

PROCESSES, SYSTEMS, AND INFORMATION

An Introduction to MIS **3E**



Earl H. McKinney Jr.
David M. Kroenke



MyLab MIS: Fostering Employability Skills for Today's Learner

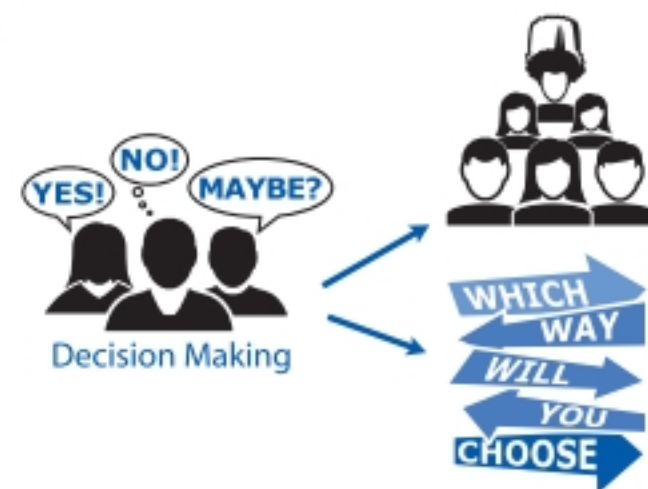
Reach every student with MyLab MIS MyLab is the teaching and learning platform that empowers you to reach every student. By combining trusted authors' content with digital tools and a flexible platform, MyLab MIS personalizes the learning experience and improves results for each student. And with Decision-Making Sims and Excel and Access Grader Projects, students understand how MIS concepts will help them succeed in their future careers.



MyLab MIS™ Grader

• Using proven, field-tested technology, **Auto-Graded Excel and Access Projects** let you seamlessly integrate Microsoft® Excel and Access content into your course without having to manually grade.

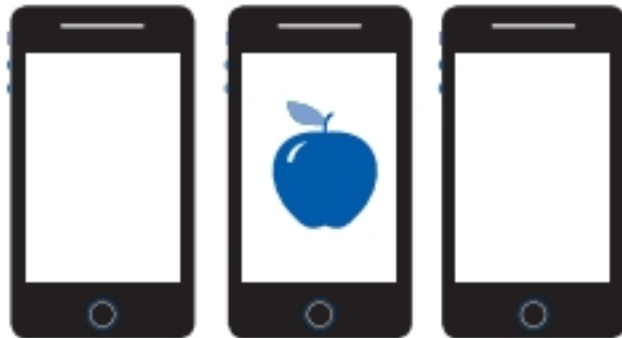
- **Decision-Making Sims** put students in professional roles and give them the opportunity to apply course concepts and develop decision-making skills through real-world business challenges.



- **Writing Space** offers a single place to create, track, and grade writing assignments, provide resources, and exchange meaningful, personalized feedback with students—quickly and easily. Auto-graded, assisted-graded, and create-your-own-assignments help facilitate better writers in your course and beyond.



- **Dynamic Study Modules** help students study chapter topics and the language of MIS on their own by continuously assessing their knowledge application and performance in real time. These are available as graded assignments prior to class, and are accessible on smartphones, tablets, and computers.



- **Learning Catalytics™** is a student response tool that helps you generate class discussion, customize your lecture, and promote peer-to-peer learning based on real-time analytics. Learning Catalytics uses students' smartphones, tablets, or laptops to engage them in more interactive tasks.

- The **Gradebook** offers an easy way for you and your students to see their performance in your course.

Item Analysis lets you quickly see trends by analyzing details like the number of students who answered correctly/incorrectly, time on task, and more.

And because it's correlated with the AACSB Standards, you can track students' progress toward outcomes that the organization has deemed important in preparing students to be leaders.



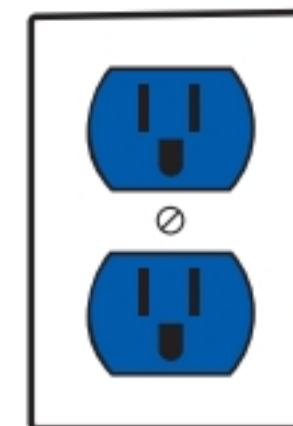
- **Pearson eText** enhances learning — both in and out of the classroom. Students can take notes, highlight, and bookmark important content, or engage with interactive lecture and example videos that bring learning to life anytime, anywhere via MyLab or the app.



- **Accessibility (ADA)**—Pearson is working toward WCAG 2.0 Level AA and Section 508 standards, as expressed in the **Pearson Guidelines for Accessible Educational Web Media**. Moreover, our products support customers in meeting their obligation to comply with the Americans with Disabilities Act (ADA) by providing access to learning technology programs for users with disabilities.

Please email our Accessibility Team at disability.support@pearson.com for the most up-to-date information.

- With **LMS Integration**, you can link your MyLab course from Blackboard Learn™, Brightspace® by D2L®, Canvas™, or Moodle®.



This page intentionally left blank

PROCESSES, SYSTEMS, AND INFORMATION

An Introduction to MIS

This page intentionally left blank

PROCESSES, SYSTEMS, AND INFORMATION

An Introduction to MIS

THIRD EDITION

EARL McKINNEY JR.

Bowling Green State University

DAVID M. KROENKE



330 Hudson Street, NY NY 10013

Vice President, IT & Careers: Andrew Gilfillan
Senior Portfolio Manager: Samantha Lewis
Managing Producer: Laura Burgess
Associate Content Producer: Stephany Harrington
Portfolio Management Assistant: Madeline Houpt
Director of Product Marketing: Brad Parkins
Product Marketing Manager: Heather Taylor
Product Marketing Assistant: Jesika Bethea
Field Marketing Manager: Molly Schmidt
Field Marketing Assistant: Kelli Fisher
Cover Image: RedlineVector/Shutterstock; bluebay/Shutterstock

Vice President, Product Model Management: Jason Fournier
Senior Product Model Manager: Eric Hakanson
Lead, Production and Digital Studio: Heather Darby
Digital Studio Course Producer: Jaimie Noy
Program Monitor: SPi Global
Full-Service Project Management and Composition:
Katie Ostler, Cenveo® Publisher Services
Printer/Binder: LSC Communications
Cover Printer: Phoenix
Text Font: 10/12 Times LT Pro Roman

