ACCOUNTING INFORMATION SYSTEMS: A CONTROL EMPHASIS

David H. Li

Accounting Information Systems
A Control Emphasis

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To Philip,
as he enters the job market
in the Information Age

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Preface

Accounting information systems, although a relatively new academic discipline in the accounting curriculum, has received considerable attention in recent years. One important reason is probably the passage of the Foreign Corrupt Practices Act of 1977, whose accounting provisions require companies to "devise and maintain a system of internal accounting controls." This book takes the viewpoint suggested by that act; that is, it is the company's—and, by extension, the management accountant's—responsibility to *design* an accounting information system with emphasis on internal accounting controls. This viewpoint is to be contrasted with that taken in the auditing course—the view of an independent public accountant whose interest in internal accounting controls is limited to a *review* for the purpose of determining the extent of reliance in the performance of various auditing procedures.

The book is divided into five parts. Part I discusses each of the three words comprising this academic discipline—*accounting, information,* and *systems* The *process* of accounting information systems—how accounting data are captured, processed, stored, and disseminated—is discussed in Chapter 1. Information, as the *communication* aspect of accounting information systems, is covered in Chapter 2, which emphasizes such topics as top-down and bottom-up information flows, the creation of an environment for the development of accounting information systems, and the concept of responsibility accounting. Systems, as the *organization* aspect of accounting information systems,

is treated in Chapter 3; the process of systems study and the use of such system-documentation tools as flowcharts are introduced.

Part II covers accounting information systems in a manual context. To emphasize that internal accounting controls are pervasive, Chapter 4 recasts many familiar manual accounting devices in terms of their usefulness as control mechanisms. Chapters 5 through 8 discuss seven principal subsystems of accounting information systems: sales and receivables, purchases and payables, cash receipts, cash disbursements, payroll, inventory, and production. For each application, design considerations are stated in terms of control objectives, control procedures, information needs, document flow, and management reports. Chapter 9 integrates these subsystems into an accounting information system and discusses additional control considerations at the systems level.

Part III provides a transition from manual systems to computer-based systems. As a review, Chapter 10 surveys computer technology in processing accounting information: components of computer systems, data representation and data hierarchy, computer software, and current and prospective developments. Chapter 11 discusses the computer planning process and the role of systems analysis in that process, while Chapter 12 treats the computer implementation process and the role of systems analysis therein.

Accounting information systems in a computer environment are introduced in Part IV. As an overview, Chapter 13 discusses differences in control practices between manual and computer-based accounting information systems and focuses attention on controls unique to a computer environment. The next four chapters discuss the computerization of the same accounting applications presented in Part II. This parallel treatment allows an in-depth discussion on processing controls and data bases needed for each application and on reports prepared therefrom—thereby facilitating students' understanding of the process of designing accounting information systems in a computer environment. Chapter 18 concludes the systems development life cycle with a discussion on post-implementation review. It covers the entire process from planning to implementation and from operations to documentation, with emphasis again on internal accounting controls.

Part V explores new areas affecting accounting information systems and control. Cost/benefit analysis of internal accounting controls, required in the accounting provisions of the Foreign Corrupt Practices Act but not treated in other accounting information systems texts, is attempted in Chapter 19, using examples from earlier chapters in Parts II and IV. Chapter 20 explores control implications of small computers, database management systems, and distributed data processing and summarizes the role of accountants in the emerging "control community."

In this book, I assume that students are familiar with basic concepts

of financial and managerial accounting and that they have been exposed to the fundamentals of data processing. Since the design of accounting information systems must be approached from a mangement perspective, and since students of general management or of management information systems have as much at stake in the design and maintenance of accounting information systems as students of accounting, I have written this book in such a way as to make it equally meaningful to students of management or of information systems.

End-of-chapter materials, which are closely coordinated with topics presented in the text, are divided into three groups. Questions, the first group, are intended for class discussion or individual review to sharpen understanding of concepts, allow contrast of related terms, or provide clarification with specific examples; they are arranged in the general sequence as related materials are introduced in the text. Exercises, the second group, generally require responses in writing; each is introduced by a few key words following the exercise number. Particularly difficult or controversial exercises are indicated by asterisks preceding the exercise number and are elaborated upon in the solutions manual. Cases, the third group of end-of-chapter materials, are intended to allow students to test their understanding in some less-well structured situations or to appreciate the role of accounting information systems in complex real-world environments.

