

### INFORMATION SYSTEMS MANAGEMENT IN PRACTICE

SEVENTH EDITION

BARBARA C. MCNURLIN RALPH H. SPRAGUE, JR.

# Brief Contents

ricinee AAI	
CHAPTER 1	The Importance of Information Systems Management 1
PART I LEADERSHIP ISSUE	S 47
CHAPTER 2	The Top IS Job 49
	Strategic Uses of Information Technology 99
	nformation Systems Planning 134
Part I Discussion Case: What I'l	Strategy Would You Recommend Based on Royal hell Group's Scenarios? 169
PART II MANAGING THE E	SSENTIAL TECHNOLOGIES 177
CHAPTER 5 I	Distributed Systems: The Overall Architecture 179
CHAPTER 6 M	Managing Telecommunications 227
CHAPTER 7	Managing Information Resources 263
CHAPTER 8	Managing Operations 298
Part II Discussion Case: Manag	ing Information Security on a Shoestring Budget 350
PART III MANAGING SYSTI	EM DEVELOPMENT 369
CHAPTER 9	Technologies for Developing Systems 371
	Management Issues in System Development 402
Part III Discussion Case: A Dre	am Project Turns Nightmare:
	Flawless Software Never Got Implemented 445
PART IV SYSTEMS FOR SUF	PPORTING KNOWLEDGE-BASED WORK 461
CHAPTER 11 S	Supporting Decision Making 463
	Supporting Collaboration 498
	Supporting Knowledge Work 529
	should Lego Protect Its Trademark, Operating System, pplications? 562
PART V THINKING AHEAD	565
CHAPTER 14 T	he Challenges Ahead 567
Glossary 609	
Index 623	

## Contents

Preface

	CHAPTER 1 THE IMPORTANCE OF INFORMATION SYSTEMS MANAGEMENT 1
	Introduction 1  Themes of This Book 2  Management of IS 3
	A Little History 4 The Organizational Environment 5 The External Business Environment 5 The Internal Organizational Environment 7 Goals of the New Work Environment 10
	The Technology Environment 12  Hardware Trends 12  Software Trends 12  Data Trends 13  Communications Trends 14
	The Mission of IS Organizations 15 A Simple Model 16 A Better Model 17 The Technologies 17 The Users 18 System Development and Delivery 19
	IS Management 19 Organization of This Book 20 Case Example: MeadWestvaco Corporation 21 Questions and Exercises 44 References 45
PART I:	LEADERSHIP ISSUES 47 CHAPTER 2 THE TOP IS JOB 49
	Where Is the IS Organization Headed? 50  The Escalating Benefits of IT 50  Case Example: The SABRE System 52

Traditional Functions Are Being Nibbled Away 53 New Roles Are Emerging 54 Toward IS Lite 58 Case Example: LifeScan 60	
The CIO's Responsibilities 62	
CIO Roles in Three Eras 62	
Leading: Creating a Vision by Understanding the Business 65	
Case Example: BP 69 Case Example: Aetna Life and Casualty 73 Governing: Establishing an IS Governance	
Structure 75	
Case Example: Duke Energy International 78 Investing: Shaping the IT Portfolio 79	
Case Example: Wal-Mart Versus Kmart 81	
Case Example: AXA Financial 82	
Managing: Establishing Credibility and Fostering	
Change 89	
Case Example: Rexam 92	
The Office of the CIO? 95	
Whither CIOs? 95	
Conclusion 96	
Questions and Exercises 96	
References 97	
APTER 3 STRATEGIC USES OF INFORMATION TECHNOLOGY 99	,
Introduction 100	
History of Strategic Uses of IT 100 Whither the Internet Revolution? 101 The Cheap Revolution 103	
Episode Two: Profitability Strikes Back 103	
Case Example: Grainger 104	
Does IT Still Matter? 105	
Working Inward: Business-to-Employee 107	
Building an Intranet 108	
Case Example: GE Power Systems 109	
Fostering a Sense of Belonging 110	
Case Example: Wire Nova Scotia 111	
Working Outward: Business-to-Customer 113	
Tiber and Dustiness to Customer 113	
Jumping to a New Experience Curve 113	
Jumping to a New Experience Curve 113 Case Example: The Shipping Industry 114	
Jumping to a New Experience Curve 113 Case Example: The Shipping Industry 114 Case Example: Cisco Systems and UPS Supply Chain	
Jumping to a New Experience Curve 113 Case Example: The Shipping Industry 114 Case Example: Cisco Systems and UPS Supply Chain Solutions 116	
Jumping to a New Experience Curve 113 Case Example: The Shipping Industry 114 Case Example: Cisco Systems and UPS Supply Chain Solutions 116 The Emergence of Electronic Tenders 117	
Jumping to a New Experience Curve 113 Case Example: The Shipping Industry 114 Case Example: Cisco Systems and UPS Supply Chain Solutions 116	

