

Management Information Systems



Raymond McLeod, Jr

E I G H T H E D I T I O N

George Schell

Table of Contents

Preface xxxiii

PRRTI THE COMPUTER HS FIH OHGHHIZHTIOHHL IMFDRMITIONH SVSTEM 1

Chapter 1	Introduction to the Computer-Based Information System	2
	Introduction	3
	Information Management	3
	<i>Main Types of Resources</i>	3
	<i>Management of the Resources</i>	3
	<i>How Information Is Managed</i>	4
	Interest in Information Management	4
	<i>Increasing Complexity of Business Activity</i>	4
	<i>Improved Computer Capabilities</i>	4
	Who are the Information Users?	5
	<i>Where Managers Are Found</i>	5
	<i>What Managers Do</i>	6
	<i>Management Skills</i>	8
	<i>Management Knowledge</i>	8
	The Manager and Systems	9
	<i>What Is a System?</i>	9
	<i>System Elements</i>	9
	<i>Open-Loop and Closed-Loop Systems</i>	9
	<i>Open Systems and Closed Systems</i>	10
	<i>What Is a Subsystem?</i>	10
	<i>What Is a Supersystem?</i>	10
	<i>The Business System</i>	11
	<i>Physical Systems and Conceptual Systems</i>	11
	<i>The Importance of a Systems View</i>	12
	Data Versus Information	12
	The Evolution of Computer-Based Information Systems	12
	<i>The Initial Focus on Data</i>	12
	<i>The New Focus on Information</i>	12
	<i>The Revised Focus on Decision Support</i>	13
	<i>The Current Focus on Communication</i>	13

	<i>The Potential Focus on Consultation</i>	13
	A Model of a Computer-Based Information System	14
	An Example of a Management Information System	14
	The Information Services Organization	16
	<i>Information Specialists</i>	16
	The Trend to End-User Computing	17
	<i>What Stimulated End-User Computing?</i>	17
	<i>The Role of Information Specialists in End-User Computing (EUC)</i>	18
	Justifying the CBIS	18
	Achieving the CBIS	19
	Reengineering the CBIS	19
	Managing the CBIS	20
	Putting the CBIS in Context	20
	Highlight's ill NIS - How a CIO Sees the CBIS	22
	SUMMARY	21
	KEY TERMS	23
	KEY CONCEPTS	23
	QUESTIONS	23
	TOPICS FOR DISCUSSION	24
	PROBLEMS	24
	COSe Problem - Freeway Ford	24
Chapter 2	Using Information Technology For Competitive Advantage	26
	Introduction	27
	The Firm in Its Environment	27
	<i>The Eight Environmental Elements</i>	27
	<i>Environmental Resource Flows</i>	28
	Competitive Advantage	28
	<i>Porter's Value Chains</i>	28
	<i>Expanding the Scope of the Value Chain</i>	29
	What Are the Information Resources?	30
	<i>Types of Information Resources</i>	30
	Who Manages the Information Resources?	30
	<i>The Chief Information Officer</i>	31
	The Increasing Complexity of Information Management	31
	Strategic Planning	31
	Strategic Planning for the Enterprise	31
	Highlight's in HIS — Information Technology at Federal Express	32
	<i>Strategic Planning for Business Areas</i>	32
	Strategic Planning for Information Resources	32
	<i>Strategy Set Transformation</i>	33

	<i>The SPIR Approach</i>	33
	<i>Content of a Strategic Plan for Information Resources</i>	33
	<i>End-User Computing as a Strategic Issue</i>	35
	<i>Levels of End-User Capability</i>	35
	<i>Benefits of End-User Computing</i>	36
	<i>Risks of End-User Computing</i>	36
	<i>The Information Resources Management Concept</i>	37
	<i>Required IRM Elements</i>	37
	<i>The IRM Model</i>	37
	SUMMARY	39
	KEY TERMS	39
	KEY CONCEPTS	40
	QUESTIONS	40
	TOPICS AND DISCUSSION	40
	PROBLEMS	40
	CISE Profile "" Water Equipment Technology Company of Mexico	41
Chapter 3	Using Information Technology to Engage in Electronic Commerce	42
	<i>Introduction</i>	43
	<i>Electronic Commerce</i>	43
	<i>Anticipated Benefits from Electronic Commerce</i>	44
	<i>Electronic Commerce Constraints</i>	44
	<i>The Pathway to Electronic Commerce</i>	44
	<i>Business Intelligence</i>	45
	<i>Basic Intelligence Tasks</i>	45
	<i>External Databases</i>	46
	<i>Search Engines</i>	47
	<i>Electronic Commerce Strategy</i>	47
	<i>The Interorganizational System (IOS)</i>	47
	<i>IOS Benefits</i>	48
	<i>Electronic Data Interchange (EDI)</i>	49
	<i>Typical EDI Linkages</i>	49
	<i>Vendor Stock Replenishment</i>	49
	<i>Electronic Funds Transfer</i>	49
	<i>EDI Standards</i>	50
	<i>Degree of EDI Implementation</i>	50
	<i>Proactive and Reactive Business Partners</i>	51
	<i>Adoption Influences</i>	51
	<i>EDI Benefits</i>	52
	<i>A Challenge to EDI</i>	53
	<i>Electronic Commerce Technology</i>	53
	<i>Technology Choices</i>	53

