Table of Contents

Part I Overview of Accounting Information Systems  1

Chapter 1 The Information System: An Accountant’s Perspective  2

   The Information Environment  3
      What Is a System?  4
      An Information Systems Framework  6
      AIS Subsystems  9
      A General Model for AIS  10
      Acquisition of Information Systems  15

   Organizational Structure  16
      Business Segments  16
      Functional Segmentation  17
      The Accounting Function  20
      The Information Technology Function  21

   The Evolution of Information System Models  26
      The Manual Process Model  26
      The Flat-File Model  27
      The Database Model  29
      The REA Model  31
      Enterprise Resource Planning Systems  34

   The Role of the Accountant  34
      Accountants as Users  35
      Accountants as System Designers  35
      Accountants as System Auditors  36

   Summary  37

Chapter 2 Introduction to Transaction Processing  44

   An Overview of Transaction Processing  45
      Transaction Cycles  45
      The Expenditure Cycle  45
      The Conversion Cycle  46
      The Revenue Cycle  47

   Accounting Records  47
      Manual Systems  47
      The Audit Trail  54
      Computer-Based Systems  55

   Documentation Techniques  57
      Data Flow Diagrams and Entity Relationship Diagrams  58
**Computer-Based Accounting Systems** 188  
Automating Sales Order Processing with Batch Technology 188  
Keystroke 191  
Edit Run 191  
Update Procedures 191  
Reengineering Sales Order Processing with Real-Time Technology 193  
Transaction Processing Procedures 194  
General Ledger Update Procedures 194  
Advantages of Real-Time Processing 195  
Automated Cash Receipts Procedures 195  
Reengineered Cash Receipts Procedures 197  
Point-of-Sale (POS) Systems 197  
Daily Procedures 198  
End-of-Day Procedures 199  
Reengineering Using EDI 200  
Reengineering Using the Internet 200  
Control Considerations for Computer-Based Systems 201  

**PC-Based Accounting Systems** 203  
PC Control Issues 204  
Summary 204  
Appendix 205

**Chapter 5**  
**The Expenditure Cycle Part I: Purchases and Cash Disbursements Procedures** 234  

**The Conceptual System** 235  
Overview of Purchases and Cash Disbursements Activities 235  
The Cash Disbursements Systems 243  
Expenditure Cycle Controls 245  

**Physical Systems** 249  
A Manual System 249  
The Cash Disbursements Systems 251  

**Computer-Based Purchases and Cash Disbursements Applications** 252  
Automating Purchases Procedures Using Batch Processing Technology 253  
Cash Disbursements Procedures 258
Chapter 6  The Expenditure Cycle Part II: Payroll Processing and Fixed Asset Procedures  285

The Conceptual Payroll System  286
Payroll Controls  294
The Physical Payroll System  296
Manual Payroll System  297
Computer-Based Payroll Systems  298
Automating the Payroll System Using Batch Processing  298
Reengineering the Payroll System  298
The Conceptual Fixed Asset System  301
The Logic of a Fixed Asset System  302
The Physical Fixed Asset System  305
Computer-Based Fixed Asset System  305
Controlling the Fixed Asset System  307
Summary  310

Chapter 7  The Conversion Cycle  332

The Traditional Manufacturing Environment  333
Batch Processing System  334
Controls in the Traditional Environment  344
World-Class Companies and Lean Manufacturing  347
What Is a World-Class Company?  348
Principles of Lean Manufacturing  348
Techniques and Technologies that Promote Lean Manufacturing  350
Physical Reorganization of the Production Facilities  350
Automation of the Manufacturing Process  350
Table of Contents

Accounting in a Lean Manufacturing Environment 355

What's Wrong with Traditional Accounting Information? 355
Activity-Based Costing (ABC) 356
Value Stream Accounting 358

Information Systems that Support Lean Manufacturing 360

Materials Requirement Planning (MRP) 360
Manufacturing Resource Planning (MRP II) 360
Enterprise Resource Planning (ERP) Systems 363

Summary 364

Chapter 8 Financial Reporting and Management Reporting Systems 381

Data Coding Schemes 382
A System without Codes 382
A System with Codes 383
Numeric and Alphabetic Coding Schemes 383

The General Ledger System 387
The Journal Voucher 387
The GLS Database 388
GLS Procedures 389

The Financial Reporting System 389
Sophisticated Users with Homogeneous Information Needs 389
Financial Reporting Procedures 389

Controlling the FRS 391
CONOSAS 78 Control Issues 392

The Management Reporting System 394
Factors that Influence the MRS 394
Management Principles 395
Management Function, Level, and Decision Type 398
Problem Structure 401
Types of Management Reports 403
Responsibility Accounting 405
Behavioral Considerations 409

Summary 412
Part III  Advanced Technologies in Accounting Information  429

Chapter 9  Database Management Systems  430

Overview of the Flat-File vs. Database Approach  431
- Data Storage  431
- Data Updating  431
- Currency of Information  431
- Task-Data Dependency  431
- The Database Approach  432
- Flat-File Problems Solved  432
- Controlling Access to the Database  433
- The Database Management System  433
- Three Conceptual Models  434

Elements of the Database Environment  434
- Users  435
- Database Management System  436
- Database Administrator  438
- The Physical Database  441

The Relational Database Model  442
- Relational Database Concepts  443
- Anomalies, Structural Dependencies, and Data Normalization  447

Designing Relational Databases  454
- Identify Entities  455
- Construct a Data Model Showing Entity Associations  457
- Add Primary Keys and Attributes to the Model  458
- Normalize Data Model and Add Foreign Keys  459
- Construct the Physical Database  460
- Prepare the User Views  463
- Global View Integration  464