Microsoft and/or its respective suppliers make no representations about the suitability of the information contained in the documents and related graphics published as part of the services for any purpose. All such documents and related graphics are provided “as is” without warranty of any kind. Microsoft and/or its respective suppliers hereby disclaim all warranties and conditions with regard to this information, including all warranties and conditions of merchantability, whether express, implied or statutory, fitness for a particular purpose, title and non-infringement. In no event shall Microsoft and/or its respective suppliers be liable for any special, indirect or consequential damages or any damages whatsoever resulting from loss of use, data or profits, whether in an action of contract, negligence or other tortious action, arising out of or in connection with the use or performance of information available from the services. The documents and related graphics contained herein could include technical inaccuracies or typographical errors. Changes are periodically added to the information herein. Microsoft and/or its respective suppliers may make improvements and/or changes in the product(s) and/or the program(s) described herein at any time. Partial screen shots may be viewed in full within the software version specified.

Microsoft® and Windows® are registered trademarks of the Microsoft Corporation in the U.S.A. and other countries. This book is not sponsored or endorsed by or affiliated with the Microsoft Corporation.

This publication contains references to the products of SAP AG. SAP, R/3, SAP NetWeaver, Duet, PartnerEdge, ByDesign, SAP BusinessObjects Explorer, StreamWork, and other SAP products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of SAP AG in Germany and other countries.

Business Objects and the Business Objects logo, BusinessObjects, Crystal Reports, Crystal Decisions, Web Intelligence, Xcelsius, and other Business Objects products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of Business Objects Software Ltd. Business Objects is an SAP company.

Sybase and Adaptive Server, iAnywhere, Sybase 365, SQL Anywhere, and other Sybase products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of Sybase, Inc. Sybase is an SAP company. SAP AG is neither the author nor the publisher of this publication and is not responsible for its content. SAP Group shall not be liable for errors or omissions with respect to the materials. The only warranties for SAP Group products and services are those that are set forth in the express warranty statements accompanying such products and services, if any. Nothing herein should be construed as constituting an additional warranty.

Copyright © 2019, 2015, 2013 by Pearson Education, Inc. All rights reserved. Manufactured in the United States of America. This publication is protected by copyright, and permission should be obtained from the publisher prior to any prohibited reproduction, storage in a retrieval system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise. For information regarding permissions, request forms, and the appropriate contacts within the Pearson Education Global Rights and Permissions department, please visit www.pearsoned.com/permissions/.

Acknowledgments of third-party content appear on the appropriate page within the text.

PEARSON, ALWAYS LEARNING, and MYLAB MIS™ are exclusive trademarks owned by Pearson Education, Inc. or its affiliates in the U.S. and/or other countries.

Unless otherwise indicated herein, any third-party trademarks that may appear in this work are the property of their respective owners, and any references to third-party trademarks, logos, or other trade dress are for demonstrative or descriptive purposes only. Such references are not intended to imply any sponsorship, endorsement, authorization, or promotion of Pearson’s products by the owners of such marks, or any relationship between the owner and Pearson Education, Inc. or its affiliates, authors, licensees, or distributors.

Library of Congress Cataloging-in-Publication Data

On file with the library of Congress.



ISBN 10: 0-13-482700-7
ISBN 13: 978-0-13-482700-1

Brief Contents

Part 1	Why MIS?	1
Chapter 1	The Importance of MIS	2
Chapter 2	Business Processes, Information Systems, and Information	24
Part 2	Information Technology	49
Chapter 3	Networks and the Cloud	50
Chapter 4	Database Processing	70
Chapter 5	Information Systems Security	104
Part 3	Structured Processes and Information Systems	129
Chapter 6	Using IS to Improve Processes	130
Chapter 7	Supporting Processes with ERP Systems	156
Chapter 8	Supporting the Procurement Process with SAP	184
Appendix 8	SAP Procurement Tutorial	214
Chapter 9	Supporting the Sales Process with SAP	230
Appendix 9	SAP Sales Tutorial	258
Part 4	Dynamic Processes and Information Systems	276
Chapter 10	Collaboration and IS	278
Chapter 11	Social Media and IS	306
Chapter 12	Business Intelligence and IS	334
Appendix 12	SAP Business Intelligence Tutorial	368
Extension 1	Information Systems Careers	372
Extension 2	Hardware and Software	380
Extension 3	Process Management and Information Systems Development	394
Extension 4	AI and Robots	410
Extension 5	Location-Based Data Information Systems: Mobile Devices and Geographic Information Systems	420
Appendix A		432
Application Exercises		448
Glossary		466
Index		479

This page intentionally left blank

Contents

Preface xix
About the Authors xxxi

Part 1 Why MIS? 1

Chapter 1 The Importance of MIS 2

- Q1-1** Why Is Introduction to MIS the Most Important Class in the Business School? 4
 - How Can I Attain Job Security? 5
 - How Can Intro to MIS Help You Learn Employability Skills? 6
 - Jobs 8
 - What Is the Bottom Line? 8
- Q1-2** What Is MIS? 9
 - Processes, Information Systems, and Information 9
 - Creating, Monitoring, and Adapting 9
 - Achieve Strategies 10
- Q1-3** How Does MIS Relate to Organizational Strategy? 10
- Q1-4** What Five Forces Determine Industry Structure? 11
- Q1-5** What Is Competitive Strategy? 12
- Q1-6** How Does Competitive Strategy Determine Value Chain Structure? 13
 - Primary Activities in the Value Chain 14
 - **MIS INCLASS: Work Skills Exercise** 15
 - Support Activities in the Value Chain 15
 - Value Chain Linkages 16
- Q1-7** How Does Competitive Strategy Determine Business Processes and Information Systems? 16
 - **ETHICS GUIDE: Ethics and Professional Responsibility** 18
 - **CASE STUDY: Tesla: Driving Competitive Strategy** 21

Chapter 2 Business Processes, Information Systems, and Information 24

- Q2-1** What Is a Business Process? 26
 - An Example Business Process 26
 - Why Do Organizations Standardize Business Processes? 28
- Q2-2** What Is an Information System? 29
 - How Can I Use the Five-Component Model? 30
- Q2-3** How Do Business Processes and Information Systems Relate? 31
 - The Role of Procedures 32
- Q2-4** How Do Structured and Dynamic Processes Vary? 33
 - Characteristics of Structured Processes 33
 - Characteristics of Dynamic Processes 34
- Q2-5** What Is Information? 35
 - Definitions Vary 35
 - Common Elements in the Definitions 36
 - How Can I Use These Ideas About Information? 37