	Evolution of the Internet	54
	<i>ARPANET</i>	54
	<i>The World Wide Web</i>	54
	<i>World Wide Web Terminology</i>	55
	Cyberspace and the Information Superhighway	56
	An Internet Model	57
	Internet Standards	57
	Internet Security	58
	Highlights in MIS - Traffic Cop of the Internet	59
	Business Applications of the Internet	59
	<i>Marketing Research</i>	60
	Highlights in MIS - The Name Game	61
	<i>Competitive Intelligence</i>	61
	Retailing Applications	61
	Suggestions for Successful Internet Use	62
	Future Impact of the Internet on Business	63
	<i>SUMMARY</i>	63
	<i>KEY TERMS</i>	64
	<i>KEY CONCEPTS</i>	64
	<i>QUESTIONS</i>	65
	<i>TOPICS AND DISCUSSION</i>	65
	<i>PROBLEMS</i>	65
	Case Problem - The Office Works	66
Chapter 4	Computer Use in an International Marketplace	68
	Introduction	69
	The Multinational Corporation	69
	<i>The Special Need for Information Processing in an MNC</i>	69
	<i>Types of MNC Organizational Structure</i>	69
	The Special Need for Coordination in an MNC	70
	<i>The Advantages of Coordination</i>	70
	Global Business Strategies	71
	<i>Multinational Strategy</i>	71
	<i>Global Strategy</i>	71
	<i>International Strategy</i>	72
	<i>Transnational Strategy</i>	72
	Global Business Drivers	73
	Problems in Implementing Global Information Systems	74
	<i>Politically Imposed Constraints</i>	74
	<i>Technological Problems</i>	74
	<i>Lack of Support from Subsidiary Managers</i>	74
	GIS Implementation Strategies	75

<i>A Transnational Strategy for GIS Implementation</i>	75
<i>Computing Around the World</i>	77
<i>Group Support Systems in Africa</i>	77
<i>A Strategic Decision Support System in Switzerland</i>	79
<i>Putting International Computer Use in Perspective</i>	80
<i>Highlights in MIS - Special Training from Hell</i>	80
<i>SUMMARY</i>	80
<i>KEY TERMS</i>	81
<i>KEY CONCEPTS</i>	81
<i>QUESTIONS</i>	81
<i>TOPICS FOR DISCUSSION</i>	81
<i>PROBLEM</i>	82

Case Problem - Athens Computer Sales and Service 82

Chapter 5 Ethical Implications of Information Technology 84

<i>Introduction</i>	85
<i>Morals, Ethics, and the Law</i>	85
<i>What Are Morals?</i>	85
<i>What Are Ethics?</i>	85
<i>What Are Laws?</i>	85
<i>Putting Morals, Ethics, and Laws in Perspective</i>	86
<i>The Need for an Ethics Culture</i>	86
<i>How the Ethical Culture Is Imposed</i>	86
<i>Putting the Credos, Programs, and Codes in Perspective</i>	88
<i>Ethics and Information Services</i>	88
<i>What is Computer Ethics?</i>	88
<i>Reasons for the Importance of Computer Ethics</i>	88
<i>Social Rights and the Computer</i>	89
<i>Rights to the Computer</i>	89
<i>Rights to Information</i>	90
<i>The Social Contract of Information Services</i>	90
<i>Ethics and the CIO</i>	91
<i>Perceptions of the CIO's Ethics</i>	91
<i>An Action Plan for Achieving an Ethical Computer Operation</i>	92
<i>The Information Services Standards of Conduct</i>	93
<i>Putting Computer Ethics in Perspective</i>	93
<i>Highlights in MIS - Applying a Marketing Ethical Decision-Making Theory to Information Systems</i>	95
<i>SUMMARY</i>	94
<i>KEY TERMS</i>	96
<i>KEY CONCEPTS</i>	96
<i>QUESTIONS</i>	97
<i>TOPICS FOR DISCUSSION</i>	97
<i>PROBLEM</i>	97
<i>Case Problem - The Pet Store AG</i>	96

