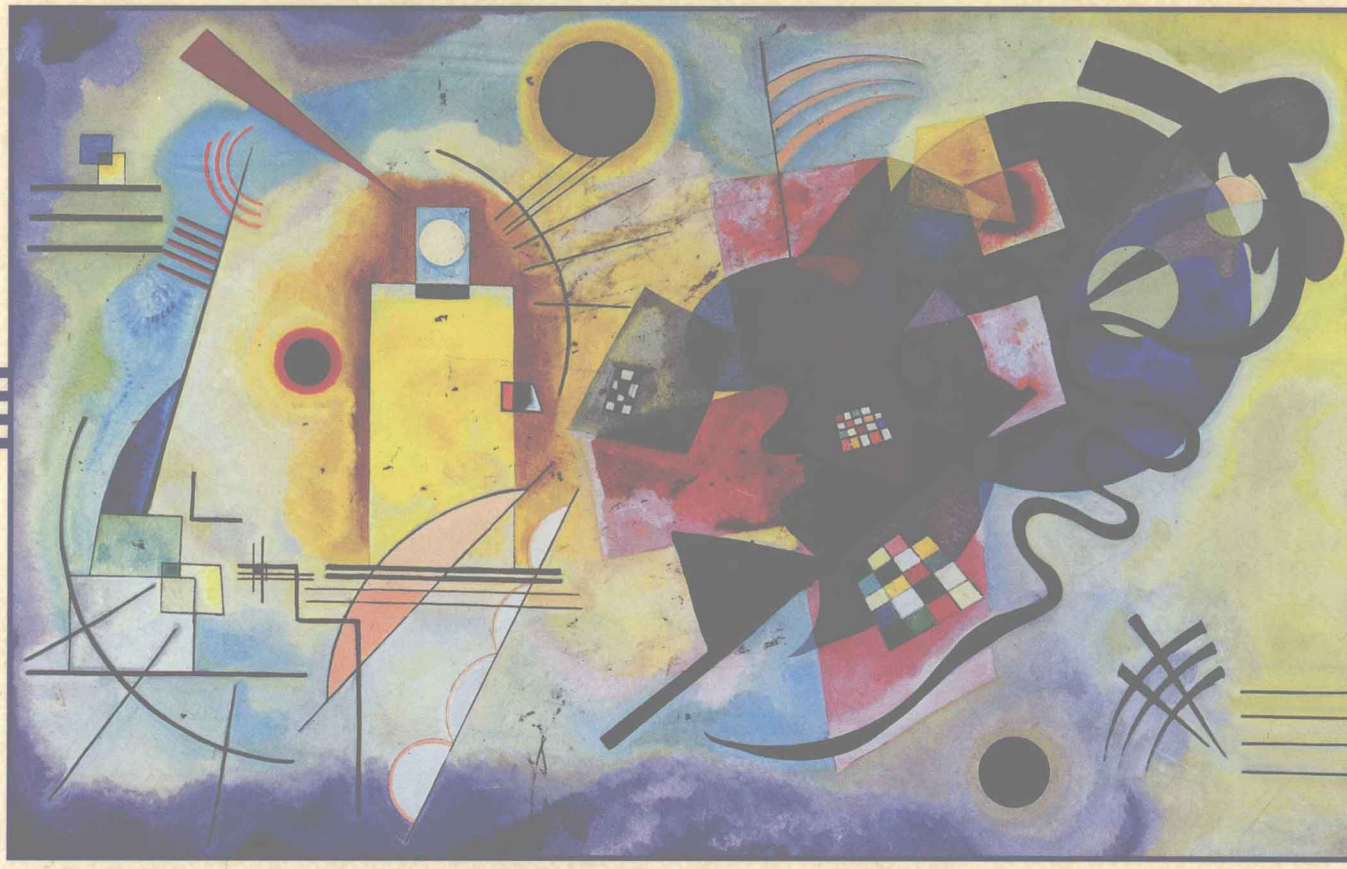
SEVENTH EDITION

Management Information Systems



Raymond McLeod, Jr.

