CONTENTS

Preface xvii

Chapter 1 Managing IT in a Digital World 1

Recent Information Technology Trends 2

Computer Hardware: Faster, Cheaper, Mobile 2

Computer Software: Integrated, Downloadable, Social 2

Computer Networks: High Bandwidth, Wireless, Cloudy 4

New Ways to Compete 4

New Ways to Work 5

Managing IT in Organizations 5

Managing IT Resources 5

IT Leadership Roles 7

The Topics and Organization of This Textbook 8

Review Questions 9 • Discussion Questions 9 • Bibliography 9

CASE STUDY 1 Midsouth Chamber of Commerce (A): The Role of the Operating Manager in Information Systems 10

PART I Information Technology 17

Chapter 2 Computer Systems 19

Basic Components of Computer Systems 20

Underlying Structure 20

Input/Output 20

Computer Memory 21

Arithmetic/Logical Unit 23

Computer Files 23

Control Unit 25

The Stored-Program Concept 25

Types of Computer Systems 28

Microcomputers 29

Midrange Systems 30

Mainframe Computers 33

Supercomputers 34

Key Types of Software 34

Applications Software 36

An Example of an Application Product 37

Personal Productivity Software 38

Support Software 41

The Operating System 41

Language Translators 43
Chapter 3  Telecommunications and Networking  60

The Need for Networking  61
  Sharing of Technology Resources  61
  Sharing of Data  61
  Distributed Data Processing and Client/Server Systems  62
  Enhanced Communications  62
  Marketing Outreach  62

An Overview of Telecommunications and Networking  62

Key Elements of Telecommunications and Networking  63
  Analog and Digital Signals  63
  Speed of Transmission  64
  Types of Transmission Lines  65
  Transmission Media  65
  Topology of Networks  70
  Types of Networks  72
  Network Protocols  86

The Exploding Role of Telecommunications and Networking  88
  Online Operations  88
  Connectivity  89
  Electronic Data Interchange and Electronic Commerce  89
  Marketing  89

The Telecommunications Industry  90

Chapter 4  The Data Resource  95

Why Manage Data?  96

Technical Aspects of Managing the Data Resource  97
  The Data Model and Metadata  97
  Data Modeling  98
  Database Programming  100
PART II  Applying Information Technology  187

Chapter 5  Enterprise Systems  189
  Application Areas  189
  Critical Concepts  191
    Batch Processing versus Online Processing  191
    Functional Information Systems  192
    Vertical Integration of Systems  192
    Distributed Systems  192
    Client/Server Systems  193
    Virtualization  194
    Service-Oriented Architecture and Web Services  194
  Transaction Processing Systems  196
    Payroll System  196
    Order Entry System  196
  Enterprise Resource Planning Systems  198
    An Example ERP System: SAP ERP  199
  Data Warehousing  201
  Customer Relationship Management Systems  204
  Office Automation  206
    Videoconferencing  207
    Electronic Mail  208
  Groupware and Collaboration  209
    An Example Groupware System: Lotus Notes  210
Intranets and Portals 213
Factory Automation 215
Engineering Systems 216
Manufacturing Administration 216
Factory Operations 217
Robotics 217
Supply Chain Management Systems 217
Review Questions 219 • Discussion Questions 220 • Bibliography 220

Chapter 6  Managerial Support Systems 223
Decision Support Systems 223
Data Mining 224
Group Support Systems 228
Geographic Information Systems 229
  Business Adopts Geographic Technologies 230
  What’s Behind Geographic Technologies 231
  Issues for Information Systems Organizations 232
Executive Information Systems/Business Intelligence Systems 234
Knowledge Management Systems 237
  Two Recent KMS Initiatives within a Pharmaceutical Firm 239
  KMS Success 240
Artificial Intelligence 241
Expert Systems 241
  Obtaining an Expert System 242
  Examples of Expert Systems 242
Neural Networks 244
Virtual Reality 245
  Review Questions 250 • Discussion Questions 250 • Bibliography 251

Chapter 7  E-Business Systems 253
Brief History of the Internet 254
  E-Business Technologies 254
  Legal and Regulatory Environment 257
Strategic E-Business Opportunities (and Threats) 259
B2B Applications 260
B2C Applications 263
  Two Dot-Com Retailers 264
  Two Traditional Catalog Retailers 266
  Two Traditional Store Retailers 267
Summary: B2C Retailing 268
PART III Acquiring Information Systems 327

Chapter 8 Basic Systems Concepts and Tools 329

The Systems View 329
What Is a System? 330
Seven Key System Elements 330
Organizations as Systems 334
Systems Analysis and Design 335
Business Processes 336
Identifying Business Processes 336
Business Process Redesign 336
Processes and Techniques to Develop Information Systems 339
The Information Systems Development Life Cycle 339
Structured Techniques for Life-Cycle Development 340
Procedural-Oriented Techniques 341
Techniques for the As-Is Model 343
Techniques for the Logical To-Be Model 344
Techniques for Documenting the Physical To-Be System 348
Object-Oriented Techniques 351
Core Object-Oriented Concepts 351
Summary of Processes and Techniques to Develop Information Systems 353
Chapter 9 Methodologies for Custom Software Development 361