PRRTII SYSTEMS METHODOLOGIES 99

Chapter 6	Systems Concepts	100
	Introduction	101
	Models	101
	<i>Types of Models</i>	101
	<i>Uses of Models</i>	102
	The General Systems Model	103
	<i>The Physical System</i>	103
	<i>The Conceptual System</i>	104
	The Environment	110
	<i>Putting the General Systems Model in Context</i>	110
	<i>Problem Solving</i>	110
	Highlights in MIS - Applying Systems Theory to Everything	111
	<i>Decision Making and Problem Solving</i>	111
	<i>Elements of a Problem-Solving Process</i>	112
	<i>Problems Versus Symptoms</i>	112
	<i>Problem Structure</i>	113
	The Systems Approach	113
	<i>A Series of Steps</i>	114
	Preparation Effort	114
	<i>Step One—View the Firm as a System</i>	114
	<i>Step Two—Recognize the Environmental System</i>	114
	<i>Step Three—Identify the Firm's Subsystems</i>	114
	Definition Effort	115
	<i>Step Four—Proceed from a System to a Subsystem Level</i>	115
	<i>Step Five—Analyze System Parts in a Certain Sequence</i>	115
	Solution Effort	117
	<i>Step Six—Identify Alternative Solutions</i>	117
	<i>Step Seven—Evaluate the Alternative Solutions</i>	117
	<i>Step Eight—Select the Best Solution</i>	117
	<i>Step Nine—Implement the Solution</i>	117
	<i>Step Ten—Follow Up to Ensure that the Solution is Effective</i>	117
	Review of the Systems Approach	118
	SUMMARY	119
	KEY TERMS	119
	KEY CONCEPTS	119
	QUESTIONS	121
	TOPICS FOR DISCUSSION	121
	PROBLEMS	121
	Case Problem - Bargain City	120

Chapter 7	System Life Cycle Methodologies	122
	Introduction	123
	The System Life Cycle	123
	<i>Life Cycle Phases</i>	123
	<i>Life Cycle Management</i>	123
	<i>Project Leadership</i>	124
	The Planning Phase	125
	<i>Benefits from Planning the CBIS Project</i>	125
	Steps of the Planning Phase	125
	1. <i>Recognize The Problem</i>	125
	2. <i>Define the Problem</i>	125
	3. <i>Set System Objectives</i>	125
	4. <i>Identify System Constraints</i>	125
	5. <i>Conduct a Feasibility Study</i>	126
	6. <i>Prepare a System Study Proposal</i>	127
	7. <i>Approve or Disapprove the Study Project</i>	127
	8. <i>Establish a Control Mechanism</i>	127
	The Analysis Phase	128
	1. <i>Announce the System Study</i>	128
	2. <i>Organize the Project Team</i>	129
	3. <i>Define Information Needs</i>	129
	4. <i>Define System Performance Criteria</i>	129
	5. <i>Prepare the Design Proposal</i>	130
	6. <i>Approve or Disapprove the Design Project</i>	130
	The Design Phase	130
	1. <i>Prepare the Detailed System Design</i>	130
	2. <i>Identify Alternative System Configurations</i>	131
	3. <i>Evaluate Alternative System Configurations</i>	132
	4. <i>Select the Best Configuration</i>	132
	5. <i>Prepare the Implementation Proposal</i>	132
	6. <i>Approve or Disapprove the System Implementation</i>	132
	The Implementation Phase	133
	7. <i>Plan the Implementation</i>	134
	2. <i>Announce the Implementation</i>	134
	3. <i>Obtain the Hardware Resources</i>	134
	4. <i>Obtain the Software Resources</i>	136
	5. <i>Prepare the Database</i>	136
	6. <i>Prepare the Physical Facilities</i>	136

- 7. *Educate the Participants and Users* 136
- 8. *Prepare the Cutover Proposal* 137
- 9. *Approve or Disapprove Cutover to the New System* 137
- 10. *Cutover to the New System* 137

Highlights in MIS - The Time Must be Right for Cutover 137

Applying the Systems Approach 13s

The Use Phase 138

- 7. *Use the System* 138
- 2. *Audit the System* 138
- 3. *Maintain the System* 138
- 4. *Prepare Reengineering Proposal* 139
- 5. *Approve or Disapprove the Reengineering System* 139