The increased attention to accounting information systems has been reflected in many questions in qualifying examinations of various professional organizations. As appropriate, the end-of-chapter materials have benefited from including questions that have appeared in the CPA examination (administered by the American Institute of Certified Public Accountants), the CMA examination (administered by the Institute of Management Accounting), and the CIA examination (administered by the Institute of Internal Auditors). Their consent in granting permission is gratefully acknowledged.

I also wish to acknowledge the careful review and editing done by Professor Robert N. Anthony. I am also grateful to the following professors for reviewing the manuscript and supplying valuable comments: J. L. Bookholdt, University of Houston; James G. Fox, East Carolina University; James V. Hansen, Indiana University; Frederick L. Neumann, University of Illinois; Robert L. Paretta, University of Delaware; and Ira R. Weiss, University of Houston.

This book is affectionately dedicated to my son, Philip, as he enters the job market in the Information Age, and begins his career in the corporate systems division of a major financial institution.

David H. Li

Contents

Part I ACCOUNTING INFORMATION SYSTEMS: AN OVERVIEW, 1

1. **Collecting and processing accounting information, 3**
Organizations and events: *Organizations Events affecting an organization* Collection and transmission of events through a system of human and computer resources. *System of human and computer resources Structure of human support* Processing of events in terms of accounting methodology: *Events and transactions Recording in terms of money The accounting process* Reporting of information. The relationship between accounting information systems and management information systems

2. **Reporting accounting information to management, 27**
Information and information flow. Top-down information flow: The creation of an environment for developing accounting information systems: *Organizational structure Policy statements. Performance standards* Bottom-up information flow: The concept of responsibility accounting: *Responsibility center Responsibility group Performance budget Responsibility report* Systems implications of communicating accounting information to management: *Codification of responsibility units. Accumulation of accounting information by responsibility units Conversion from responsibility reports to financial reports*

3. **Organizing accounting information into systems, 56**
System and the systems study process. Subsystems in accounting information systems *Transaction cycles as subsystems. Integration*

of subsystems The relationship between accounting information systems and management information systems *Information within and without an accounting information system. Hierarchy of information systems* Flowcharting· System description tools *Systems chart Systems flowchart Program flowchart Control flowchart Document flowchart*

Part II ACCOUNTING INFORMATION SYSTEMS IN A MANUAL CONTEXT, 81

4. Internal control in a manual context, 83

Internal control· Historical perspective and current development *Internal control: Circa 1949 Internal control 1970s and 1980s Internal control Management's interest versus auditor's responsibility* Elements of a properly coordinated system of internal control *Plan of organization Personnel policies and practices Authorization procedures Sound practices* Accounting methodology as an internal control system *Debit and credit analysis Chart of accounts Journal vouchers Trial balance Control account Special journals*

5. The subsystem analysis and development process; the sales/receivable subsystem, 104

The subsystem analysis and development process System objectives at the system and subsystem levels· *System objectives Subsystem objectives* Developing a sales/receivable subsystem *Review system and subsystem objectives Enumerate transaction types covered Identify key functions Understand existing information flow Assess adequacy of control procedures Evaluate requirements for forms and reports Prepare preliminary list of suggestions Undertake cost/benefit analysis Prepare pro forma control flowchart Write procedural descriptions Make recommendations.* Developing a sales/receivable subsystem Other transaction types *Sales-return and sales-allowance transaction types Write-off of uncollectible accounts* Forms and records used in the sales/receivable subsystem *Sales invoice Standard journal voucher Accounts receivable record Control-total report Special journals Aged accounts receivable trial balance Sales returns and allowance memo*