- Q2-6** What Are Necessary Data Characteristics? 38
 - Accurate 38
 - Timely 39
 - Relevant 39
 - Just Sufficient 39
 - Worth Its Cost 39
 - Summary 40
- Q2-7** How Can I Use These Topics at Work? 40
 - **MIS INCLASS 2:** A Beautiful Mind 41
 - **ETHICS GUIDE:** Informing About Misinforming 43
 - **CASE STUDY 2:** One IS, Many Cups of Coffee 46

Part 2 Information Technology 49

Chapter 3 Networks and the Cloud 50

- Q3-1** What Do Business Professionals Need to Know About Networks and the Internet? 52
 - Types of Networks 52
 - Wireless Options for Networks 52
 - Connecting a LAN to the Internet 54
- Q3-2** How Does Data Move over a Network? 55
 - Protocols 55
 - Addressing 57
 - Languages 57
 - SOA 59
 - Carriers 60
- Q3-3** How Does a Typical Web Server Move Data on a Network? 60
- Q3-4** Why Is the Cloud the Future for Most Organizations? 61
 - The Cloud 61
 - Why Is the Cloud Preferred to In-House Hosting? 63
 - Why Now? 64
 - Outsourcing 64
- Q3-5** What Are the Typical Cloud Options? 64
 - Public Cloud Options 64
 - Private Cloud 65
 - **MIS INCLASS 3:** Peanut Butter and Jelly 65
 - **ETHICS GUIDE:** Showrooming: The Consequences 66
 - **CASE STUDY 3:** McDonald's: New Options for that Burger 68

Chapter 4 Database Processing 70

- Q4-1** What Is the Purpose of a Database? 72
- Q4-2** What Are the Contents of a Database? 73
 - What Are Relationships Among Rows? 74
 - Metadata 75
- Q4-3** What Is a Database Management System (DBMS)? 76
 - Creating the Database and Its Structures 77
 - Processing the Database 77
 - Administering the Database 78

Q4-4	What Are the Components of a Database Application?	79
	Forms, Reports, Queries, and Application Programs	79
	Database Application Programs	80
	Multi-User Processing	80
	Enterprise DBMS Versus Personal DBMS	81
	■ MIS INCLASS 4: How Much Is a Database Worth?	82
Q4-5	How Do Data Models Facilitate Database Design?	83
	What Is the Entity-Relationship Data Model?	83
	Entities	83
	Relationships	84
Q4-6	How Is a Data Model Transformed into a Database Design?	86
	Normalization	86
	Data Integrity Problems	87
	Normalizing for Data Integrity	87
	Summary of Normalization	88
	Representing Relationships	88
	What Is the User's Role in the Development of Databases?	91
Q4-7	How Do NoSQL DBMS Differ from Relational DBMS?	91
Q4-8	How Can the Hospital Improve Its Database?	92
	■ ETHICS GUIDE: Querying Inequality?	94
	■ CASE STUDY 4 : Searching for Pianos...	100
Chapter 5	Information Systems Security	104
Q5-1	What Is Information Systems Security?	106
	The IS Security Threat/Loss Scenario	106
Q5-2	What Are the Most Significant Threats and Potential Losses They Can Cause?	107
	What Are the Types of Threats?	107
	What Are the Types of Loss?	108
	Challenges of Information Systems Security	110
Q5-3	How Should You Respond to Security Threats?	111
Q5-4	How Should Organizations Respond to Security Threats?	112
Q5-5	How Can Technical and Data Safeguards Protect Against Security Threats?	113
	Identification and Authentication	114
	Encryption	115
	Firewalls	116
	Malware Protection	117
	Hardening, VPN, and Secure Design	118
Q5-5	How Can Data Safeguards Protect Against Security Threats?	118
	Data Safeguards	118
Q5-6	How Can Human Safeguards Protect Against Security Threats?	119
	Human Safeguards for Employees	119
	Human Safeguards for Nonemployee Personnel	121
	Account Administration	121
	Backup and Recovery Procedures	121
	Security Monitoring	122

- Q5-7** How Should Organizations Respond to Security Incidents? 122
- **MIS INCLASS 5:** Personal IS Security 123
 - **ETHICS GUIDE:** Security Privacy 124
 - **CASE STUDY 5:** WikiLeaks: One More Security Risk 126

Part 3 Structured Processes and Information Systems 129

Chapter 6 Using IS to Improve Processes 130

- Q6-1** What Are the Important Characteristics of Processes in Organizations? 132
- Examples of Processes 132
 - Scope of Processes 133
 - Objectives of Processes 134
- Q6-2** What Are Examples of Common Business Processes? 135
- Processes in the Value Chain 136
 - Applying Process Concepts and Characteristics 137
- Q6-3** How Can Management Improve Processes? 138
- Process Objectives 138
 - Process Measures and KPIs 138
- Q6-4** How Can Information Systems Be Used to Improve Processes? 139
- Improve an Activity 139
 - Improve Data Flow Among Activities 140
 - Improve Control of Activities 140
 - Use Automation 141
 - Improve Procedures 142
- Q6-5** How Can Process Management Principles Improve Processes? 144
- Q6-6** How Do Process Teams Diagram Process Improvement? 145
- Q6-7** How Can an IS Hinder a Process? 147
- Why Information Silos Exist 147
 - **MIS INCLASS 6:** Improving the Process of Making Paper Airplanes 148
 - **ETHICS GUIDE:** The Ethics of Automation 151
 - **CASE STUDY 6:** Where Are Ü Now, Justin Bieber? 154

Chapter 7 Supporting Processes with ERP Systems 156

- Q7-1** What Problem Does an ERP System Solve? 158
- ERP Implementation: Before and After Examples 159
- Q7-2** What Are the Elements of an ERP System? 162
- The Five Components of an ERP IS: Software, Hardware, Data, Procedures, and People 163
 - Inherent Business Processes 166
 - Implementing the ERP Components and Processes 166
- Q7-3** What Are the Benefits of an ERP System? 167
- **MIS INCLASS 7:** Google Golf 168
- Q7-4** What Are the Challenges of Implementing an ERP System? 169
- Decision-Making Challenges 169
 - People Challenges 171
 - ERP Upgrades 172
- Q7-5** What Types of Organizations Use ERP? 173
- ERP by Industry 173