Putting the System Life Cycle in Perspective 140

Prototyping 140

Types of Prototypes 140

Prototyping and the System Development Life Cycle 142

The Attraction of Prototyping 142

Potential Pitfalls of Prototyping 143

Applications That Are Good Prospects for Prototyping 143

Rapid Application Development 143

The Essential Ingredients of RAD 143

Business Process Redesign 144

Reverse Engineering 144

Restructuring 145 »

Reengineering 145

Selection of the BPR Components 145

Putting SLC, Prototyping, RAD, and BPR in Perspective 146

SUMMARY 147 *KEY TERMS* 148 *KEY CONCEPTS* 148

QUESTIONS 148 *TOPICS FOR DISCUSSION* 149

PROBLEMS 149

Case Problem - Epic Publications 149

PRRTIII THE COMPUTER HS II PROBLEM-SOLVING TOOL 1ST

Chapter 8 Fundamentals of Computer Processing 152

Introduction 153

Computing History 153

Early Mainframe Computers 153

Smaller Computers 154

	<i>Early Computer Applications</i>	154
	Computer Hardware	155
	Processors	155
	Memory	156
	Highlights in MIS	157
	Replanning the Systems Approach	157
	Storage	158
	Input Devices	161
	Output Devices	162
	Multimedia	163
	Keeping Abreast of Hardware Change	164
	Software	164
	System Software	164
	Application Software	166
	Prewritten Application Software	166
	Custom Application Software	167
	The Role of User-Friendly Software	167
	Keeping Abreast of Software Change	167
	SUMMARY	168
	KEY TERMS	169
	KEY CONCEPTS	169
	QUESTIONS	169
	TOPICS FOR DISCUSSION	169
	PROBLEMS	170
	Case Problem - The Bed Cellar	170
Chapter 9	The Database and Database Management System	172
	Introduction	173
	Data Organization	173
	Folders	173
	Organizing Data on Computer Resources	175
	The Spreadsheet as a Simple Database	177
	Flat Files	177
	Key Fields	178
	Database Structure	178
	Hierarchical Database Structures	178
	Network Database Structures	179
	Relational Database Structures	179
	A Relational Database Example	179
	The Database Concept	181
	The Evolution of Database Software	183
	Creating a Database	184

TABLE OF CONTENTS

<i>Determine the Data Needs</i>	184
<i>Describe the Data</i>	185
flipping the Systems Approach	185
<i>Enter the Data</i>	188
<i>Use the Database</i>	188
<i>On-Line Analytical Processing</i>	189
A Model of Database Management System	189
The Database Administrator	190
Knowledge Discovery in Databases	191
<i>Data Warehousing</i>	191
<i>The Data Mart</i>	191
<i>Data Mining</i>	191
<i>The KDD Process</i>	192
<i>Database Management Systems in Perspective</i>	192
Highlights in MIS - It Can Be Healthy to Mine the Corporate Database	193
<i>DBMS Advantages</i>	193
<i>DBMS Disadvantages</i>	193
SUMMARY	194
KEY TERMS	195
KEY CONCEPTS	195
QUESTIONS	195
TOPICS FOR DISCUSSION	195
PROBLEMS	196
Case Problem - Maple Tree Industries	196
~ Blue Bell Plastic Manufacturing Company	197
Chapter 10 Data Communications	198
Introduction	199
Communication Basics	199
<i>Protocols for Computer Communication</i>	199
<i>Packets</i>	201
<i>Network Addresses</i>	201
<i>The Evolution in Protocols for Public Telephone Systems</i>	202
flipping the Systems Approach	203
Networks	203
<i>Local Area Networks</i>	204
<i>Metropolitan Area Networks</i>	205
<i>Wide Area Networks</i>	205
<i>Internet</i>	205
Control of Data Communications Networks	206
<i>Centralized Control</i>	206

<i>Distributed Processing</i>	207
<i>Client/Server Processing</i>	207
Communications Hardware	208
<i>Modem</i>	208
<i>Hub</i>	209
<i>Router</i>	209
<i>Switch</i>	209
Communications Connections	209
<i>Private Line</i>	210
<i>Virtual Private Network</i>	210
Network Management	210
Highlights in MIS - Mobile Computing	211
<i>Network Planning</i>	212
<i>Network Control</i>	212
<i>The Network Manager</i>	212
SUMMARY	212
KEY TERMS	213
KEY CONCEPTS	213
QUESTIONS	214
TOPICS FOR DISCUSSION	215
PROBLEMS	215
Case Problem - Special Salmon	214