6. The purchases/payable subsystem, 148

Developing a purchases/payable subsystem *Transaction types and key functions Pro forma control flowchart for purchase-on-account transaction type Pro forma control flowchart for purchases of capital assets Pro forma control flowchart for purchases of services Pro forma control flowchart for purchase returns and purchase allowances* Voucher system as a control device *Voucher register Vouchering all payables Purchase discount lost One-to-one correspondence*

7. **The cash receipts, cash disbursements, and payroll subsystems, 178**

Developing a cash receipts subsystem: *Transaction types and key functions. Pro forma control flowchart for cash receipts of customers' payment on account. Pro forma control flowchart for cash receipts of customers' payment on account using a lockbox Pro forma control flowchart for cash sales.* Developing a cash disbursements subsystem. Developing a payroll subsystem.

8. **Inventory and production subsystems, 208**

Developing an inventory subsystem: *Periodic method of inventory accounting Perpetual method of inventory accounting. Differences between periodic and perpetual methods of inventory accounting Pro forma control flowchart for inventories.* Developing a production subsystem: *Scope Transaction types. Pro forma control flowchart for transferring materials to work in process Pro forma control flowchart for transferring labor to work in process. Pro forma control flowchart for accounting for overhead. Pro forma control flowchart for transferring work in process to finished goods.*

9. **A manual accounting information system, 243**

Subsystem coordination· *Books of original entry Forms. Standard journal vouchers Sources of postings to accounts* Management reports: *Monthly customer statements. Aged accounts receivable trial balance. Schedule of open vouchers by due date. Daily cash position report. Profitability analysis by product line. Financial statements.* Internal control considerations: *Management reports as internal control devices Internal auditing.* Systems study report. System implementation and post-implementation review.

Part III ACCOUNTING INFORMATION SYSTEMS AND COMPUTER TECHNOLOGY: AN OVERVIEW, 275

10. **Processing accounting information by computers, 277**

Components of a computer system: *The central processing unit. Secondary storage devices On-site input devices. Off-site input devices. On-site output devices. Off-site output devices.* Data representation and data hierarchy: *Bit. Byte. Field. Record. File. Database* Computer software: *Operating system. Utility routines. Language-translation programs. Application programs.* Current and prospective developments in information technology: *Central processing unit Continual improvements in cost/performance ratio. Input/output units· Move toward distributed data processing. Applications software· Move toward standardization of software packages.*

11. **Planning computer processing of accounting information, 296**

The computer planning process: *The computer planning committee Formulation of computer objectives Development of computer policies Appointment of a systems study group* The preliminary as-

sessement phase of the systems study process in a computer environment: *Review system objectives. Ascertain organizational and technological constraints. Perform technological feasibility study: Select processing method. Perform technological feasibility study: Determine centralization or decentralization of facilities. Formulate study premises.* The general design phase of the systems study process: *Conduct fieldwork: Preparation of interview reports. Conduct of fieldwork. Preparation of decision tables. Identify critical factors of success. Evaluate forms, flows, functions, and facilities. Identify information requirements. Consider data traceability. Formulate systems recommendations* Economic feasibility study and computer selection: *Economic feasibility study. Computer selection.*

12. **Implementing computer processing of accounting information, 321**
The computer implementation process: Preliminary considerations: *Prepare a computer implementation plan. Select computer personnel* The systems development process: Development of standards: *Select a programming language Assess the need for database processing. Initiate a data dictionary.* The systems development process: Program preparation and testing: *Review systems flowcharts and prepare program flowcharts. Assemble subroutines and write programs. Prepare test data and test programs. Convert files.* The computer implementation process: Installation-related activities: *Prepare site. Install equipment and perform acceptance test Initiate parallel operations.* The systems development process: Program documentation.