ERP by Organization Size 173

International Firms and ERP 174

Q7-6 Who Are the Major ERP Vendors? 174

Goals of Large ERP Vendors 175

ERP Products 175

Q7-7 What Makes SAP Different from Other ERP Products? 176

SAP Inputs and Outputs 177

SAP Software 177

■ **ETHICS GUIDE:** ERP Estimation 179

■ **CASE STUDY 7:** U.S. Air Force ERP Bonfire 182

Chapter 8 Supporting the Procurement Process with SAP 184

Q8-1 What Are the Fundamentals of a Procurement Process? 186

Q8-2 How Did the Procurement Process at CBI Work Before SAP? 188

Q8-3 What Were the Problems with the Procurement Process Before SAP? 190

Warehouse Problems 190

Accounting Problems 190

Purchasing Problems 191

Q8-4 How Does CBI Implement SAP? 191

Q8-5 How Does the Procurement Process Work at CBI After SAP? 194

Purchasing 194

Warehouse 196

Accounting 196

The Benefits of SAP for the CBI Procurement Process 197

Q8-6 How Can SAP Improve Supply Chain Processes at CBI? 199

Supply Chain Processes 199

Improving Supply Chain Processes by Data Sharing 200

Improving Supply Chain Processes with Integration 201

Improving CBI Processes Beyond the Supply Chain 202

■ **MIS INCLASS 8:** The Bicycle Supply Game 203

Q8-7 How Does the Use of SAP Change CBI? 204

Q8-8 What New IS Will Affect the Procurement Process in 2028? 205

■ **ETHICS GUIDE:** Estimation Ethics 209

■ **ACTIVE CASE 8:** SAP Procurement Tutorial 212

Appendix 8 SAP Procurement Tutorial 214

Chapter 9 Supporting the Sales Process with SAP 230

Q9-1 What Are the Fundamentals of a Sales Process? 231

Q9-2 How Did the Sales Process at CBI Work Before SAP? 234

Q9-3 What Were the Problems with the Sales Process Before SAP? 235

Sales Problems 235

Warehouse Problems 236

Accounting Problems 236

Q9-4 How Does CBI Implement SAP? 236

Q9-5 How Does the Sales Process Work at CBI After SAP? 237

Sales 237

Warehouse 239

	Accounting	240
	The Benefits of SAP for the CBI Sales Process	241
	■ MIS INCLASS 9: Building a Model	243
Q9-6	How Can SAP Improve CRM Processes at CBI?	243
	Improving CRM Processes by Data Sharing	243
	Improving CRM Processes with Integration	245
	Challenges	246
Q9-7	How Does E-commerce Improve Processes in an Industry?	246
	E-Commerce Merchant Companies	247
	Nonmerchant E-Commerce	248
	How Does E-Commerce Improve Market Efficiency?	248
Q9-8	What New IS Will Affect the Sales Process in 2028?	249
	Process Integration and You in 2028	252
	■ ETHICS GUIDE: Are My Ethics for Sale?	253
	■ ACTIVE CASE 9: Sap Sales Tutorial	256

Appendix 9 SAP Sales Tutorial 258

Part 4 Dynamic Processes and Information Systems 276

Chapter 10 Collaboration and IS 278

Q10-1	What Is Collaboration, and Why Is It Important to Business?	280
	The Two Key Activities of Collaboration	280
	Importance of Effective Critical Feedback	281
	Guidelines for Giving and Receiving Critical Feedback	282
	Warning!	282
Q10-2	What Are the Objectives of the Collaboration Process?	283
	Product Objective: Successful Output	283
	Team Objective: Growth in Team Capability	283
	Individual Objective: Meaningful and Satisfying Experience	284
Q10-3	What Are the Key Components of a Collaboration IS?	285
	The Five Components of a Collaboration IS	285
	Key Attributes of Collaboration IS	286
Q10-4	How Can Collaboration IS Support the Communicating Activity?	286
Q10-5	How Can Collaboration IS Support the Iterating Activity?	290
	No Iteration Control	290
	Iteration Management	291
	Iteration Control	292
Q10-6	How Can Collaboration IS Support Business Processes?	293
	The Project Management Process	293
	The Workflow Process	295
	Supporting New Processes with Collaboration IS	295
Q10-7	Which Collaboration IS Is Right for Your Team?	296
	Three Sets of Collaboration Tools	296
	Choosing the Set for Your Team	297
	Don't Forget Procedures and People!	298
	■ MIS INCLASS 10	299

- Q10-8** 2028? 300
 - **ETHICS GUIDE:** Virtual Ethics? 301
 - **CASE STUDY 10:** Miracle on Hudson 304

Chapter 11 Social Media and IS 306

- Q11-1** What Is Social Media, and Why Is It Important to Business? 308
- Q11-2** What Are the Objectives of the Social Media Process? 309
 - Effectiveness Objectives 309
 - Efficiency Objectives 310
- Q11-3** What Are the Key Components of a Social Media IS? 311
 - The Five Components of a Social Media IS 311
 - Key Attributes of a Social Media IS 313
- Q11-4** How Do Social Media IS Support Social Media Activities? 313
 - Creating 313
 - Sharing 315
- Q11-5** How Can Social Media IS Support Business Processes? 316
 - The Promotion Process 316
 - The Customer Service Process 317
 - The Hiring Process 318
 - Supporting New Processes with Social Media IS 318
 - Tips for Conducting Social Media Promotions 319
- Q11-6** How Can Social Media IS Support the Process of Building Social Capital? 319
 - **MIS INCLASS 11:** Using Twitter to Support the Class Discussion Process 320
 - Using Social Media IS to Increase the Number of Relationships 321
 - Using Social Media IS to Increase the Strength of Relationships 321
 - Using Social Media IS to Connect to Those with More Assets 322
- Q11-7** How Do Businesses Manage the Risks of Social Media? 322
 - Management Risks 322
 - Employee Communication Risks 323
 - User-Generated Content Risks 324
 - Responding to User Content Problems 324
- Q11-8** How Can IS Similar to Social Media Support Business Processes? 325
- Q11-9** What Is the Sharing Economy? 326
- Q11-10** 2028? 327
 - **ETHICS GUIDE:** Ethics, Social Marketing, and Stretching the Truth 329
 - **CASE STUDY 11:** Airbnb 332