SEVENTH EDITION

MANAGEMENT INFORMATION SYSTEMS

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MANAGEMENT INFORMATION SYSTEMS

To Martha

Preface

A textbook consists of two key ingredients—the selection of topics and their organization. These ingredients have always received top priority in *Management Information Systems;* but because of the dynamic nature of the computer field, the task becomes more difficult with successive editions. Each year there are numerous new topics, and decisions must be made concerning where to put them and what old topics, if any, to discard.

Although these can be tough decisions, two situations make the job easier. First, there are many more sources of material today than there were in the past. When the first edition of *Management Information Systems* was published in 1979, one good reference on a topic was considered a gold mine. Fortunately, that situation has changed. Today there are many excellent sources for each topic, making it possible to provide complete descriptions from several points of view.

The second situation that simplifies the job of writing an MIS text is the fact that the underlying theory does not change that much. The theory provides the framework for the technology and is relatively stable. So, when someone writes a new edition, it is not like starting out with a clean slate, wondering what the first word should be.

Management Information Systems has always enjoyed a strong brand loyalty among the instructors who adopt and use it. The main reason is that students like it. In their course evaluations, students consistently give the text a good rating, their comments indicating that they like the logical organization and the clear descriptions. Underlying these two features is the strong theoretical base.

- **Logical Textbook Organization** You will find this seventh edition well organized, with the topics flowing logically within each part and each chapter. Terms are not used in a chapter without first defining them.
- **Thorough Explanations** This edition upholds its tradition of complete coverage of each topic that is introduced. Emphasis has never been on the number of topics covered but, rather, on the number covered well.
- **Solid Theoretical Base** The framework for the text consists of approximately 400 illustrations in the form of schematic diagrams, or models. Some of the models were created over the years by experts in the field, and their contributions are acknowledged. Most, however, are unique to this text. The diagrams provide a road map, making it easier to learn the material so that students can apply it in their careers.

These three features—good organization, thorough explanations, and a solid theoretical base—give students an advantage in learning about the complex and changing field of business computing.

A Management Orientation

Like the previous editions, the seventh edition views computer use through the eyes of the manager. The management orientation has always seemed appropriate, but the case is even stronger today with so many managers personally using their computers to produce information.

When students later become managers, they will have many opportunities to apply the text material. Perhaps, however, they are primarily interested in

computers and want to become computer specialists. As systems analysts, network specialists, or database administrators they will apply the material as they work with managers in developing managerial systems. Of course, before long they may become managers themselves in the information systems area. So, regardless of their position in the organization, it will benefit them to see problems from management's point of view. This text will give them that perspective.

New to This Edition

Internet Links In the margins throughout the text are "Internet icons" that look like the one shown here. These link various important topics in the book to expanded information and activities on the McLeod website. The ability to get online feedback reinforces learning and stimulates discussion. The book's Internet address is:

http://www.prenhall.com/mcleod

New and Updated Chapters This edition includes one completely new chapter—Chapter 3, which is titled "Using Information Technology to Engage in Electronic Commerce." The purpose of Chapter 3 is to show how organizations are now using the computer to make fundamental changes in their operations. These efforts are called *reengineering,* and many of the changes involve such data communications technologies as the *Internet.* Chapter 3 begins by describing *electronic commerce*—how firms use the computer to interface with organizations and individuals with whom they do business—customers, suppliers, and so on. Firms often band together to form *interorganizational systems* that function better in an integrated fashion than they would by operating separately. The members of the interorganizational system are connected by computer-to-computer transmissions, an activity called *electronic data interchange,* or *EDI.* These transmissions can travel along normal data communications circuits or can make use of the Internet.

In addition to this new material, many substantive changes have been made to other chapters. In Chapter 2, for example, the topic of competitive advantage is enhanced with the addition of *Michael Porter's value chains and value systems.* Chapter 10, on databases, has been augmented with a description of *knowledge discovery in databases (KDD),* which encompasses such topics as *data warehousing,* the *data mart,* and *data mining.* The discussion in Chapter 11 of data communications has been expanded with the inclusion of *middleware, LAN software,* and the *Intranet.* The coverage of group decision support systems in Chapter 14 has been enhanced with attention to *groupware.* The chapter on office automation, Chapter 15, has been renamed and refocused on the *virtual office* to encompass the topic of *telecommuting*—people working at home. In a like manner, Chapter 16 has been refocused to provide more equal coverage of all types of *knowledge-based systems,* especially expert systems and neural networks. Possibly the most important change comes in Chapter 22 with the discussion of an information system for the information services unit called *IRIS—information resources information system.* Also included is a report on research comparing information management in the United States, Korea, and Mexico.

