

会计学
影印系列

Accounting Information Systems

Essential Concepts and Applications

会计信息系统

核心概念与应用 第4版

[美] 威尔金森(Wilkinson) 塞如洛(Cerullo) 拉文尔(Raval)

王安威(Wong-On-Wing)/著



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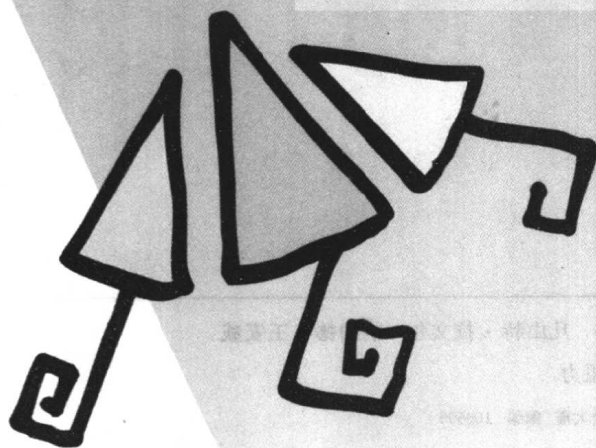
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会计信息系统 (第4版)

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To Sharon, Jenny, Prafulla, and Laura

序

随着世界经济一体化进程的加快，会计信息作为国际通用商业语言的功能越来越强化。在中国加入WTO之后，中国经济正以更快的速度融入世界经济大潮之中。与此相适应，中国的会计标准必将进一步向国际标准靠拢。举世公认，由于多方面的原因，在会计标准国际化的过程中，美国的公认会计准则（GAAP）是最具影响力的。因此，更多地了解美国的GAAP，对于推动我国会计改革的进一步深化、加速中国会计标准的国际化，具有很重要的意义。在此背景下，中信出版社引进美国著名出版社出版的有重大影响的英文原版会计教科书，是一件很有意义的事情。

这套英文教科书，内容全面，架构完备，既包括基本的会计学原理、财务会计和管理会计，也包括高层次的专题会计、财务报告和报表分析。其中，《会计学原理》、《财务会计》、《管理会计》和《中级会计》的作者均是美国久负盛名的会计学教授，无论杰里·J·韦安特博士、唐纳德·E·基索博士，还是保罗·D·金梅尔博士、特里·D·沃菲尔德博士，在美国会计学界都具有重大影响和权威性。他们都是美国会计协会、美国注册会计师协会的成员，并曾服务于财务会计准则委员会（FASB）的重要部门，对于GAAP的修订及改革发展具有相当的影响。这些书是他们总结多年教学经验和专业研究经验精心编写而成，一经出版便备受瞩目和欢迎，并且已经成为美国高校会计教学中的必选书籍。尤其是《中级会计》一书，自1965年首次出版，至今已出版到第10版，每个版本都受到热烈欢迎，目前的第10版不仅增加了光盘，更增加了网上相关辅导和练习，使其成为更加完善的教学用书。

另外，《高级会计》、《会计信息系统》、《国际会计与跨国企业》和《财务会计理论与分析》等书的作者也是颇具盛名的专家权威，这些作者既有多年教学经验，又有长期实际从业经验，其编写的书籍既适合普通高校会计专业本科生学习，也适用于广大实际工作者，其中《财务会计》一书特别适合非会计专业的读者了解美国会计。

我衷心祝愿这套英文教科书的出版，能给广大读者带来便利。

戴德明

于中国人民大学宣园

PREFACE

Four experienced instructors in accounting information systems (AIS) have cooperated in preparing this textbook. Within its covers we have incorporated our strongly held views that accountants interact constantly and in varied ways with an AIS. First and foremost, they use an AIS on a daily basis in fulfilling their professional responsibilities. Accountants are also frequently called on to design an AIS. Furthermore, they are expected to evaluate systems, often with an eye toward their improvement.