Chapter 12 Business Intelligence and IS 334

- Q12-1** What Is Business Intelligence, and Why Is It Important to Business? 336
 - Examples of BI 337
- Q12-2** What Are the Objectives of the BI Process? 337
- Q12-3** What Are the Key Components of a Business Intelligence IS? 339
 - The Five Components of a BI Information System 339
 - Key Attributes of BI Information Systems 340

	Q12-4	How Do BI Information Systems Support BI Activities?	340
		Acquiring	341
		Analyzing	342
		Publishing	347
	Q12-5	How Can BI Information Systems Support Business Processes?	349
		Supporting Existing Processes with BI Information Systems	350
		Supporting New Processes with BI Information Systems	351
	Q12-6	What Is a Big Data BI System, and How Is It Used?	352
		NoSQL Databases	353
		MapReduce	353
		Hadoop	354
		SAP HANA and In-Memory Database Systems	354
		Processes Supported by Big Data BI IS	354
	Q12-7	How Do Businesses Manage the Risks of Business Intelligence?	355
		Data Problems	356
		People Problems	357
		■ MIS INCLASS 12: I Know That, I Think	358
	Q12-8	How Does SAP Do BI?	359
	Q12-9	2028?	360
		Mobile BI	360
		Easier-to-Use Analysis Software for Unstructured Data	360
		Internet of Things	360
		Privacy	361
		■ ETHICS GUIDE: Unseen Cyberazzi	362
		■ CASE STUDY 12: Pizza and Big Data	365
Appendix 12		SAP Business Intelligence Tutorial	368
Extension 1		Information Systems Careers	372
	QE1-1	What Is the Employment Environment Like for IS Graduates?	372
	QE1-2	What Are the Duties and Titles of IT Jobs?	373
	QE1-3	What IS-Related Job Positions Exist?	375
	QE1-4	What Do IT Professionals Like About Their Jobs?	377
Extension 2		Hardware and Software	380
	QE2-1	How Do the Main Components of Computer Hardware Work?	380
	QE2-2	What Are the Types of Computer Hardware and Their Capacities?	382
		Types of Hardware	382
		Computer Capacity: Data Storage Volume and Speed	382
	QE2-3	What Is Operating System Software?	384
		What Are the Major Operating Systems?	384
	QE2-4	What Are the Types of Software Apps, and How Do Organizations Obtain Them?	385
		Categories of Apps	386
		Sources of Apps	386
		Open Source	387
	QE2-5	What Is Virtualization?	388

- QE2-6** What Are Native and Web Apps, and How Are They Different? 389
 - Native Apps 390
 - Web Apps 390

Extension 3 **Process Management and Information Systems Development 394**

- QE3-1** What Are the Activities of Business Process Management? 394
 - The BPM Monitor Activity 395
 - The BPM Model Activity 395
 - The BPM Create Components Activity 396
 - The BPM Implement Process Activity 396
- QE3-2** What Are the Activities of the Systems Development Life Cycle (SDLC) Development Process? 396
 - Define System 397
 - Determine Requirements 398
 - Design Components 400
 - Implement 401
 - Maintain the System 402
- QE3-3** How Can Agile Development and the Scrum Process Overcome the Problems of the SDLC? 404
 - Why Agile Development Is Needed 404
 - What Are the Principles of Agile Development? 404
 - What Is the Scrum Process? 405
 - Challenges to Systems Development Both SDLC and Agile 407

Extension 4 **AI and Robots 410**

- QE4-1** What Is the Intelligence Process? 410
- QE4-2** What Is Artificial Intelligence? 411
 - Three Common AI Techniques 411
 - Expert Systems 411
 - Content Management 412
 - Neural Networks 413
 - Five Common Components 414
 - Broad AI Versus Narrow AI 414
- QE4-3** What Business Processes Are Supported by AI? 415
 - Process: Medical Diagnosis 415
 - Process: Locating Expertise 415
 - Process: Fraud Detection 415
 - Process: Human Authentication 415
- QE4-4** What Are the Challenges of AI? 416
- QE4-5** How Are Robots Used in Business? 416
 - Attributes 416
 - Limited Here to Business 417
 - Challenges for Robotics 417
 - Impact on Your Career 418

Extension 5 **Location-Based Data Information Systems: Mobile Devices and Geographic Information Systems 420**

- QE5-1** How Fast Is LBD Growing? 420
- QE5-2** How Are Mobile Devices and GIS Different? 421

QE5-3	What Is a Location-Based Process?	422
QE5-4	How Do Mobile Devices Support the Location-Based Process?	423
	Capture	423
	Analyze	424
	Present	425
QE5-5	How Do GIS Support the Location-Based Process?	426
	Capture	426
	Analyze	426
	Present	428
QE5-6	What Business Processes Are Supported by LBD?	428
QE5-7	What Are the Limitations and Challenges of LBD?	429
	Technical	429
	People	430

Appendix A	432
Application Exercises	448
Glossary	466
Index	479

Preface

Since the emergence of ERP and EAI systems in the early 1990s, the MIS discipline has undergone a slow but persistent change. Whereas the early emphasis of MIS was on the management and use of information systems *per se*, emerging cross-functional systems began to place the focus on processes that utilize such systems. We believe that existing MIS textbooks, particularly those at the introductory level, do not sufficiently recognize this change in emphasis. Hence, we offer this textbook that provides a strong process orientation.

Why This Third Edition?

We have made a number of changes to this third edition; these are listed in Table 1. While Table 1 spells out the changes in detail, there are several significant changes that warrant a short explanation.

First, the technology landscape has changed rapidly from the time the second edition was written. At that time, Uber, Blockchain, Smartphone payments, group messaging, and the Internet of Things were not on the scene. Robotics, Big Data, and SAP HANA S/4 were just beginning. Further, security was not the priority it is now. These changes led to updates of many of the chapters. In addition, we decided to introduce Extensions in this third edition to provide more coverage of new topics without making existing chapters too long.