All of these changes serve to keep the text up to date in areas of technology and methodology.

Boxed Inserts

All chapters contain a boxed insert entitled "Highlights in MIS" that relates the chapter material to the use of information technology in business and industrial

organizations. In essence, these inserts describe how firms have been both successful and unsuccessful in applying the principles of information management.

Examples of Applying the Systems Approach

Chapter 7 describes the basic problem-solving methodology—the systems approach. From that point on, each chapter includes a section, new to this edition, called "Applying the Systems Approach" on how this approach can be applied to the chapter material. These sections continue the systems focus long after the fundamentals are presented early in the text.

New and Updated Appendixes

In addition to the chapters, there are three appendixes that deal with the tools of systems development. These topics are of most interest to information specialists but can have value to users engaged in end-user computing. The topics include:

- Appendix A: Data Modeling
- Appendix B: Process Modeling
- Appendix C: Object Modeling—NEW!

Data modeling is accomplished by using entity-relationship diagrams and data dictionaries to document the firm's data. Process modeling is accomplished by using data flow diagrams and structured English. Object modeling, new to this edition, documents both data and processes in the form of objects.

The appendixes can be used in any combination and in any sequence when the course intent is to provide students with the tools of systems work. Such an approach is appropriate when there is no separate course in systems analysis and design and the MIS course must carry the entire load.

Modular Organization of the Chapters

The text is divided into six parts, and Figure P.1 on the next page shows the modular organization.

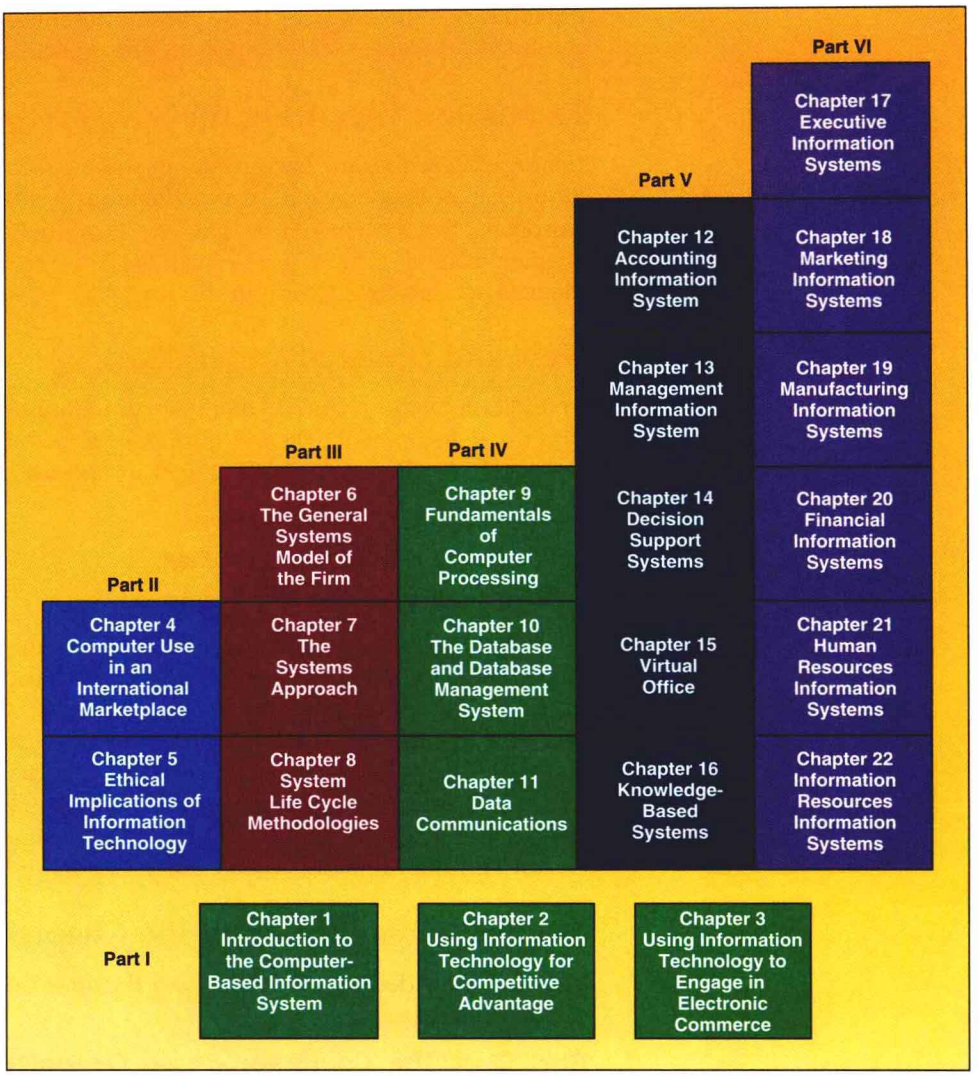
Part One: The Computer as an Organizational Information System Part One consists of three chapters and provides the course foundation. Regardless of the course approach, Chapters 1, 2, and 3—Introduction to the Computer-Based Information System; Using Information Technology for Competitive Advantage; and Using Information Technology to Engage in Electronic Commerce—should always be covered first. They capture the essence of contemporary computer use in business.

