third edition

Accounting Information Systems and Business Organizations

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Preface

Today's professional accountant performs in a world that is dynamic and complex. Progress in information technology is being made at an increasing rate. Patterns of organizational behavior are evolving rapidly. Economic and legal considerations are having a much greater impact upon the work of accountants. All of these environmental trends require the accounting student of today to be better prepared than ever before to enter the accounting profession.

A central feature of accounting work in today's business world is the interaction of accounting professionals with information systems. As the major users of information systems in organizations, accountants must participate in their design and understand their operation. Accounting managers must measure and evaluate the performance of information systems. Internal and external auditors must assess the quality of information processing and evaluate the accuracy of information output. The major share of the work of accounting consultants is in the design, implementation, and evaluation of information systems.

To be prepared adequately for a career in the accounting profession, today's accounting student must acquire a basic knowledge of information systems and their role in the performance of the accounting function in contemporary business organizations. Fundamental to this basic knowledge are (1) an understanding of the patterns of flow of accounting data and information in business, (2) a familiarity with the tools of accounting systems work, such as flowcharting, (3) an understanding of the use of computer technology in information processing, and (4) a thorough knowledge of the principle of internal control and its application in various orga-

nizational contexts. The objective of this book is to provide students with these essential elements of preparation for an accounting career. The goal is to provide a foundation for the development of today's accounting students into tomorrow's users, auditors, and managers of information systems.

This book is intended for use in a one-semester course in accounting information systems for advanced undergraduate accounting majors and for others interested in business applications of computers. Introductory financial and managerial accounting courses are necessary prerequisites, and an introductory course in data processing that covers a computer language is helpful. The book should also serve as a useful supplement either to graduate or advanced undergraduate courses in management information systems.

Organization

The third edition has the same basic structure as the first two editions. The book is divided into four parts. Part I, consisting of four chapters, reviews several underlying concepts that are basic to an understanding of any kind of accounting information system—regardless of the technology employed. These include principles and practices of business organizations, responsibility accounting, records management, information coding, file processing, and internal control concepts and techniques.

Part II, which contains five chapters, examines contemporary information technology from an accounting perspective. The first three of these chapters introduce basic hardware and software concepts. The important techniques of systems and program flowcharting are introduced here. The last two chapters of Part II review the more advanced topics of data base management systems and real-time systems.

Part III, which encompasses six chapters, explores a variety of issues relating to the management of information technology, including systems planning, management involvement in systems, and systems selection and acquisition. Also covered in Part III are numerous techniques of systems work, including work measurement, document flowcharting, reliability analysis, feasibility studies, point scoring, PERT, and various control and auditing techniques.

Part IV, which consists of five chapters, integrates the first three parts by providing a detailed look at applications of accounting information systems in a typical business organization. This section discusses the information needs of the marketing, logistics, personnel, and finance functions in business and explains the accounting processes and data bases that help to fulfill those needs. Within each application area, manual, computerized batch processing, and real-time systems are described and contrasted.

Changes in the Third Edition

One new chapter has been added to this edition, and significant changes have been made to several of the other nineteen chapters. Many new photographs and illustrations have been incorporated. Furthermore, several new problems and cases have been added, and many others have been revised to reflect changes made in the text.

The following list summarizes by chapter the major changes that have been made in the text.

1. Chapter 1 opens with a discussion entitled "Why Study Accounting Information Systems?" in order to provide students with an initial motivation for studying the subject.
2. Chapter 2 compares and contrasts functional and divisional forms of organization structure.
3. Chapter 3 contains a new section dealing with Principles of Forms Design.
4. Chapter 4 treats the impact of the Foreign Corrupt Practices Act.
5. Chapters 5 and 6 have been completely restructured. Coverage of punched card systems has been dropped. Chapter 5 contains an expanded section on Basic Computer Concepts, and a new section on Computer Data Entry that expands upon and replaces the treatment of input devices and media formerly contained in Chapter 6. Chapter 6 contains a new section on Computer Hardware Configurations that encompasses the material on minicomputers formerly found in Chapter 5. Chapter 6 also includes coverage of microcomputers and larger computer systems. The material on systems flowcharting formerly found in both Chapters 5 and 6 has been combined and placed in Chapter 6.
6. Chapter 8 has been modified in order to make the subject of data base management more understandable to undergraduate students. A section on Putting Data Base Concepts to Work has been added that introduces the concepts of the data dictionary and the relational data base.
7. Chapter 9 contains expanded coverage of distributed processing and data communications networks.
8. Chapter 10 introduces Nolan's "Stage Hypothesis" of data processing evolution in organizations.
9. Chapter 11 includes coverage of decision support systems and computer graphics.
10. Chapter 13 describes Gantt charts as a means of planning and scheduling systems projects.
11. Chapter 14 contains an expanded treatment of controls in online systems.
12. Chapter 15 is the new chapter, entitled "Auditing of Computer-Based Information Systems." Its two largest sections deal with the review and evaluation of internal control in EDP systems and with computer-assisted auditing techniques.
13. Chapters 16–20 (formerly 15–19) now incorporate a description of the data base structure (schema) associated with each of the functional areas. Furthermore, the computerized batch processing system descriptions in each chapter have been modified to incorporate magnetic disk, rather than magnetic tape, as the primary file storage medium.