These Extensions include completely new discussions of technologies such as Location Based Data, AI, and Robots. They also include some topics that no longer fit in chapters such as hardware, software, and systems development. Finally the extensions include a discussion of IS careers.

We also wanted to expand the opportunity for students to gain more first-hand practice with SAP. We added a Production tutorial in Appendix A based on the same Chuck's Bikes case used in the Procurement and Sales tutorials.

One of the biggest challenges to any SAP tutorial is ensuring students understand the underlying business processes, that they not blindly enter data into on-screen forms. To that end, Pearson has introduced a new app called MySAP Lab. This browser app runs independently from SAP but is synced to the tutorial so that as a student works through the tutorial this app periodically poses questions about the underlying process. It also provides the instructor an opportunity to passively observe assignment completion, notice where students encounter difficulty, and record student responses to questions.

Another significant change is our coverage of security. Security is becoming more essential for all business students. Often the only exposure business students get to security is in an MIS class. For this reason we greatly expanded our discussion of security, gave it its own chapter, and moved it earlier in the semester next to the other technical topics.

Another change is that MyLab MIS is now integrated with the 3rd Edition. At the end of each chapter students are directed to MyLab MIS for short answer questions as well as essay questions.

Many colleagues have told us they are “flipping” their class rooms and are using more student engagement activities during class meeting times. As a result, we updated half of the MIS InClass exercises and improved the instructions on the others.

At times introductory classes like MIS can devolve into a mastery of vocabulary lists. We've tried to counter this by helping the student see the value of using the vocabulary and the usefulness of the models presented in the text by consistently applying the course vocabulary to familiar domains such as a hospital, a bicycle company, and a university. We also ask students to self-inspect; we don't ask them to memorize the definition of collaboration and experimentation—we ask them to evaluate themselves and find ways to improve. Just as important, we tried to identify key themes for entire chapters highlighting them in the introduction and returning to them at various points in the chapters. For example, the security chapter theme is that security is a tradeoff; a tradeoff between freedom and security and between cost and security. All these changes seek to make student engagement more natural and frequent.

Finally, to improve currency and readability all the chapters were updated, and many new figures added or repurposed. In addition, 8 opening vignettes, 10 end of chapter cases, and 7 application exercises were completely rewritten. We also tried to be more efficient with page use, reducing the length of chapter opening vignettes, cases, and ethical guides.

TABLE 1 Changes in the 3rd Edition

Chapter	Change
1	<p>New Figure on Data and Internet rapid expansion</p> <p>New Figure on IS job history and growth</p> <p>Updated and simplified the definition of MIS</p> <p>New MIS InClass on student skills</p> <p>New Tesla Case Study</p>
2	<p>6 new Figures</p> <p>New chapter opening vignette highlights hospital process</p> <p>Expanded discussion of importance of processes</p> <p>Definitions of IS components more specific</p> <p>Expanded discussion of the value of internal information</p> <p>New MIS InClass on information</p> <p>New concluding question applying book topics to work</p> <p>New Coffee Shop Case Study</p>
3	<p>10 new Figures</p> <p>New chapter opening vignette describes cloud issues</p> <p>Hardware and Software updated and moved to Extension</p> <p>Expanded discussion of Cloud, recent growth, most popular uses</p> <p>MIS InClass moved here from Chapter 2</p> <p>Key Terms and Concepts reduced</p> <p>New vocabulary: PAN, handover, net neutrality, peering</p> <p>New discussion of cellular networks</p> <p>Three questions replace one on how networks work</p> <p>A single continuous example of image upload to Snapchat</p> <p>Added discussion of Tier 1 network providers</p> <p>New McDonalds Case Study</p>
4	<p>New chapter opening vignette on database issues at a hospital</p> <p>Updated discussion of NoSQL</p> <p>New case study on personal DBMS</p> <p>New discussion on how hospital database should be corrected</p>
5	<p>New Security chapter, previously half a chapter</p> <p>9 new figures</p> <p>New chapter opening vignette describes a security lapse</p> <p>New end of chapter collaboration exercise</p> <p>New MIS InClass</p> <p>New WikiLeaks case</p> <p>New vocabulary: APT, BYOD, brute force, CAPTCHA, forensics, hash, malware, overflow</p> <p>New vocabulary: Ransomware, risk, audit, session hijacking, usurpation, VPN</p> <p>Updated discussion of implications from IoT, cloud, mobile, and Big Data</p> <p>Current security failures and scope of challenges updated</p> <p>Emphasis on tradeoff expanded</p> <p>Figure on Threat vs Loss updated and simplified</p> <p>Suggestions for personal security updated and expanded</p> <p>Expanded discussion on passwords, 2 factor, VPN and others</p>
6	<p>7 new figures</p> <p>New chapter opening vignette describes poor hospital process</p> <p>Expanded discussion of importance of processes to business</p> <p>New end of chapter collaboration exercise</p> <p>New ethics guide on the ethics of automation</p> <p>New Electronic Dance Music case</p> <p>Emphasis on KPI rather than measures for processes</p> <p>New discussion of the importance of process feedback</p>