This textbook recognizes that these interactions cause AIS-knowledge to be extremely relevant to the career of every accountant. It therefore has the primary mission of acquainting accounting students with all types of AIS, especially those systems that employ state-of-the-art information technology. If we have been successful, future accountants and other professionals (such as managers, analysts, and engineers) who are exposed to this textbook should enhance their professional worth. That is, they should be enabled to use, design, and evaluate AISs more effectively in varied settings and organizations. In doing so, these future accountants and related professionals are more likely to add value to their own and/or client organizations.

We have carefully reviewed the third edition of this textbook. It is our belief that this extensively revised fourth edition excels in providing comprehensive, and yet concise, coverage of all relevant and essential topics. It maintains a careful balance between conceptual frameworks underpinning AIS and realistic applications of AIS-oriented approaches and techniques. Our concern has been to emphasize the accounting nature of each particular AIS. While stressing that the goal of an AIS is to generate information for decision making and other critical uses, we detail the steps involved in capturing, processing, managing, and interpreting the underlying data. Through both the conceptual discussions and practical guided sequences, we have endeavored to be as readable as possible. We have also reduced the overall size of the textbook.

SUMMARY OF HARD-COPY CONTENTS

The fourth edition is organized into five parts. Each part incorporates a related body of knowledge that logically develops a perspective of an AIS through its key functions and components. However, we appreciate that every instructor has an individual view concerning the sequence of presenting the topics relating to an understanding of an AIS. Thus our coverage has been formed in a modular fashion to allow his or her preferred sequence to be employed easily and smoothly.

- Part I, entitled Overview of Systems, spans the first three chapters. *It introduces the basic concepts and terms that provide the foundation of accounting information systems. The first chapter clarifies the nature of an AIS and the roles of ac-*

accountants in relating to any AIS. It also has the purpose of motivating students to develop an interest in learning more about accounting information systems and to recognize that in this information age accountants are truly systems-oriented professionals. The second chapter establishes the setting of AIS within business firms and their environments. It also identifies the varied events encountered and processes performed by business firms in conducting their activities. Although students have likely been exposed to these basics, we have found it desirable to reinforce these elements in terms that will be employed throughout the textbook. The third chapter describes the enhancements in value that information technology brings to AIS. It also emphasizes the emergence of enterprisewide processing and large-scale data systems and marts. Furthermore, this chapter clarifies the nature of data communications within information systems and the varied types of computer networks that are currently employed throughout the business world, including client/server networks, local-area networks, and the Internet. Introducing such concepts and architectures at this early stage allows us to incorporate a variety of state-of-the-art applications throughout subsequent chapters in a manner that is readily understandable.

- Part II, entitled Computer Systems Functions, covers Chapters 4 through 6. It introduces and compares the data and process-oriented perspectives of AIS, as well as the vital approach known as data modeling. Chapter 4 describes the management of data in both file and data-base environments. Chapter 5 surveys the various approaches to coding and processing data within computer-based systems, as well as the steps in using data-flow diagrams and system flowcharts. It also contrasts the principal means of organizing and accessing data within files and data bases. Chapter 6 outlines the steps in developing data bases by means of the entity-relationship diagram, a data modeling approach. It contrasts the available logical data structures, with an emphasis on the relational data base.
- Part III, entitled Control Concepts and Procedures, includes Chapters 7 through 10. It surveys risk exposures, controls and security measures related to AIS, and auditing approaches. Chapter 7 focuses on risk exposures, in particular those arising from computer fraud and control problems. The chapter also discusses the internal control structure, based in part on the finding of the Treadway Commission, and the forces that led to the improvement of controls in individual organizations. Chapter 8 introduces the wide variety of general and application controls that are suitable to computer-based AIS. Chapter 9 surveys the array of security measures that are needed for physical noncomputer resources, computer hardware facilities, and data/information. In addition, it discusses planning that is critical to cope with and to recover from disasters. Chapter 10 deals with the steps in the auditing process and the principal audit approaches in computer-based systems. Appendices to these chapters expand on such topics as fraud, computer viruses, and auditing-through-the computer techniques.
- Part IV, entitled Transaction Cycles, covers Chapters 11, 12, and 13. These chapters pertain to transactions that affect the general ledger (Chapter 11) and arise from revenues (Chapter 12) and expenditures (Chapter 13) of individual firms. Each chapter opens with the objectives of the cycle and incorporates such aspects as data flows and processing, data inputs, data base, reports and other outputs, and related controls. Each chapter also examines the benefits of Web-based systems within a cycle, as well as related Web security issues. Appendices describe manual processing within the revenue and expenditure cycles, as well as details concerning the fixed assets management and cash management cycles.