PIT IV THE COMPUTER-BRSEOINFORNRTHO SYSTEM 217

Chapter 11	The Accounting Information System	218
	Introduction	219
	What Is Data Processing?	219
	The Accounting Information System	219
	Data Processing Tasks	219
	<i>Data Gathering</i>	219
	<i>Data Manipulation</i>	219
	<i>Data Storage</i>	220
	<i>Document Preparation</i>	220
	Characteristics of the Accounting Information System	220
	A Sample Accounting Information System	221
	System Overview	221
	The Major Subsystems of the Distribution System	222
	<i>Systems That Fill Customer Orders</i>	222
	<i>Systems That Order Replenishment Stock</i>	223
	<i>Systems That Perform General Ledger Processes</i>	224
	Fill Customer Orders	225

TABLE OF CONTENTS

	7.7 Order Entry	225
	1.2 Inventory	226
	1.3 Billing	227
	1.4 Accounts Receivable	228
	Order Replenishment Stock	228
	2.1 Purchasing	229
	2.2 Receiving	230
	2.3 Accounts Payable	231
	The Role of the Accounting Information Systems in Problem Solving	232
	Highlights in MIS - Order Your Dell Computer on the Internet	233
	flipping the Systems Approach	235
	SUMMARY	233
	KEY TERMS	234
	KEY CONCEPTS	235
	QUESTIONS	235
	TOPICS FOR DISCUSSION	237
	PROBLEMS	237
	Case Problem - Interstate Hydraulic Manufacturing Co.	236
Chapter 12	The Management Information System	238
	Introduction	239
	What Is an MIS?	239
	Early MIS Efforts	239
	A Definition of MIS	239
	An MIS Model	240
	The Concept of Organizational Information Subsystems	240
	Highlights in MIS - Dearden Was Right: The Early MIS Was a Mirage	241
	Report Writing Software	242
	Incorporating Management by Exception into Reports	242
	Mathematical Modeling	245
	Static or Dynamic Models	245
	Probabilistic or Deterministic Models	245
	Optimizing or Suboptimizing Models	245
	Simulation	245
	The Modeling Scenario	245
	Decision Variables	245
	Simulation Technique	246
	Format of Simulation Output	246
	A Modeling Example	247

	<i>Model Input</i>	247
	<i>Model Output</i>	247
	Modeling Advantages and Disadvantages	248
	Graphical Output	250
	<i>When to Use Graphs</i>	250
	<i>Which Graphs to Use</i>	251
	The MIS and Human Factors Considerations	252
	<i>Fear as the Underlying Human Factors Consideration</i>	252
	Applying the Systems Approach	253
	Putting the MIS in Perspective	253
	The MIS and Problem Solving	253
	<i>SUMMARY</i>	<i>254</i>
	<i>KEY TERMS</i>	<i>255</i>
	<i>KEY CONCEPTS</i>	<i>255</i>
	<i>QUESTIONS</i>	<i>255</i>
	<i>TOPICS FOR DISCUSSION</i>	<i>257</i>
	<i>PROBLEMS</i>	<i>257</i>
	Case Problem - Racine Paper Products	256
Chapter 13	Decision Support Systems	258
	Introduction	259
	Decision Making	259
	<i>Simon's Types of Decisions</i>	<i>259</i>
	<i>Simon's Phases of Problem Solving</i>	<i>259</i>
	The DSS Concept	260
	<i>The Term DSS Is Coined</i>	<i>260</i>
	<i>Alter's DSS Types</i>	<i>261</i>
	DSS Objectives	262
	<i>Problem Structure</i>	<i>262</i>
	<i>Decision Support</i>	<i>262</i>
	<i>Decision Effectiveness</i>	<i>262</i>
	A DSS Model	262
	Group Decision Support Systems	263
	<i>The GDSS Concept</i>	<i>263</i>
	<i>How the GDSS Contributes to Problem Solving</i>	<i>263</i>
	<i>GDSS Environmental Settings</i>	<i>263</i>
	Groupware	264
	<i>Lotus Notes</i>	<i>264</i>
	Artificial Intelligence	265
	Highlights in MIS - When It Came to Selecting Groupware, Burger King Had It Their Way	266

flpplpg the Systems Hpproach 267*History of At 267**Areas of AI 267*

The Appeal of Expert Systems 268

An Expert System Model 268

The User Interface 269

*Expert System Inputs 269**Expert System Outputs 269*

The Knowledge Base 270

*Rules 270**Networks of Rules 270*

The Inference Engine 270

*Forward Reasoning 271**Reverse Reasoning 272**Comparing Forward and Reverse Reasoning 272*