Chapter	Change
7	<p>10 new figures</p> <p>New chapter opening vignette on ERP cutover at CBI</p> <p>Added personal examples to motivate students</p> <p>New end of chapter collaboration exercise</p> <p>New MIS InClass</p> <p>New AF ERP Bonfire case describes implementation disaster</p> <p>New emphasis on upgrades not initial implementation of ERP</p> <p>Removed discussion of EAI</p> <p>Discussion of new concepts—Fiori, SAP HANA S/4</p> <p>Expanded discussion of ERP system challenges</p> <p>Updated goals of Tier 1 ERP vendors</p>
8	<p>11 new figures</p> <p>Expanded discussion of supply chain early to provide procurement ERP context</p> <p>Implications for student job skills added</p> <p>New 2028—A/R, robots, 3-D printing, and Worldwide Internet</p>
9	<p>14 new figures</p> <p>Expanded discussion of marketing early to provide sales ERP context</p> <p>A consideration of Salesforce discussion added</p> <p>Implications for student job skills added</p> <p>New 2028—Blockchain, Amazon buttons, darknet, and smartphone payment</p>
10	<p>New chapter opening vignette hospital collaboration</p> <p>New end of chapter collaboration exercise on Kata</p> <p>Updated descriptions of Google Drive and Microsoft OneDrive</p> <p>New MIS InClass</p> <p>New Miracle on the Hudson case</p> <p>New 2028—collaboration with AI and robots</p> <p>Expanded motivation to students to apply collaboration topics</p>
11	<p>7 new Figures</p> <p>New chapter opening vignette examines negative social media posts</p> <p>New Airbnb case</p> <p>New section on the sharing economy and trust added</p> <p>Added new section on group messaging apps and Reddit</p> <p>New vocabulary: Reddit, sharing economy, unicorns, collaborative consumption</p> <p>New vocabulary: click-through rate, conversion rate, Enterprise 2.0, privacy</p> <p>Expanded discussion of common social media measures</p> <p>Updated business uses of social media</p> <p>New 2028—analysis of social media data and privacy</p> <p>Impact of social media on hiring process added</p> <p>Expanded discussion of challenge of measuring financial results</p>
12	<p>9 new Figures</p> <p>New discussion of data marts, Excel PowerPivot, text mining</p> <p>Expanded descriptions of prediction markets, urban applications</p> <p>New Privacy case</p> <p>New 2028—mobile BI, unstructured data, IoT, and privacy</p> <p>New vocabulary: data marts, text mining, sentiment analysis, IoT, GDPR</p> <p>Big Data section updated on NoSQL, MapReduce, Hadoop, SAP HANA</p> <p>New discussion on skepticism of analysis added</p>
New	<p>Extensions</p> <p>1 IS Careers</p> <p>2 Software and Hardware</p> <p>3 Process Management and IS Design</p> <p>4 Robots and AI</p> <p>5 Location Based Data Information Systems</p> <p>Appendix A: SAP Production Tutorial</p>

Importance of MIS

Chapter 1 claims that MIS is the most important class in the business curriculum. That's a bold statement, and every year we ask whether it remains true. Is there any discipline having a greater impact on contemporary business and government than IS? We continue to doubt there is. Every year brings important new technology to organizations, and many of these organizations respond by creating innovative applications that increase productivity and otherwise help them accomplish their strategies. In the past year, Blockchain, IoT, and new security challenges are posing new opportunities and requirements on organizations. More sophisticated and demanding users push organizations into a rapidly changing future, one that requires continual adjustments in business planning. To participate, our graduates need to know how to apply emerging technologies to better achieve their organizations' strategies. Knowledge of MIS is critical to this application.

The effects of changing technology and new user demands fall on processes and information systems at all levels—workgroup, organizational, and inter-enterprise. The impact on the latter is especially dramatic because cloud-based hosting and mobile devices enable independent organizations to work together in ways previously unimaginable.

As stated, we continue to believe we can enter the classroom with the confidence that we are teaching the single most important course in the business school—an argument that relies on two observations. First, because of nearly free data storage and data communications, businesses are increasingly finding and, more important, increasingly *required* to find innovative applications for information systems. The incorporation of Facebook and Twitter into marketing systems is an obvious example, but this example is only the tip of the iceberg. For at least the next 10 years, every business professional will, at a minimum, need to assess the efficacy of proposed IS applications. To excel, business professionals will need to not only assess but define innovative IS applications. These applications will increasingly take advantage of advances in Big Data and analytical software.

Such skills will not be optional. Businesses that fail to create systems that take advantage of nearly free data storage and communication will fall prey to the competition that can create such systems. So, too, will business professionals.

The second premise for the singular importance of the MIS class relies on the work of Robert Reich, former Secretary of Labor for the Clinton administration. In *The Work of Nations*,¹ Reich identifies four essential employability skills for knowledge workers in the 21st century:

- Abstract reasoning
- Systems thinking
- Collaboration
- Experimentation

For reasons set out in Chapter 1, beginning on page 2, we believe the MIS course is the single best course in the curriculum for learning these four key skills.

While most Introduction to MIS textbooks address technical innovation and nonroutine skills, *Processes, Systems, and Information, Third Edition*, uniquely enables the Intro course to also address business processes. The process view of business is the dominant view of business today; students need a consistent, extended opportunity to master the language and apply it. The Introduction to MIS class that uses this textbook can expose both IS and non-IS students to process concepts and appropriately place IS in its vital role of supporting and improving processes. With this process foundation, students are better able to understand the benefits and challenges of ERP systems.

Background on Processes and IS

The relationship between business processes and information systems is complex. They are not one and the same; a given process might use several different information systems, and, at the same time, a given information system might support many different processes. So, we cannot

¹Robert B. Reich, *The Work of Nations* (New York: Alfred A. Knopf, 1991), p. 229.

say that a process encapsulates all of its information systems, nor can we say that an information system encapsulates all of its processes.

In part because of this complex relationship, we define *MIS* as creating, monitoring, and adapting *processes, information systems, and information* to help organizations achieve their strategy (Chapter 1). The fabric of this text is woven around and through these definitions.

Potential adopters of this textbook are departments that make business processes a key component or thread throughout their curricula. This group includes all of the universities that are part of the SAP University Alliance, those that are part of the Microsoft Dynamics Academic Alliance, and other institutions for which a business process orientation is important. Chapters 8 and 9 provide specific examples of the use of SAP, and the cases that conclude each of those chapters provide tutorial exercises that use the SAP University Alliance's Global Bikes Inc. (GBI) case. This is the same case and client data used in University Alliance training, so it will be familiar to many instructors.

In our opinion, a text must go beyond the operational processes that comprise Chapters 8 and 9. Of course, operational processes are most important, and five chapters and an Appendix of our text include or are devoted to them. However, other dynamic processes, such as collaboration, project management, problem solving, business intelligence, and social networking, are also important. Hence, we believe that this text should include much more than SAP-oriented processes.

Text Features

A challenge of teaching the Introduction to MIS course from a process orientation is the lack of business knowledge and experience on the part of most students. Many universities offer the Introduction to MIS course at the sophomore and even freshman levels. Most of these students have completed few business courses. Even when this course is taught to higher-level students, however, few of them have significant business or process experience. They have been lifeguards or baristas. When we attempt to talk about, for example, the impact of process change on departmental power, that discussion goes over the heads of students. They may memorize the terms, but they often lose the essence of the discussion. The features of this text are designed, in part, to address this problem.