- Part V, entitled Development of Information Systems, consists of a single chapter—Chapter 14. This chapter spans the entire systems development life cycle—that is, the sequence of phases that are desirable in developing a new AIS or significantly improving a current AIS. Appendices expand such related topics as fact gathering and organizing techniques, economic feasibility, systems design methodologies, network diagrams, and management of systems resources.

SUMMARY OF CD-ROM CONTENTS

In addition to the hard-copy portion of this textbook, we have added a significant quantity of information via a CD-ROM. (The CD-ROM disk is attached to the inside back cover of the textbook.) A summary of the contents of this CD-ROM is as follows:

- Four modules provide chapter-like coverage of supplementary but important topics. Module 1 discusses decision making by managers and their key information needs. It also provides an introduction to information processing support systems, such as operational support, decision support, and artificial intelligence systems. Module 2 compares decision support systems and expert systems in detail and introduces group decision support systems and neural networks. Module 3 covers the conversion cycle, including computer-integrated manufacturing systems, while module 4 details the human resource management (payroll) cycle.
- Five supplements survey the technical aspects of computer systems. Supplement 1 covers computer hardware employed in data collection, data processing, information output, and data storage. Supplement 2 discusses computer software, including programming languages, operating systems, and application programs. Supplement 3 focuses on data communications hardware, media, channel factors, and software. Supplement 4 spans microcomputer systems, ranging from hardware features to applications software packages. Supplement 5 lists relevant references, organized by the hard-copy chapters.
- Various appendices expand on the content of most of the hard-copy chapters. The content of most of these appendices has been described in conjunction with the affected chapters.

KEY CHANGES TO THE FOURTH EDITION

Two new co-authors have joined us on this edition: Vasant Raval and Bernie Wong-On-Wing. Together we have incorporated the following changes for a better learning experience:

1. Substantially reducing the total hard-copy pages and shrinking the number of chapters to 14.
2. Moving forward to Chapter 3 the material pertaining to computer networks and state-of-the-art information technology, so that meaningful examples and applications can be included in following chapters.
3. Moving much of the detailed material—for example, commercial on-line networks, computer viruses, economic feasibility computations—to chapter appendices, so that the chapters are shorter and the flow is smoother.

4. Replacing many of the questions and problems at the ends of chapters with new discussion questions and new or revised problems that are relevant to the material in the respective chapters and answerable without the need for other sources.
5. Including many new vignettes—identified by the term “Spotlighting”—to provide current illustrations of system-related applications in real-world firms.
6. Updating the coverage of topics that have become increasingly important to accountants, such as the Internet, client/server networks, and computer frauds.
7. Employing a single firm—Infoage, Inc.—as a continuing illustrative vehicle for examples throughout all chapters.

CONTINUING CHAPTER FEATURES

Each chapter includes the following learning aids:

1. A brief introductory statement of objectives and a concluding summary.
2. A variety of figures and diagrams that clarify the concepts and techniques described.
3. One or more vignettes.
4. A comprehensive set of discussion questions and problems, which may be discussed in class, assigned as homework, or employed (perhaps in modified form) as examination questions. Many of the problems are taken, with permission, from CMA and other professional examinations.
5. One or more review problems that illustrate the important points covered in the chapter.