Teaching Aids

From the very beginning, my guiding objective in preparing this book has been to simplify the teaching of accounting information systems by freeing the instructor from the burden of locating, assembling, and distributing materials and enabling him or her to concentrate on classroom presentation and discussion. I view this book and the related materials available from Addison-Wesley as not just a textbook but as a teaching system. The major elements of this teaching system follow.

1. Over 200 figures containing photographs and diagrams illustrating major concepts are contained in the book.
2. Over 250 discussion questions and problems and cases suitable for assignment to students appear at the end of each chapter. These include selected items from professional examinations, such as the CPA, CIA, and CMA examinations, for those instructors who wish to expose their students to them.
3. An Instructor's Resource Guide is available to instructors who consider adoption of the book. For each chapter the guide contains (a) a one-page outline of major topics, suitable for reproduction in transparency form, (b) a brief discussion of the content and objectives of each problem, (c) guidelines for leading a discussion of each discussion question, (d) suggested solutions for each of the problems and cases, and (e) ten or more multiple-choice questions suitable for use in quizzes covering the material in the chapter. Furthermore, the solutions to the problems and cases have been paginated in a modular fashion in order to facilitate the preparation of transparencies of the solutions.
4. A bibliography is included at the back of each chapter, and footnotes have been used liberally within the text. This should help those instructors who wish to locate background material or additional readings for assignment to their students.
5. The book, *Accounting Information Systems: A Book of Readings with Cases,* by James R. Davis and me (Addison-Wesley, 1980) was prepared with the idea of supplementing this book with outside readings organized according to the same topical outline, and with more complex and comprehensive cases.

By incorporating these features, I have attempted to develop a comprehensive teaching package that will render the teaching of accounting systems courses an enjoyable experience rather than an unwelcome burden.

Acknowledgments I am indebted to numerous faculty members throughout the country who have adopted the earlier editions and who have been generous with their suggestions for improvements. Among those who have been most helpful are Professors Myles Stern of Wayne State University, Fred Davis of North Texas State University, Marshall Romney of Brigham Young University, Robert Baker of the University of South Carolina, John Wragge of the University of Florida, Howard Shapiro of Eastern Washington University, Norman Tooby of Notre-Dame de Grâce, and Norman Pendegraft of California State University, Chico.

Special thanks are extended to Jim Coaklay and David Denton, Ph.D. candidates at the University of Utah, for their assistance in preparing illustrations and problem solutions, and for other helpful suggestions.

Suggestions and comments on the text and the related materials are welcome.

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Part 1

Conceptual Foundation of Accounting Information Systems

Chapter 1

Accounting Information Systems: An Overview

Accounting information is essential to the efficient management of economic affairs. Within a business organization, accounting information is produced by a system. Most readers are probably familiar with many of the elements of such systems. These elements include journals, ledgers, and other records, as well as the people who carry out the procedures necessary to the operation of the system. And increasingly they include machines designed to relieve people of the burden of routine and repetitive tasks. The purpose of this book is to develop an understanding of these accounting information systems—the elements they contain, the ways in which they are designed, and the role they play in supplying information to those requiring it, both within the business organization and outside of it.

Why Study Accounting Information Systems?

Accounting students often ask why a course in accounting information systems is a necessary part of the accounting curriculum. Such a course is quite different in structure and content from other accounting courses, which leads students to question its relevance. However, there are several reasons why the student's knowledge of accounting is not complete without an understanding of accounting information systems.

In most other accounting courses, the student is placed in the role of an information user. It is assumed that certain information is available to the student, who will address such questions as (1) how to account for the information, (2) how to re-

port the information to managers, stockholders, taxing authorities, or other government bodies, or (3) how to audit the information. These questions are certainly relevant, but by focusing only on these, most accounting courses virtually ignore another very relevant question—Where did the information come from?