Databases in a Distributed Environment  464
- Centralized Databases  464
- Distributed Databases  466

Summary  470

Appendix  471
Table of Contents

Chapter 10 The REA Approach to Database Modeling 496

The REA Approach 497
The REA Model 497
Developing an REA Model 501
Differences between ER and REA Diagrams 501
View Modeling: Creating an Individual REA Diagram 502
View Integration: Creating an Enterprise-Wide REA Model 509
Step 1. Consolidate the Individual Models 510
Step 2. Define Primary Keys, Foreign Keys, and Attributes 513
Step 3. Construct Physical Database and Produce User Views 516
REA and Value Chain Analysis 520
REA Compromises in Practice 521
Summary 521

Chapter 11 Enterprise Resource Planning Systems 528

What Is an ERP? 529
ERP Core Applications 531
Online Analytical Processing 531
ERP System Configurations 532
Server Configurations 532
OLTP Versus OLAP Servers 532
Database Configuration 535
Bolt-on Software 535
Data Warehousing 537
Modeling Data for the Data Warehouse 537
Extracting Data from Operational Databases 538
Cleansing Extracted Data 540
Transforming Data into the Warehouse Model 540
Loading the Data into the Data Warehouse Database 541
Decisions Supported by the Data Warehouse 542
Supporting Supply Chain Decisions from the Data Warehouse 542
Risks Associated with ERP Implementation 543
Big Bang Versus Phased-in Implementation 544
Opposition to Changes in the Business’s Culture 544
Choosing the Wrong ERP 545
Choosing the Wrong Consultant 546
High Cost and Cost Overruns 547
Disruptions to Operations 548
Implications for Internal Control and Auditing 549
Transaction Authorization 549
Segregation of Duties 549
Supervision 549
Accounting Records 550
Access Controls 550
Auditing the Data Warehouse 551
Summary 552
Appendix 553

Chapter 12 Electronic Commerce Systems 563
Intra-Organizational Networks and EDI 564
Internet Commerce 564
Internet Technologies 564
Protocols 567
Internet Protocols 569
Benefits from Internet Commerce 577
Risks Associated with Electronic Commerce 578
Intranet Risks 580
Internet Risks 581
Risks to Consumers 581
Security, Assurance, and Trust 587
Encryption 588
Digital Authentication 588
Firewalls 590
Seals of Assurance 591
Implications for the Accounting Profession 592
Privacy Violation 593
Audit Implications of XBRL 594
Continuous Auditing 594
Electronic Audit Trails 594
Chapter 14  Construct, Deliver, and Maintain Systems

Project 659

In-House Systems Development 660
Tools for Improving Systems Development 660

Construct the System 664
The Structured Design Approach 664
The Object-Oriented Design Approach 667
System Design 669
Data Modeling, Conceptual Views, and
Normalized Tables 670
Design Physical User Views 670
Design the System Process 677
Design System Controls 681
Perform a System Design Walk-Through 681
Program Application Software 682
Software Testing 683

Deliver the System 684
Testing the Entire System 684
Documenting the System 685
Converting the Databases 687
Converting to the New System 688
Post-Implementation Review 689
The Role of Accountants 690

Commercial Packages 691
Trends in Commercial Packages 691
Advantages of Commercial Packages 693
Disadvantages of Commercial Packages 693
Choosing a Package 693
Part V  Computer Controls and Auditing  723

Chapter 15  IT Controls Part I: Sarbanes-Oxley and IT Governance  724

Overview of Sections 302 and 404 of SOX  725
Relationship between IT Controls and Financial Reporting  725
Audit Implications of Sections 302 and 404  726

IT Governance Controls  728
Organizational Structure Controls  728
Segregation of Duties within the Centralized Firm  729
The Distributed Model  731
Creating a Corporate IT Function  732
Audit Objectives Relating to Organizational Structure  734
Audit Procedures Relating to Organizational Structure  734

Computer Center Security and Controls  734
Computer Center Controls  735

Disaster Recovery Planning  737
Providing Second-Site Backup  738
Identifying Critical Applications  739
Performing Backup and Off-Site Storage Procedures  740
Creating a Disaster Recovery Team  740
Testing the DRP  740
Audit Objective: Assessing Disaster Recovery Planning  741
Audit Procedures for Assessing Disaster Recovery Planning  741

Summary  742
Appendix  743
Chapter 16  IT Controls Part II: Security and Access  759

Controlling the Operating System  760
  Operating System Objectives  760
  Operating System Security  760
  Threats to Operating System Integrity  761
  Operating System Controls and Test of Controls  762

Controlling Database Management Systems  767
  Access Controls  767
  Backup Controls  770

Controlling Networks  771
  Controlling Risks from Subversive Threats  771
  Controlling Risks from Equipment Failure  780

Electronic Data Interchange (EDI) Controls  782
  Transaction Authorization and Validation  783
  Access Control  783
  EDI Audit Trail  783

Summary  785

Appendix  786

Chapter 17  IT Controls Part III: Systems Development, Program Changes, and Application Controls  797

Systems Development Controls  798
  Controlling Systems Development Activities  798
  Controlling Program Change Activities  800
  Source Program Library Controls  801
  The Worst-Case Situation: No Controls  802
  A Controlled SPL Environment  802

Application Controls  806
  Input Controls  806
  Processing Controls  809
  Output Controls  812

Testing Computer Application Controls  815
  Black Box Approach  815
  White Box Approach  816
  White Box Testing Techniques  818
# Table of Contents

- The Integrated Test Facility 822
- Parallel Simulation 823
- Substantive Testing Techniques 824
  - The Embedded Audit Module 825
  - Generalized Audit Software (GAS) 826
- Summary 830

- Glossary G-1
- Index I-1