Being an Online Customer 121 Case Example: A Day in the Life of an E-lancer 121
Working Assess During Day
Coordinating with Cosuppliers 123  Case Example: General Mills and Land O' Lakes 12  Establishing Close and Tight Relationships 124  Case Example: Sara Lee Bakery Group 126  Becoming a Customer-Centric Value Chain 128  Case Example: Dell 129  Getting Back-End Systems in Shape 130
Conclusion 131
Questions and Exercises 131
References 133
CHAPTER 4 INFORMATION SYSTEMS PLANNING 134
Introduction 134
Why Planning Is So Difficult 135
The Changing World of Planning 137  Traditional Strategy Making 137  Today's Sense-and-Respond Approach 139  Case Example: Microsoft 140  Case Example: Skandia Future Centers 141  Case Example: Shell Oil 143
Seven Planning Techniques 145
Stages of Growth 146 Critical Success Factors 147 Competitive Forces Model 148 Framework Example; Five Forces Analysis of the Internet 150 Value Chain Analysis 152
Case Example: An Automobile Manufacturer 154 E-Business Value Matrix 155 Case Example: Cisco Systems 157 Linkage Analysis Planning 158
Case Example: Electric Power Research Institute 160 Scenario Planning 162 Case Example: Scenarios on the Future of IS Management 163
Conclusion 166
Questions and Exercises 167
References 168
Part I Discussion Case: What IT Strategy Would You Recommend Based on Royal Dutch/Shell Group's

Scenarios? 169

PART II:	MANAGING THE ESSENTIAL TECHNOLOGIES 177
	CHAPTER 5 DISTRIBUTED SYSTEMS: THE OVERALL ARCHITECTURE 179
	Introduction 180  Four Attributes of Distributed Systems 181 When to Distribute Computing Responsibilities 183 Two Guiding Frameworks 184
	Seven Types of Distributed Systems 188  Host-Based Hierarchy 188  Decentralized Stand-Alone Systems 189  Peer-to-Peer LAN-Based Systems 190  Hybrid Enterprisewide Systems 190  Case Example: Northwest Airlines 192  Client-Server Systems 195  Case Example: An Aerospace Company 197  Internet-Based Computing 200  Case Example: Chubb & Son Insurance Company 201  Case Example: The SABRE Group 202  Case Example: 31 203  Web Services 204  Case Example: General Motors 207
	Defining the Overall IT Architecture 208  An Enterprise Architecture Framework 209  Case Example: FMC Corporation 212  Case Example: The SABRE System 214  The Coming Architecture: Service-Oriented Architecture 215  Case Example: Credit Suisse 216
	The Importance of the IT Infrastructure 218  The Structure of the IT Infrastructure 218  Three Views of Infrastructure 221  Case Example: City of Sunnyvale, California 222
	Conclusion 224 Questions and Exercises 224 References 225
	CHAPTER 6 MANAGING TELECOMMUNICATIONS 227
	Introduction 227 The Evolving Telecommunications Scene 228  A New Telecommunications Infrastructure Is Being Built 228 The Telecommunications Industry Is Being Transformed 229 Case Example: ICG Communications 231

The Internet Is the Network of Choice

Case Example: XYZ Company

233

the state of the s	/ 11
Case Example: National Semiconductor 236	
Digital Convergence Has Become a Reality 237	
Case Example: Toronto Pearson International Airport	239
The OSI Reference Model Underlies Today's Networks	24
The Rate of Change Is Accelerating 243	**
The Control E 1978 B 11 B 1 11 B	244
The Wireless Century Begins 245	
Case Example: BMW 248	
Case Example: Louisville Metro Sewer District 251	
Case Example: American Greetings 253	
Messaging Is a Killer App 256	
Case Example: Keebler 257	
Coming: An Internet of Things 258	
The Role of the IS Department 259	
Conclusion 260	
Questions and Exercises 260	
References 261	
PTER 7 MANAGING INFORMATION	
RESOURCES 263	
Introduction 263	
Managing Data 265	
The Three-Level Database Model 265	
Four Data Models 265	
Getting Corporate Data into Shape 268	
Case Example: Monsanto 270	
Managing Information 272	