The answer is, of course, that the information used by accountants, managers, auditors, etc. is produced by an information system. This raises a number of other questions: (1) Who decides what information is relevant for a particular purpose? (2) How do they make that decision? (3) What steps are required in order to obtain the relevant information and make it available? (4) What resources (people, machines, money, etc.) are consumed in obtaining the information and making it available? (5) What is the most cost-effective way of coordinating the necessary resources to perform the required steps? (6) Is the value of the information worth the cost of producing it? (7) How can it be ensured that the information is available on a timely basis? (8) How can it be ensured that the information is accurate and reliable? These are the kinds of questions that are addressed by a course in accounting information systems. Virtually all organizations must find answers to these questions —and in most organizations the accountant plays a central role (often a dominant role) in finding these answers.

The accounting student of today may tomorrow become an auditor, accountant, manager, or management consultant. Each of these positions requires a close involvement with the information system. For example, one of the auditor's main objectives is to evaluate the accuracy of information, and one of the most common approaches used by auditors for this purpose is a detailed assessment of the reliability of the information system. The accountant—whether in industry, government, or nonprofit organizations—is likely to have a major responsibility for the evaluation of existing information systems and the design of new ones. Accountants at the managerial level are often directly responsible for the management of the information systems department. Finally, many accountants become management consultants because of the opportunity to employ more effectively their expertise in the design, evaluation, and management of information systems.

Within the past several years an ongoing revolution in information technology has continued to exert a profound effect on accounting information systems (as well as all other types of information systems). The driving force behind this revolution is, of course, the computer. In virtually all large organizations, and in many smaller ones as well, the computer is responsible for processing accounting transactions and preparing accounting reports. As computers become smaller, faster, more reliable, easier to use, and less expensive, this trend toward the computerization of accounting work will continue. This development makes it even more essential for the accounting student to understand accounting information systems, and especially the role of the computer in these systems. The organization of the future that does not use a computer to do its accounting work will be a rare exception. Therefore a course in accounting information systems that emphasizes the role of the computer is an essential element of a student's preparation for a career in accounting.

This belief is widely shared by accounting educators as well as professional accountants. For example, the following statement was issued by a joint task force

of the American Accounting Association (representing accounting educators) and the American Institute of CPAs.

> *The accounting graduate will very likely be involved in the use of the computer. Corporations are expanding their data processing applications, and CPA firms are also increasingly using computer systems in-house. (The availability of lower cost and easier to use computing equipment has accelerated this trend.)*
>
> *The accounting graduate should not start a career in awe—or fear—of a computerized accounting system. Rather, the graduate should have a good appreciation of the benefits and drawbacks of a computer system as well as a general understanding of its operation.*[1]

It is true that most undergraduate accounting and business curricula have incorporated computer education for many years. However, many prominent practicing accountants feel that the emphasis in such education has been misplaced. For example, one describes educational deficiencies of newly hired staff auditors as follows.

> *The first [deficiency] involves computer applications in business. Their [students] experience with computers has been in a problem-solving mode, using canned packages or programming rather simple mathematical problems. They seem to have very little feel for accounting transaction processing: the concepts of files, transaction updates, editing, reporting, and so forth. The second common deficiency was in flowcharting analysis and documentation, not strictly limited to computers, but emphasizing computers.*[2]

Although general coursework dealing with computers and electronic data processing is important and useful, many accounting students are still left with a gap in their knowledge of how modern information technology relates to accounting. This book is written with the intention of closing this gap and providing a more solid foundation of knowledge for future accounting graduates who will participate in the evaluation, design, audit, and management of accounting information systems.

The Role of the Accounting Information System

Virtually all organizations—from businesses and government agencies to hospitals, educational institutions, and churches—have an accounting information system. Among these groups, the accounting information systems of business organizations tend to be the most highly developed and innovative, and for this reason will be the primary focus of this book. However, many of the same concepts, techniques, and principles are equally applicable to accounting information systems in other kinds of organizations.

[1] *Committee on Accounting Education, American Accounting Association, and Computer Education Subcommittee, American Institute of Certified Public Accountants. "Inclusion of EDP in an Undergraduate Auditing Curriculum: Some Possible Approaches,"* The Accounting Review *49 (October 1971), p. 863.*

[2] *Michael R. Moore, "Undergraduate Computer Curriculum Requirements for Entering Staff in Accounting and Auditing," in* Education for Expanding Computer Curriculums, *edited by Daniel L. Sweeney (New York: American Institute of Certified Public Accountants, Inc., 1976), p. 7.*