Part IV ACCOUNTING INFORMATION SYSTEMS IN A COMPUTER ENVIRONMENT, 343

13. **Internal control in a computer environment, 345**
Organizational independence in a computer environment: *Location of the computer operations group. Organization of the computer operations group. Incompatible function-pairs.* General controls and application controls: *Security controls: Physical protection of information system resources. Security controls: Backup facilities and reconstruction procedures. Hardware controls.* Input controls: *Keypunch verification and document count. Validity test· Admissible characters and field size. Validity test: Self-checking digits Validity test: Coding check. Limit check. Range check. Consistency check. Completeness check. Resubmission procedure.* Processing controls: *Limit check. Sign check. Consistency check. Crossfooting check Record count. Control total. Preventive controls and detective controls.* Output controls: *Record count. Reasonableness check Control total. User review. Secondary output control.*

14. **The sales/receivable subsystem; the inventory update program, 374**
Accounts receivable segment of the sales-on-account transaction: *Scope. Master-record format. Input considerations: The sales invoice.*

Input considerations: Other input documents Output considerations. Application controls: Accounts receivable update. Coding considerations Program flowchart: Accounts receivable update. Summary of steps· Accounts receivable update. Output format: Accounts receivable report. Application controls: Accounts receivable report. Program flowchart: Accounts receivable report. Systems flowchart: Accounts receivable. Order-entry segment of the sales-on-account transaction: *Input consideration: The sales invoice. Input consideration: The credit check. Input consideration: Stock availability. Master-record format for inventories. Program flowchart: Inventory update. Systems flowchart: Inventory update.*

15. The purchases/payable and inventory subsystems, 405

The purchase order segment of the purchase-of-inventories-on-account transaction type: *Input considerations: Purchase requisition. Master-record format: Purchase order. Input and output considerations: Purchase order. Input and output considerations: Receiving report. Inventory subsystem. Input and output considerations: Vendor's invoice. Output considerations: Vendor performance analysis. Application controls. Coding considerations. Program and systems flowcharts: Purchase order programs.* The vouchers payable segment of the purchase-of-inventories-on-account transaction type: *Master-record format: Open voucher. Input and output considerations: Voucher. Application controls and coding considerations. Program and systems flowcharts: Vouchers payable programs*

16. The cash receipts, cash disbursements, and payroll subsystems, 436

The cash disbursements subsystem: *Input consideration: Check issued. Output considerations· Check issued and open vouchers Application controls. Systems flowchart: Cash disbursements.* Cash receipts subsystem: *Input considerations: Customers' payment on account and cash sales. Output considerations: Remittance list and cash sales report. Application controls. Systems flowchart: Cash receipts.* The payroll subsystem: *Master-record format. Employee information Input considerations: Clock card. Input considerations· Earnings computation needs. Output considerations: Payroll register. Output considerations: Other reports. Application controls. Coding considerations. Program and systems flowcharts: Payroll-processing programs.*

17. The production subsystem; a computer-based accounting information system, 466

The materials accounting segment of the production subsystem: *Input considerations: Production order requisition. Master-record format: Bill of materials. Input considerations: Production order. Output considerations: Materials requisition slip. Processing considerations· Materials requisition processing file. Input and output considerations: Other materials requisition slips. Input and output considerations: Materials requisition reports. Master-record format:*

Production order cost sheet. Systems flowchart: Materials accounting segment of the production subsystem. Control considerations. Internal transactions. The labor accounting segment of the production subsystem: *Master-record format: Operations list. Input considerations: Job ticket. Processing considerations· Labor cost by job ticket. Output considerations: Report of labor cost by production order number. Processing considerations: Labor cost summary by production order number. Systems flowchart: Labor accounting segment of the production subsystem.* The work in process inventory segment of the production subsystem: *Input considerations: Overhead application rates. Input considerations: Work in process completion report. Output considerations: Production order cost sheet Output considerations: Summary of production orders completed. Processing considerations: Finished goods inventory processing file. Output considerations: Work in process inventory reports at month-end. Output considerations: Management reports. Systems flowchart: Work in process inventory segment of the production subsystem.* A computer-based accounting information system: *Coordination of subsystems. Summary of summary reports. Need for other subsystems. Review of implementation and monitoring of controls*

18. **Post-installation review of computer-based accounting information systems, 503**
Post-implementation review and computer operations review: *Post-implementation review: Completion of the systems development life cycle. Post-implementation review: Feedback to computer planning. Computer operations review: Feedback to computer planning. Scope and frequency of post-installation review. Responsibility for post-installation review. Post-implementation review of the systems study and feasibility study processes.* Post-implementation review of the development process: *Evaluation of performance. Evaluation of documentation.* Post-installation review of the computer operations group: *Evaluation of cost savings. Review of computer utilization. Evaluation of departmental organization.* Post-installation review of internal accounting controls: *Review of general controls. Review of input controls: Data-entry operations and document count. Review of input controls: Validity tests and other checks. Review of processing controls: Use of audit software package. Review of processing controls: Use of snapshot technique. Review of output controls. Review of security controls.* Post-implementation review of control documentation.