#### Four Types of Information 273 Data Warehouses Case Example: Owens & Minor 277 Document Management Case Example: HICSS Personal Proceedings 282 Case Example: Tapiola Insurance Group 283 Case Example: Tennessee Valley Authority 286 Content Management 287 Case Example: Eastman Chemical Company 290 Case Example: Groove Networks

Conclusion 295
Questions and Exercises 295
References 296

#### CHAPTER 8 MANAGING OPERATIONS 298

Introduction 299
What Are Operations? 300
Why Talk About Operations? 300
Solving Operational Problems 300
Operational Measures 300

	The Importance of Good Management 301 What's New in Operations? 301 Case Example: Microsoft 303
	Outsourcing IS Functions 304
	The Driving Forces Behind Outsourcing 304 Changing Customer–Vendor Relationships 304 Outsourcing's History 306
	Case Example: ANZ Banking Group Ltd. 309 Case Example: Mobil Travel Guide 312 Managing Outsourcing 313
	Case Example: Eastman Kodak Company 313 Case Example: Honda Motor Company 317 Offshoring 318 Case Example: Exult 321
	Information Security 326
	The Threats 326 Case Example: Credit Card Fraud 329 Security's Five Pillars 331 Management Countermeasures 332 Case Example: An Internet Services Company 334 Technical Countermeasures 336 Case Example: Plymouth Rock Assurance
	Corporation 339
	Planning for Business Continuity 340  Using Internal Resources 341  Using External Resources 343  Case Example: Household International 344
	Conclusion 347 Questions and Exercises 347 References 348
Part II Discu	ssion Case: Managing Information Security on a Shoestring Budget 350
PART III:	MANAGING SYSTEM DEVELOPMENT 369
	CHAPTER 9 TECHNOLOGIES FOR DEVELOPING SYSTEMS 371
	Introduction 371
	Foundations of System Development 372
	Structured Development 373 Fourth-Generation Languages 374 Software Prototyping 375
	Computer-Aided Software Engineering 375 Case Example: DuPont Cable Management Services 376 Object-Oriented Development 378 Client-Server Computing 379 Case Example: MGM 379

System Integration 381	
ERP Systems 382	
Case Example: Colgate-Palmolive 383 Middleware 384	
Case Example: A Telecommunications Firm 385	
Internacional and Control Park	
Discussion Case: How Should ExxonMobil Leverage Its IT Asset? 386	
Case Example: Hong Kong Exchanges and Clearing	388
Internet-Based Systems 391	
Application Servers 391	
Java 392	
Web Services 393	
Case Example: Building a Web Service 394	
Case Example: Bekins 396	
Conclusion 399	
Questions and Exercises 399	
References 400	
CHAPTER 10 MANAGEMENT ISSUES IN SYST	EM
DEVELOPMENT 402	
Introduction 403	
Project Management 404	
What Is Project Management? 404	
The Job of a Project Manager 405	
Case Example: A Day in the Life	
of an IT Project Manager 408	
Change Management 413	
Case Example: The BOC Group 414	
Risk Management 417	
Case Example: Dow Corning 420 Tips for Good IT Project Management 420	
Tips for Good IT Project Management 422	
Improving Legacy Systems 424	
To Replace or Not to Replace? 424	
Options for Improving a Legacy System 424	
Case Example: GTE Directories 427	
Case Example: Amazon.com 430	
Case Example: Toyota Motor Sales 431	
Case Example: Wachovia 434	
Measuring the Benefits of Systems 435	
Distinguish Between the Different	
Roles of Systems 436	
Measure What Is Important to Management 437	
Assess Investments Across Organizational Levels 438	
Case Example: A Trucking Company 438  Do Investors Value IT Investments? 440	
Do Investors Value IT Investments? 440	

Conclusion	441	
Questions and	Exercises	442
References	443	

Part III Discussion Case: A Dream Project Turns Nightmare: How Flawless Software Never Got Implemented 445

