for Business Operations*
Section I is a revision of material on IS support of the functional areas of business. Section II contains revised material on transaction processing systems.

Chapter 9: *Information Systems for Managerial Decision Support*
Substantial new material has been added to Section I on online analytical processing (OLAP) and decision support and executive information systems including new coverage of knowledge management systems. Section II features revised coverage of artificial intelligence and expert systems, and new material on case-based reasoning, neural networks, fuzzy logic, virtual reality, and intelligent agents.

Chapter 10: *Information Systems for Strategic Advantage*
Section I of this new chapter contains new and revised coverage of competitive strategy concepts formerly in Chapter 8. Section II

contains much new material on the strategic use of IT for business process reengineering, total quality management, agile competition, virtual corporations, and strategic use of the Internet.

Chapter 11: *Developing Business Solutions with Information Technology*
Section I contains expanded coverage of end user development, and includes material on CASE formerly in Section III, which has been dropped. Section II contains new material on managing change caused by implementing new information technologies in an organization.

Chapter 12: *Enterprise and Global Management of Information Technology*
Section I is a revision of managerial issues in IT including management involvement in IS governance, trends in IS organization, and the managerial and organizational impact of IT. Section II contains much new and revised material on global IT management, including cultural challenges, global company requirements, and global business/IT strategies.

Chapter 13: *Security and Ethical Challenges of Information Technology*
Section I of this chapter contains new material on IS security and controls. Section II contains new material on computer crime and ethical controversies on the Internet, as well as revised coverage of ethical and societal IT issues.

Support Materials

The Irwin/McGraw-Hill Advantage and Effective Series are a collection of laboratory tutorials for the most popular microcomputer software packages available. There are numerous lab manuals available, so you can choose any combination to accommodate your individual class needs.

A software casebook, *Application Cases in MIS: Using Spreadsheet and Database Software,* second 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 spreadsheet or database management software packages to develop solutions for realistic business problems.

New to this edition is an Instructor CD-ROM containing all the files for the following list of supplements.

An Instructor's Resource Manual, revised by Margaret Trenholm-Edmunds of Mount Allison University, is available to instructors upon adoption of the text. This helpful resource contains instructional aids and suggestions, detailed annotated chapter outlines with instructional suggestions for use in lectures, answers to chapter questions, and problems and case study questions.

Data/Solutions files are included for use with the spreadsheet and database exercises in the text.

There is also presentation graphics in PowerPoint revised by Margaret Trenholm-Edmunds that supplies color slide shows for each chapter to support classroom discussion.

A Test Bank, which contains over 3,000 true-false, multiple choice, and fill-in-the-blank questions, has been prepared by Margaret Trenholm-Edmunds of Mount Allison University. It is available in computerized form for use with the Irwin/McGraw-Hill Test Generator Program.

The Irwin/McGraw-Hill IS Video Library contains 14 videos, approximately 10–12 minutes long, on various IS concepts like multimedia, business process reengineering, and client/server computing. These videos, along with two new 1997 updates, are available to adopters of the text.

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Acknowledging the Real World of Business

The unique contribution of over 100 business firms and other computer-using organizations that are the subject of the real world cases, problems, exercises, and case studies in each chapter is also 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, intranets, extranets, and other information technologies to support the business operations, managerial decision making, and strategic advantage of the internetworked business enterprise.

Internet Web Site

An Internet web site (www.mhhe.com/business/mis/obrien) is available to support users of this book and my other texts in management information systems. The web site offers additional information resources, real world cases, and links to other helpful web sites. In addition, you may use the web site E-mail address (webmaster@mhhe.com) to share your questions, comments, and suggestions on the text material with me and other members of the Irwin/McGraw-Hill team. We look forward to hearing from you.

James A. O'Brien

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