INSTRUCTIONAL SUPPLEMENTS

Several supplements are available to facilitate the task of the instructor who adopts this textbook:

- A Solutions Manual that contains suggested answers to discussion questions and solutions to problems and cases.
- An Instructor's Resource Guide that includes guidance in teaching chapters, such as chapter outlines, and in selecting assignments. It also contains illustrative course outlines and transparency masters.
- A Test Bank, both in hard-copy form and on disk. The test bank includes essay questions as well as multiple choice questions for all chapters.
- A Web site, which contains additional materials for use by students. The Web site address is <http://www.wiley.com/college/wilkinson>.

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Four professional accounting groups have kindly permitted the use of problem materials from past professional examinations: the American Institute of Certified Public Accountants, the Institute of Management Accounting of the National Association of Accountants, the Institute of Internal Auditors, and the Society of Management Accountants of Canada.

Finally, we extend our gratitude to all those individuals and organizations who, though not specifically recognized, have contributed in various ways to rendering this a better book. Neither they nor any of the named individuals bear any responsibility for whatever errors and omissions that may appear; that responsibility rests entirely with us.

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PART I

OVERVIEW OF SYSTEMS



THE STUDY OF ACCOUNTING INFORMATION SYSTEMS

THE LEARNING OBJECTIVES FOR THIS CHAPTER ARE TO ENABLE YOU TO:

1. Appreciate the importance of information and accounting to organizations of all types, as well as the impact of information technology.
2. Understand the nature and purposes of an accounting information system, its relationship to other information systems within an organization, and the variety of users of its outputs.
3. Describe the major characteristics and functions of an accounting information system.
4. Understand the nature of information and the value it can provide to a firm.
5. Recognize the roles of accountants with respect to accounting information systems.

INTRODUCTION

You have been involved with accounting information systems most of your life. When you bought candy as a child or textbooks as a college student, you entered into accounting transactions. If you sold lemonade in an earlier time, or sold back your textbooks in a more recent time, you engaged in other types of accounting transactions. If you have received a bill from a department store or a monthly statement from a credit card organization, you have received **accounting information**. Information systems that generate such information are called accounting information systems (AISs).

We may be involved with AISs only as receivers of information. On the other hand, we may employ them to a greater degree and in a more formal manner. For instance, we could keep careful records and prepare financial statements. All transactions might be recorded on columnar paper (which we call our accounting books). From these recorded transac-

tions we might draw up statements monthly (or quarterly or yearly) that (1) compare our revenues against our expenses for the period and (2) reflect the status of what we own and what we owe as of the end of the period. (As you know, these statements are called income statements and balance sheets.) If we are interested in planning ahead, we might also prepare budgets. To maintain control over the accuracy of our bank accounts, we might prepare bank reconciliations when the bank mails us our monthly bank statements.

You may have encountered firsthand other AISs than your own. Maybe you have worked during past summers for a business organization or an enterprise (which we will henceforth call a *firm*), or maybe you are currently working part-time for a firm. If so, you have likely seen a more formal and complicated AIS than the one you may maintain for yourself. As you probably suspect, all organizations—not-for-profit institutions as well as profit-oriented business firms—must maintain

AISs. Our focus in this textbook will be on the AISs that pertain to business firms. Nevertheless, we should remember that every entity needs an AIS. As we will see, all AISs (ranging from the most simple to the most complex) exhibit the same set of essential features.

REASONS FOR STUDYING ACCOUNTING INFORMATION SYSTEMS

1. As an accountant, you will be closely involved with AISs during your entire career. Not only will you be a user of these AISs but you may possibly become a developer of such systems. Furthermore, as an auditor, you will be expected to evaluate AISs.
2. Almost all business firms have computers as integral parts of their information systems. As information has become more vital, the management of data and the preparation of needed reports have become more complex and varied functions. You need to acquire the knowledge and skills that will enable you to apply computer-based AISs in effectively achieving these functions. Otherwise, you are likely to be much less productive in employing your accounting knowledge and skills.
3. Modern-day information systems are also rapidly changing and improving. They are incorporating new developments from fields like the Internet and e-commerce, object technology, telecommunications, and control. You should be aware of these developments and others that are just emerging, since they will be increasingly common in the future. With adequate knowledge and skills concerning computer-based information systems, you should be in a position to take advantage of the opportunities they offer.