Part V ACCOUNTING INFORMATION SYSTEMS AND CONTROL, 539

19. **Cost/benefit analysis of internal accounting controls, 541**
The concept of reasonable assurances. The concept and procedure of cost/benefit analysis: *The concept of benefits and costs. Steps in cost/benefit analyses.* Cost/benefit analysis of controls in sales/receivable subsystem. Cost/benefit analysis of controls in manual systems. Cost/benefit analysis of controls in computerized systems.

20. Accounting information systems and control: A summary, 560

Control implications of small computers: *Lack of organizational independence. Lack of programming documentation. Control over access to terminals and to computer resources. Control over processing documentation. Other controls.* Control implications of database management systems: *Data are integrated. Data format becomes program independent Data contents are shared. Control through database administrator. Control through physical and resource access.* Control implications of distributed processing: *Economic feasibility of distributed processing. Role of the central computer. Location of the database. Encryption of data transmission.* Accounting information systems and control: A summary

Index, 581

PART I

Accounting information systems: An overview

1

Collecting and processing accounting information

The study of accounting information systems concerns events affecting an organization that are (1) collected and transmitted through that organization's *system* of human and computer resources, (2) processed in terms of *accounting* methodology and requirements, and (3) reported as *information* for use by members of that organization. Various key words in the above sentence are discussed in this chapter to serve as an overview of this book.

ORGANIZATIONS AND EVENTS

Organizations

Every organization has an accounting information system—whether it is intended for profit or not for profit, or structured as a proprietorship, partnership, corporation, foundation, or even a household. While the degree of complexity of each organization's accounting information system differs, each system is similar in structure (a system of human and computer resources), process (the use of accounting methodology), and purpose (the provision of information).

To facilitate the development of our subject, the type of organization we use as an example in Parts II and IV of this book is a profit-seeking, publicly owned corporation engaged in the manufacturing and mer-

chandising of goods. This type of organization is used because the structure, process, and purpose of the accounting information system in such an organization are likely to be the most complex. Examples from other types of organizations, of course, will be drawn upon when appropriate.

Events affecting an organization

The events that affect an organization comprise its environment. For a profit-seeking manufacturing company, the environment in which it operates is made up of economic, social, political, regulatory, and other miscellaneous events. The events to be collected (and subsequently transmitted, processed, and reported) in an organization's accounting information system, as we shall see later in this chapter, depend upon (1) the scope of its accounting information system and (2) the nature of events.

COLLECTION AND TRANSMISSION OF EVENTS THROUGH A SYSTEM OF HUMAN AND COMPUTER RESOURCES

System of human and computer resources

Events, assuming that they are to be collected, are collected (and subsequently transmitted, processed, and reported) through a system of human and computer resources. When the use of human resources is dominant, the system is generally known as a *manual system.* When the use of computer and other capital resources is dominant, the system is generally known as a *computer-based system.*

This book first discusses the collection, transmission, processing, and reporting of events in the context of a manual system. This is necessary to allow us to examine and understand the elements in a manual system adequately, particularly in terms of their control requirements. Having gained this understanding, the reader is prepared for the discussion that follows on the collection, transmission, processing, and reporting of events in a computer environment.

Why do we study manual systems when the trend is clearly moving toward computer-based systems? In a manner of speaking, this is comparable to studying architectural masterpieces in an era of, say, all-glass contemporary buildings. Controls (or, in the case of architecture, aesthetics) must be incorporated whether a structure is classic or ultramodern; work flow (or, in the case of architecture, people flow) must be considered whether a design is intended for human or mechanical locomotion.