Systems Development Life Cycle Methodology 361
The SDLC Steps 362
Initiating New Systems Projects 363
Definition Phase 363
Construction Phase 365
Implementation Phase 366
The SDLC Project Team 370
Managing an SDLC Project 371
SDLC Advantages and Disadvantages 371

Prototyping Methodology 373
The Prototyping Steps 373
The Prototyping Project Team 375
Managing a Prototyping Project 375
Prototyping Advantages and Disadvantages 375
Prototyping Within an SDLC Process 376

Newer Approaches 377
Rapid Application Development (RAD) 377
Agile Methodologies 378
Managing Software Projects Using Outsourced Staff 381

Supporting User Application Development (UAD) 382
Advantages and Disadvantages of User-Developed Applications 382
Assessing the Risks from UAD 384
Guidelines for User Developers 385

Chapter 10 Methodologies for Purchased Software Packages 390

The Make-or-Buy Decision 391
Purchasing Methodology 391
The Purchasing Steps 392
Project Team for Purchasing Packages 400
Managing a Purchased System Project 401
Purchasing Advantages and Disadvantages 402
Special Case: Enterprise System Packages 403
Open Source Software 405
New Purchasing Option: Application Service Providers (ASPs) 406
Review Questions 408 • Discussion Questions 408 • Bibliography 409

Chapter 11 IT Project Management 410
IT Portfolio Management 411
Project Management Roles 412
  Project Manager 412
  Project Sponsor and Champion Roles 413
Project Initiation 415
Project Planning 416
  Scheduling 416
  Budgeting 417
  Staffing 418
  Planning Documents 420
  Project Execution and Control 420
  Managing Project Risks 423
  Managing Business Change 424
Project Closing 426
Special Issue: Managing Complex IT Projects 427
Special Issue: Managing Virtual Teams 427
  Review Questions 430 • Discussion Questions 430 • Bibliography 431

► CASE STUDY III-1 Managing a Systems Development Project at Consumer and Industrial Products, Inc. 432
► CASE STUDY III-2 A Make-or-Buy Decision at Baxter Manufacturing Company 442
► CASE STUDY III-3 ERP Purchase Decision at Benton Manufacturing Company, Inc. 449
► CASE STUDY III-4 The Kuali Financial System: An Open-Source Project 455
► CASE STUDY III-5 NIBCO’s “Big Bang”: An SAP Implementation 468
► CASE STUDY III-6 BAT Taiwan: Implementing SAP for a Strategic Transition 484
► CASE STUDY III-7 A Troubled Project at Modern Materials, Inc. 498
► CASE STUDY III-8 Purchasing and Implementing a Student Management System at Jefferson County School System 506

PART IV The Information Management System 517

Chapter 12 Planning Information Systems Resources 519
Benefits of Information Resources Planning 519
  Creating a Context for IS Resource Decisions 520
  Aligning IS and Business Goals 520
Chapter 15 Social, Ethical, and Legal Issues 575

The Legal Environment 575
Ethics Frameworks 576
  Identifying Ethical Problems 576
  Analyzing Ethical Problems 577
Social Issues 578
Privacy 579
  Privacy Problems 579
  E-Commerce Privacy Concerns 580
  Workplace Privacy 581
  Ethics of Invasion of Privacy 582
  Laws on Privacy 582
Identity Theft 583
  Impact of Identity Theft 584
  Laws on Identity Theft 585
Intellectual Property Rights 585
  Software Piracy 586
  Copyright Protection 586
  Patent Protection 586
  Digital Entertainment Piracy 587
  Internet File Sharing 587
  Ethical Questions 589
Other Social Issues 589
  Access to the Technology 589
  Freedom of Speech 590
  Hazards of Inaccuracy 590
  Impact on Workers 590
The Future 591
  Review Questions 591 • Discussion Questions 592 • Bibliography 592
CASE STUDY IV-1  The Clarion School for Boys, Inc.—Milwaukee Division: Making Information Systems Investments  594

CASE STUDY IV-2  FastTrack IT Integration for the Sallie Mae Merger  611

CASE STUDY IV-3  IT Infrastructure Outsourcing at Schaeffer (A): The Outsourcing Decision  628

CASE STUDY IV-4  IT Infrastructure Outsourcing at Schaeffer (B): Managing the Contract  634

CASE STUDY IV-5  Systems Support for a New Baxter Manufacturing Company Plant in Mexico  642

CASE STUDY IV-6  The Challenges of Local System Design for Multinationals: The MaxFli Sales Force Automation System at BAT  647

CASE STUDY IV-7  Meridian Hospital Systems, Inc.: Deciding Which IT Company to Join  660

CASE STUDY IV-8  Mary Morrison’s Ethical Issue  666

Glossary  668

Index  691