THE IMPORTANCE OF INFORMATION TO MODERN ORGANIZATIONS

Information has been critical to individuals and organizations throughout recorded history. Since the start of the agricultural and industrial ages, accounting systems have provided part of the needed information. During the agricultural age, farmers used rudimentary accounting systems to determine their costs of producing crops for sale. By comparing these costs against the revenues received in the marketplace, they ascertained how much they profited or lost from each season's crop. During the industrial age, corporations manufactured or purchased goods for sale. Although the processes they performed and the types of costs they incurred differed significantly from those encountered by farmers, they likewise compared their expenses against their revenues to measure each period's profit or loss. Their accounting systems were somewhat more sophisticated, yet most of the systems employed during the industrial age were still manually based and historically oriented.

We live in the *information age*. Today, the service sector has gained prominence in our economy. Modern business organizations function in a vastly altered environment. They must treat information as a valued resource in order to prosper. Much more information must be generated than the historical profit or loss incurred during each accounting period. A steady stream of information is needed to enable firms to make sound planning decisions and to control their operations. Firms that use information effectively can take advantage of their opportunities and thus gain ground on their competitors.

WHAT IS AN ACCOUNTING INFORMATION SYSTEM?

Although you may know a great deal about accounting, perhaps this is your first opportunity to comprehend this knowledge within the framework of AISs. We can begin by looking separately at the terms “accounting,” “information,” and “system.” Then we can compile a definition and set of purposes for the AIS.

ACCOUNTING

As you have learned from previous accounting courses, **accounting** has several facets. First, it is an information system in its own right. That is, it employs various systemic operations to generate relevant information. Among the operations that it encompasses are (1) recording economic data (data collection), (2) maintaining stored data (data maintenance), and (3) presenting quantitative information in financial terms (information generation). Figure I-1 portrays this set of operations within the accounting activity. Second, accounting is the “language of business”: it provides the means by which the key affairs of a business firm are expressed and summarized. Finally, accounting may be viewed as financial information needed for the overall functioning of an entity (such as a business firm). Certain key financial information, for instance, reflects the results of operations during accounting periods and the status of assets and equities at the ends of accounting periods. A variety of users, of whom some are within the entity and some reside outside the entity, use this information for various purposes.

INFORMATION

In the broadest sense, **information** is intelligence that is meaningful and useful to persons for whom it is intended. Information has value to firms and their managers, as we have noted, because it is necessary for making sound decisions and inducing desired actions. Much of the information needed by firms is accounting information, since it is particularly useful in meeting these needs. Accounting information is the output of AISs and is financially oriented. Among the many examples of accounting information are income statements provided to a firm’s managers, an Accounts Receivables Aging Report sent to the firm’s credit manager, and bills sent to a firm’s customers. Information in the income statements may lead the managers to make decisions concerning which expenses to reduce. An Accounts Receivable Aging Report may be used by credit and collection managers to control the receipt of cash from credit sales. Bills mailed to customers should induce them to pay the owed amounts by the stated due dates.

Usually, information is derived from the processing of data. Data are the raw

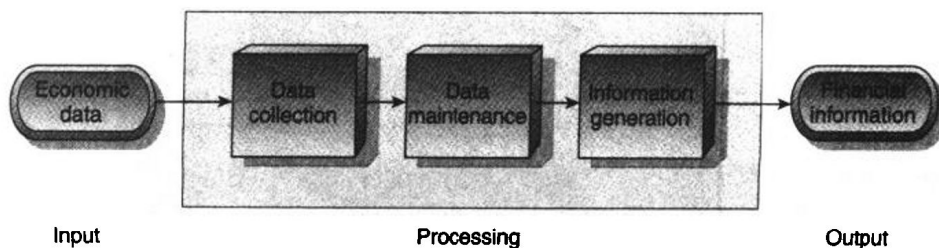


FIGURE I-1 Operations within the accounting activity.