Part Two: Current Focus in Information System Use With the foundation laid, the instructor can take the remaining parts in any order, depending on the emphasis desired. Part Two consists of two chapters: Chapter 4, Computer Use in an International Marketplace; and Chapter 5, Ethical Implications of Information Technology. These chapters can be covered in any order when an emphasis on current issues in computing is sought. Such an emphasis would be appropriate when the text is used in an introduction to computing course required of all business majors.

Part Three: Systems Theory and Methodologies This part describes the systems theory that underlies the entire field of business computing. Chapter 6, The General Systems Model of the Firm, explains business operations in systems terms. Chapter 7, The Systems Approach, provides the framework for understanding how managers and information specialists solve problems. Chapter 8, System

FIGURE P.1

Modular Organization of the Text



Life Cycle Methodologies, describes the frameworks that have been devised to guide users and information specialists in the process of systems development. This part is included in a course where the instructor recognizes the value of a solid theoretical foundation. Such an approach would be especially appropriate when the course is required of all information systems majors.

Part Four: The Computer as a Problem-Solving Tool Part Four is appropriate when the course is to include computing technology. The instructor selects such an approach when the students' previous exposure to computing has been limited primarily to personal computers and prewritten software and when students have a need for a broader foundation in technology. Chapters 9, 10, and 11—Fundamentals of Computer Processing, The Database and Database Management System, and Data Communications—provide the needed foundation.

Part Five: The Computer-Based Information System This part contains five chapters, each describing a major business computing application area. All of the areas are collectively called the *computer-based information system,* or *CBIS.* The CBIS subsystems are covered by Chapters 12–16—The Accounting Information System; The Management Information System; Decision Support Systems; The

Virtual Office; and Knowledge-Based Systems. Part Five should be included in every course approach because it provides an overview of all of the ways that the computer is being used to solve business problems.

Part Six: Organizational Information Systems This part expands on the management information system chapter to describe how the MIS concept has been applied to subsets of the organization. Chapter 17, Executive Information Systems, explains computer use at the top organizational level. The other chapters explain computer use in five major functional areas: Chapter 18, Marketing Information Systems; Chapter 19, Manufacturing Information Systems; Chapter 20, Financial Information Systems; Chapter 21, Human Resources Information Systems; and Chapter 22, Information Resources Information Systems.

Chapter 22 is the concluding chapter of the text and describes the responsibilities of the chief information officer (CIO) relating to such topics as management of a global information network, information security, and information quality. This chapter prepares students majoring in information systems for management responsibility, which will begin just a few years after graduation in the form of project leadership.