The Development Engine 273

*Programming Languages 274**Expert System Shells 274*

Advantages and Disadvantages of Expert Systems 274

*The Advantages of Expert Systems to Managers 274**The Advantages of Expert Systems to the Firm 275**The Disadvantages of Expert Systems 275*

Keys to Successful Expert System Development 275

Neural Networks 275

*Biological Comparisons 276**The Evolution of Artificial Neural Systems 276**The Artificial Neural System 277**Network Training 278**Putting the Artificial Neural System in Perspective 278*

Putting Knowledge-Based Systems in Perspective 278

SUMMARY 279 KEY TERMS 280 KEY CONCEPTS 280**QUESTIONS 280 TOPICS FOR DISCUSSION 281****PROBLEMS 281**

Case Problem - Newcastle Homes 282

Chapter 14 The Virtual Office 284

Introduction 285

Office Automation 285

The Virtual Office 285

<i>The Impact of the Virtual Office</i>	285
<i>Advantages of the Virtual Office</i>	286
<i>Disadvantages of the Virtual Office</i>	286
<i>A Recommended Virtual Office Strategy</i>	286
The Virtual Organization	287
<i>The Societal Impact of the Virtual Organization</i>	287
<i>The OA Model</i>	288
OA Applications	288
<i>Word Processing</i>	289
<i>Electronic Mail</i>	289
<i>Voice Mail</i>	289
<i>Electronic Calendaring</i>	289
<i>Audio Conferencing</i>	290
<i>Video Conferencing</i>	290
<i>Computer Conferencing</i>	291
<i>Facsimile Transmission</i>	292
<i>Videotex</i>	292
<i>Imaging</i>	292
<i>Desktop Publishing</i>	293
The Role of the Virtual Office and OA in Problem Solving	294
Putting the Virtual Office and OA in Perspective	294
Implementing the Systems Approach	294
Highlights in MIS - Meeting	296
SUMMARY	295
KEY TERMS	297
KEY CONCEPTS	297
QUESTIONS	298
TOPICS FOR DISCUSSION	298
PROBLEM	298
Case Problem — North American Plywood and Gypsum	298

PART V DIGITALIZATION OF INFORMATION SYSTEMS 301

Chapter 15 Enterprise Information Systems	302
Introduction	303
What Is an Enterprise Information System?	303
Evolution of Enterprise Information Systems	304
The ERP Software Industry	305
<i>Driving Forces Behind ERP Software Popularity</i>	305
<i>ERP Industry</i>	306
<i>The Back Office</i>	307

TABLE OF CONTENTS

	Enterprise Information System Feasibility	308
	<i>Economic Feasibility</i>	308
	<i>Technical Feasibility</i>	309
	<i>Operational Feasibility</i>	309
	Enterprise Information System Implementation	310
	<i>Vendor Selection</i>	310
	<i>User Training</i>	310
	<i>Cutover Approaches</i>	312
	Enterprise Information System Failures	312
	Enterprise Information Systems and the Web	314
	<i>Ease of Use</i>	314
	<i>Customer Concerns</i>	314
	Highlights in MIS - ERP's Window to the World	315
	The Future of Enterprise Information Systems	315
	flpplpg the Systems flpproach	315
	<i>Accelerated ERP Development Tools</i>	316
	<i>User-Friendly Software</i>	316
	<i>Converging Database and Enterprise Systems</i>	316
	SUMMARY	316
	KEY TERMS	317
	KEY CONCEPTS	317
	QUESTIONS	318
	TOPICS FOR DISCUSSION	318
	PROBLEM	319
	Case Problem - Ornamental Doors, Inc.	318
Chapter 16	Executive Information Systems	320
	Introduction	321
	What Do Executives Do?	321
	<i>Fayol's Management Functions</i>	321
	<i>Mintzberg 's Managerial Roles</i>	321
	<i>Kotter's Agendas and Networks</i>	321
	How Do Executives Think?	322
	<i>What Executives Think About</i>	323
	<i>Thought Processes While Solving Problems</i>	323
	Unique Information Needs of Executives	323
	<i>The Mintzberg Study</i>	323
	<i>The Jones and McLeod Study</i>	324
	<i>The Rockart and Treacy Study</i>	327
	<i>Putting the Computer in Perspective</i>	329
	Suggestions for Improving Executive Information Systems	329