#### PART IV: SYSTEMS FOR SUPPORTING KNOWLEDGE-BASED WORK 461

#### CHAPTER 11 SUPPORTING DECISION MAKING 463

Introduction 463

Case Example: A Problem-Solving Scenario 464

Technologies That Support

Decision Making 465

Decision Support Systems 466

Case Example: Ore-Ida Foods 468

Case Example: A Major Services Company 469

Data Mining 470

Case Example: Harrah's Entertainment 470

Executive Information Systems 472

Case Example: Xerox Corporation 473

Case Example: General Electric 476

Expert Systems 477

Case Example: American Express 480
Agent-Based Modeling 482

#### Toward the Real-Time Enterprise 483

Enterprise Nervous Systems Case Example: Delta Air Lines 485 Straight-Through Processing 486 Real-Time CRM 486 Case Example: A Real-Time Interaction on a Web Site Communicating Objects 488 Vigilant Information Systems 490 Case Example: Western Digital 491 The Dark Side of Real Time

Conclusion 495 Questions and Exercises 495 References 496

#### CHAPTER 12 SUPPORTING COLLABORATION 498

Introduction 498
Teams: The Basis of Organizations 499

Understanding Groups 500	
Characteristics of Groups 500	
Types of Groups 501	
Communities of Practice 503	
Case Example: DaimlerChrysler 503	
Network Armies 505	
Case Example: The Open Source Movement 506	
Systems to Support Collaboration 508	
Supporting "Same Time/Same Place" Collaboration	510
Case Example: Burr-Brown Corporation 512	
Supporting "Same Time/Same Place" Presentations	
and Discussions 515	
Case Example: HICSS 516	
Supporting "Different-Place" Collaboration 518	
Case Example: Boeing-Rocketdyne 519	
Managing Collaboration in Virtual Organizations	523
Motivating a Virtual Workforce 524	
Governing Virtual Organizations 524	
Conclusion 526	
Questions and Exercises 526	
References 527	
321	
APTER 13 SUPPORTING KNOWLEDGE	
Introduction 529	
Companies Want to Manage Knowledge 530	
A Model for Managing Knowledge 531	
Building Human Capital 532	
Case Example: Buckman Laboratories 533	
Case Example: BP 536	
Building Structural Capital 537	
Case Example: A Pharmaceutical Company 537	
Case Example: Skandia Future Centers 539	
Case Example: A U.S. Energy Company 540	
Building Customer Capital 541	
Case Example: A North American Bank 542	
The Cultural Side of Knowledge Management 543 Case Example: Partners HealthCare System 546	
Intellectual Capital Issues 548	
Value Issues 548	
Usage Issues 549	
Sharing Issues 549	
The Vast Arena of Computer Ethics 550	
A Little History 551	
1111	
What Is Computer Ethics? 551	

Information Privacy 553
Intellectual Property Rights 555
Legal Jurisdiction 556
Online Contracting 557
Case Example: Clickwrap Agreements

Conclusion 559
Questions and Exercises 560
References 561

Part IV Discussion Case: How Should Lego Protect Its Trademark, Operating System, and Applications? 562

### PART V: THINKING AHEAD 565 CHAPTER 14 THE CHALLENGES AHEAD 567

Organizing Principles 568
The Learning Organization 568
Processes Rather Than Functions 570
Case Example: NYNEX 571
Case Example: A Football Team 572
Communities Rather Than Groups 573
Case Example: National Semiconductor
Virtual Rather Than Physical 575
Case Example: Sun Microsystems 575

Case Example: Sun Microsystems 575
Self-Organizing Rather Than Designed 575
Case Example: Cemex 577
Case Example: Semco, S. A. 578
Adaptable Rather Than Stable 580
Case Example: Capital One 581
Distributed Rather Than Centralized 582

Understanding a Networked World 584

The Internet Mindset 584
Where's the Value in a Network? 586
The Rules of Networks 589

Moving Forward 593

Understanding Users 593
Increasing Executives' Understanding of IT 596
Case Example: MIT's IT for the Non-IT Executive
Program 600
Educating IS About the Business 602
Case Example: SIM's Strategic Business
Leaders Program 604

574

Conclusion 606

Questions and Exercises 606

References 607

Glossary 609

Index 623