This concluding part of the text, Part Six, on organizational information systems has always been one of the instructors' and students' favorites; and some or all of the chapters can be included depending on the desired emphasis.

Realistically, the text includes more material than can be covered in a single semester. This is especially true when the course includes some type of experiential activity, such as a term project or solution of case problems. The underlying philosophy of the text has always been one of allowing the instructor to "pick and choose." The instructor can assemble the ingredients to achieve just the right course emphasis.

Proven Chapter Pedagogy

Each chapter begins with Learning Objectives and an introduction, and ends with Key Terms, Key Concepts, Questions, Topics for Discussion, Problems (when appropriate), one or two Case Problems, and a Selected Bibliography. The concepts and discussion topics focus attention on the important chapter elements. The questions and problems test knowledge and allow application of the material in a creative way.

Strong Ties to the Literature

Footnotes throughout the text, combined with the end-of-chapter bibliographies, tie the material to the rich MIS literature. Many references are "classics" that have withstood the test of time. Other references shed light on applications that are just now emerging. Therefore, what is given is not only a look at the field today but an appreciation for how this point was reached, and an idea of what is to come.

A Complete Package

A complete set of materials is available that will assist students and instructors in accomplishing course objectives.

Materials to Help the Student

- **Internet Links** In the margin throughout the text are "Internet icons" that link various topics in the book to expanded information on the McLeod

website. See "New to This Edition" on page *xx* for an example of the icon and for the website address.

- **Pricing Model** The pricing model is a mathematical model that allows the student to make a set of major decisions and see the effect on a firm's profitability. The model gives first-hand experience in using the computer as a decision support system.

Materials to Help the Instructor

- **Electronic Transparencies** Color visual aids, in Microsoft PowerPoint 3.0, make it easy to supplement classroom lectures and discussions with professional graphics. The visuals include bulleted items that provide a lecture outline, plus key figures and tables from the text.
- **Instructor's Manual (IM) and Test Item File (TIF)** This edition features the IM and TIF all under one cover. The IM, written by the author, includes suggestions for designing the course and presenting the material. Each chapter is supported by answers to end-of-chapter questions and problems, and suggestions concerning the discussion topics and cases. The IM also includes suggestions for integrating the appendix material and experiential activities into the course. The test bank, written by the author, consists of true-false and multiple-choice questions, plus a 10-point miniquiz for each chapter.
- **Prentice Hall Custom Test** The computer version of the test bank includes the same questions as the paperback version, only in diskette form. The Prentice Hall Custom Test runs in Windows and enables the instructor to select questions and create customized exams.
- A video cassette covering various topics in MIS is available free to adopters.

This complete set of materials provides both students and instructors with a variety of options in terms of course support.

Acknowledgments

A Team Effort Throughout the text I frequently use the term "we." Although there is only one author, it has been a group effort. Playing key roles have been the people at Prentice Hall, among them Jo-Ann DeLuca, Senior Acquisitions Editor; Anne Graydon, Production Editor; Katherine Evancie, Managing Editor; Alana Zdinak, Manufacturing Buyer; Nancy Evans, Executive Marketing Manager; Audrey Regan, Assistant Editor; Audra Silverie and Kris King, Sales Specialists; and Marc Oliver, Editorial Assistant. Andrew G. Roney served as copy editor.

At other times when I say "we," I am including my students. Over the years I have received much constructive feedback from my students. In fact, there are several points in the book where the material has been influenced by the students' suggestions or has come directly from them. For example, the inclusion of the internal auditing input subsystem for the financial information system in Chapter 20 was suggested by Debra Dusek, a student in a summer class at Texas A & M. The end result of long-term classroom use is a text that reflects not only what students need to learn but what they recognize as being important.

Reviewers and Other Support

I also want to thank others who provided invaluable support, including the following reviewers of this edition and the last:

THIS EDITION

- Marzie Astani, Winona State University
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Even though I have received much help along the way, I alone am responsible for the manner in which the material is presented. At times, I was advised to do one thing and elected to do another. Therefore, any shortcomings are my own.

—Raymond McLeod, Jr.
College Station, Texas
July 1997

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