Computer-Based Executive Information Systems	330
<i>An EIS Model</i>	330
<i>Dialogue Between the Executive and the EIS</i>	331
<i>Drill Down</i>	331
<i>The Incorporation of Management Concepts</i>	331
EIS Implementation Decisions	333
<i>Prewritten Personal Productivity Software</i>	333
<i>Prewritten EIS Software</i>	333
<i>Custom EIS Software</i>	334
EIS Critical Success Factors	334
Future EIS Trends	335
<i>EIS Use in Large Firms Will Become Commonplace</i>	335
Highlights in MIS - It's a Mistake to Rush into an EIS Project	335
<i>There Is a Need for Lower-Priced Special EIS Software</i>	336
<i>Tomorrow's MIS and DSS Will Look Like Today's EIS</i>	336
<i>Executives Will Keep the Computer in Perspective</i>	336
Implementing the Systems Approach	337
<i>SUMMARY</i>	337
<i>KEY TERMS</i>	338
<i>KEY CONCEPTS</i>	338
<i>QUESTIONS</i>	338
<i>TOPICS FOR DISCUSSION</i>	339
<i>PROBLEMS</i>	339
Case Problem - CATCO	340
Chapter 17 Marketing Information Systems	342
Introduction	343
Functional Organization Structure	343
Functional Information Systems	343
Marketing Principles	343
<i>The Marketing Mix</i>	343
Evolution of the Marketing Information System Concept	343
<i>Early Marketing Models</i>	344
Implementing the Systems Approach	345
A Marketing Information System Model	345
<i>Output Subsystems</i>	345
<i>Database</i>	346
<i>Input Subsystems</i>	346
Accounting Information System	346
<i>Data for Preparation of Periodic Reports</i>	346
<i>Data for Preparation of Special Reports</i>	346

Data for Mathematical Models and Knowledge-Based Systems 346

Marketing Research Subsystem 346

Primary and Secondary Data 346

Marketing Research Software 347

Marketing Intelligence Subsystem 347

Product Subsystem 348

The Product Life Cycle 348

A New Product Evaluation Model 348

Place Subsystem 350

Computer-Based Information Flow 350

Promotion Subsystem 350

Highlights in MIS - Coming to a Metropolitan Area Near You: Wireless Laptops 351

Pricing Subsystem 352

Cost-Based Pricing 352

Demand-Based Pricing 352

Integrated-Mix Subsystem 352

A Study of Marketing Information Systems in Fortune 500 Firms 352

Computer Usage 354

Mathematical Modeling 355

Modeling Support for the Management Levels 356

Overall Support by the MKIS 356

Support for Management Functions 357

Support for Ingredients of the Marketing Mix 357

How Managers Use the Marketing Information System 358

SUMMARY 359 KEY TERMS 360 KEY CONCEPTS 360

QUESTIONS 360 TOPICS FOR DISCUSSION 361

PROBLEMS 361

Case Problem - Great Lakes Boat and Marine 362

Chapter 18 Information Resources Information Systems 364

Introduction 365

The Information Services Organization 365

The Information Specialists 365

The Information Resources 365

A Model of an Information Resources Information System 366

Input Subsystems 366

flpplpg the Systems flpproach	366
<i>Output Subsystems</i>	368
<i>IRIS Users</i>	369
CIO Responsibilities	369
Highlights in MIS - The Many Hats of the CIO	370
Achieving Quality Management in Information Services	370
1. <i>Identify IS Customers</i>	370
2. <i>Define Customer Quality Needs</i>	370
3. <i>Establish Quality Metrics</i>	373
4. <i>Define IS Quality Strategy</i>	373
5. <i>Implement IS Quality Programs</i>	374
6. <i>Monitor IS Quality Performance</i>	374
<i>Putting IS Quality in Perspective</i>	374
Systems Security	375
<i>Security Objectives</i>	375
<i>Security Threats</i>	375
<i>Access Control</i>	376
<i>Putting Systems Security in Perspective</i>	377
Contingency Planning	377
<i>Putting Contingency Planning in Perspective</i>	378
Information Management Cost Reduction Strategies	378
<i>Consolidation</i>	378
<i>Downsizing</i>	378
<i>Outsourcing</i>	379
<i>Putting the Cost-Reduction Strategies in Perspective</i>	379
Information Management in Three Pacific Rim Countries	380
<i>Centralization Versus Decentralization</i>	380
<i>Top Management Attitude Toward the Computer</i>	380
<i>CIO Participation in Strategic Business Planning</i>	381
<i>Information Systems Planning</i>	381
<i>Sharing Information Resources with Users</i>	383
The Future of the CIO	383
<i>A Proactive CIO Strategy</i>	384
SUMMARY	385
KEY TERMS	386
KEY CONCEPTS	387
QUESTIONS	387
TOPICS FOR DISCUSSION	387
PROBLEMS	387

A Final Note 386

Case Problem - Condor Industries 388

APPENDICES INTRODUCTION 391

Data and Process Modeling 391

Level of Detail 391

The Data and Process Modeling Toolset 391

Positioning the Tools 391

Functional Information Systems 392

Appendix A Data Modeling 392

Entity-Relationship Diagram 392

Entity Types 392

Relationships 393

Connectivity 393

Identification and Description of Entities 393

Preparation of an ERD 394

Data Dictionary 396

Data Dictionary Forms 396

Complementary Nature of the Forms 400

Putting Data Modeling in Perspective 400

Problems 400

Appendix B Process Modeling 401

Data Flow Diagrams 401

DFD Symbols 401

A DFD Example 403

Leveled Data Flow Diagrams 404

How Much Detail to Show 405

Data Flow Diagramming Guidelines 405

Putting Data Flow Diagramming in Perspective 406

Structured English 406

The Objective of Structured English 406

Structured English Guidelines 406

Putting Structured English in Perspective 409

Problems 409

Appendix C Manufacturing Information Systems 410

Introduction 410

The Computer as a Part of the Physical System 410

Computer-Aided Design 410

Computer-Aided Manufacturing 410

Robotics 411

The Computer As an Information System 411

Reorder Point Systems 411

Material Requirements Planning 412

Manufacturing Resources Planning (MRP II) 413

Benefits of MRP II 413

The Just-in-Time Approach 414

A Model of a Manufacturing Information System 415

Input Subsystems 415

Output Subsystems 415

Accounting Information System 415

Industrial Engineering Subsystem 416

Manufacturing Intelligence Subsystem 417

Labor Information 417

Supplier Information 418

Production Subsystem 418

Inventory Subsystem 421

The Importance of Inventory Level 421

Maintenance Costs 421

Purchasing Costs 421

Economic Order Quantity 422

Economic Manufacturing Quantity 422

Quality Subsystem 422

Deming's Fourteen Points 422

Total Quality Management 422

Elements of Total Quality Management 422

How the Quality Subsystem Influences Product Quality 424

Cost Subsystem 424

An Example of a Cost Report 424

Basic Ingredients of Cost Control 424

How Managers Use the Manufacturing Information System 425

Summary 425

Questions 426

Problems 426

Appendix D Financial Information Systems 427

Introduction 427

A Model of the Financial Information System 428

Prewritten Financial Software	428
Accounting Information System	428
<i>The Importance of Accounting Data</i>	429
Internal Audit Subsystem	429
<i>The Importance of Objectivity</i>	430
<i>Types of Auditing Activity</i>	430
<i>The Internal Auditor as a Member of the CBIS Team</i>	430
Financial Intelligence Subsystem	431
<i>Stockholder Information</i>	431
<i>Financial Community Information</i>	431
<i>Environmental Influence on the Money Flow</i>	432
<i>An Example of a Financial Database Service</i>	432
Forecasting Subsystem	432
<i>Short-Term and Longer-Term Forecasting</i>	433
<i>Forecasting Methods</i>	433
<i>A Forecasting Example</i>	434
<i>Putting Forecasting in Perspective</i>	436
Funds Management Subsystem	436
<i>Putting Funds Management in Perspective</i>	438
Control Subsystem	438
<i>The Budgeting Process</i>	438
<i>Budget Reports</i>	439
<i>Performance Ratios</i>	440
<i>Putting the Control Subsystem in Perspective</i>	440
How Managers Use the Financial Information	441
Summary	441
Questions	442
Problems	442
Appendix E Human Resources Information Systems	443
Introduction	443
The Human Resources Function	443
<i>Primary HR Activities</i>	443
The Human Resources Information System	444
The Evolution of the HRIS	444
A Model of a Human Resources Information System	444
The Accounting Information System	445
Human Resources Research Subsystem	446
Human Resources Intelligence Subsystem	446

The HRIS Database 446
Database Contents 446
Location of the HRIS Database 447
HRIS Output 447
Basic Forms of Output 448
HRIS Software 448
Output Subsystems 448
Workforce Planning Subsystem 448
Recruiting Subsystem 449
Workforce Management Subsystem 449
Compensation Subsystem 450
Benefits Subsystem 450
Environmental Reporting Subsystem 450
Applications Integration 451
Current Status of the HRIS 451
How Managers Use the HRIS 452
Summary 452
Questions 453
Problems 454
References 455
Index 465