Question-Based Pedagogy

Research by Marilla Svinicki in the Psychology Department of the University of Texas indicates that today's students need help managing their time. She asserts that we should never give homework assignments such as "read pages 75–95." The problem, she says, is that students will fiddle with those pages for 30 minutes and not know when they're done. Instead, she recommends that we give our students a list of questions and the assignment that they be able to answer those questions. When they can answer the questions, they're done studying. We have used this approach in our classrooms, and we believe that it is most effective. Students like it as well. Hence, we have organized each chapter as a list of questions.

Opening Vignettes

Each chapter opens with a short vignette of a business situation and problem that necessitates knowledge of that chapter. We use two different fictitious organizational settings:

1. Wood Hospital, a local hospital
2. Chuck's Bikes, Inc., a bicycle manufacturer that competes with Global Bikes

Each of these vignettes presents a situation that illustrates the use of the chapter's contents in an applied setting. Most contain a problem that requires knowledge of the chapter to understand and solve.

MIS InClass Exercises

Every chapter includes a student group exercise that is intended to be completed during class. These exercises are designed for teachers who seek to use active learning exercises, also called flipping the classroom. The purpose of the exercise is to engage the student with knowledge

gained from the chapter. These exercises are part lab and part case study in nature. In our experience, some of them lead to spirited discussions, and we could have let them run on for two or three class periods, had we had that luxury.

SAP Tutorial Exercises

The appendices to Chapters 8 and 9 as well as Appendix A contain process exercises that involve the SAP Alliance's Global Bike case. Professors at institutions that are members of the alliance can use these with their students. Because not every department that uses this book is a member of that alliance, we have made these exercises optional appendices. You can omit the exercises without any loss of continuity.

The exercises are, we hope, purposeful yet simple to do. Our goal is to make it possible for them to be conducted by teaching assistants and faculty who have not yet attended the SAP university training. To that end, we provide extensive instructor support materials. Instructors who have had training by the SAP University Alliance will immediately recognize that these tutorials use exactly the same data and screens they used during training.

Earl McKinney, the author of the tutorial exercises, has been teaching SAP for 12 years at Bowling Green State University. The tutorial exercises included in this book have been tested extensively with Introduction to MIS students in a BGSU lab setting. In addition to the exercises, Earl has written a detailed teaching guide on how to best use the exercises as well as tips and pointers about their use and his experience about where students are most likely to struggle.

A fourth tutorial is offered at the end of the Chapter 12 on Business Intelligence. This tutorial uses SAP's Lumira to analyze Global Bike Inc. data. While a particular set of data is specified in the tutorial, students and instructors can also simply read the tutorial, learn how the operations like slicing and filtering are done, and use these skills on any dataset.

Over these years, Earl learned that when doing SAP exercises, it is far too easy for students to slip into "monkey-see, monkey-do" mode without any clear understanding of what they are doing or why. Based on this classroom experience, we believe that the setup to procurement and sales in Chapters 8 and 9, together with the exercises themselves, help students move beyond simple copy mode, in which they learn the SAP keystrokes, to learn the nature of process-oriented software and its role in organizations.

Like all who have used the GBI case, we are grateful to the SAP Alliance and to the case's authors. In accordance with both the letter and spirit of the SAP Alliance community's policy, we have placed these exercises on the SAP University Alliance Web site. We hope you will find sufficient value in this text to use it in your classroom, but please feel free to use these exercises even if you do not adopt this text.

By the way, the body of Chapters 8 and 9 uses the example of Chuck's Bikes, Inc., rather than GBI. We made this change at the request of the SAP Alliance. The alliance prefers that authors not add new material to GBI, change any characters, make videos, and so forth. We created CBI so as to comply with that request while at the same time providing more detailed business scenarios that are compatible with GBI.

Ethics Guides

We believe that business ethics are a critically important component of the Introduction to MIS course and that the best way to teach ethics is in the context of case-like situations. We also believe that ethics ought not to be relegated to a single chapter or chapter section. Including ethics in one place leads to the inoculation theory of education: "We don't need to discuss ethics, we've already done that." Accordingly, each chapter contains one two-page spread called an Ethics Guide. They are shown in the table of contents; to sample just one of them, turn to page 20.

In recent years, we believe there has been a shift in students' attitudes about ethics. Many students seem to be increasingly cynical and callous about ethical issues. As a result, when we try to raise interest with them about unethical behavior, we find ourselves interjecting and defending a particular set of values, a role that strikes many students as inappropriate. A common attitude seems to be, "We should think for ourselves, thank you anyway."

In frustration about the situation, we turned to a good friend of many years, Dr. Chuck Yoos, emeritus professor from the U.S. Air Force Academy. We told him our goals for presenting

the Ethics Guides and asked him what criteria he would use with his students if he only had 20 minutes per guide. His response was that while there are many ways of addressing ethics in business, Kant's categorical imperative and the utilitarianism of Bentham and Mill would be at the top of his list. We investigated both and decided to use them with this edition.

Our goal in doing so is to ask students, whose ethical standards may be immature, to learn and apply the categorical imperative and utilitarianism perspectives. By doing so, students are asked to “try on” those perspectives and in the process think more deeply about ethical principles than they do when we allow them simply to apply their personal ethical standards.

The Ethics Guide in Chapter 1 introduces the categorical imperative, whereas the Ethics Guide in Chapter 2 introduces utilitarianism. If you choose to use these perspectives, you will need to assign both of those guides.

Collaboration Exercises

As stated in Chapter 1, collaboration is a key skill for today's business professionals. Accordingly, we believe that teaching collaboration, collaboration processes, and collaboration information systems is an important component of this course. To that end, each chapter includes a collaboration exercise to be accomplished by a student team. In our opinion, it is not possible for students to complete all of these in one term. Instead, we recommend using three or four of them throughout the term.

In doing these exercises, we recommend that students not meet face to face, at least not most of the time, but use modern collaboration tools for their meetings. Google Docs and related tools are one possibility. We prefer requiring students to use Microsoft OneDrive.

End-of-Chapter Cases

The chapter-opening vignettes are based on real-life experience, but the organizations they describe are fictitious. We use fictitious companies because we want students to learn from organizational mistakes and, at times, even organizational foolishness. We have not found many real companies that will allow us to share their laundry in this way, and, in any case, it seems unfair to ask for an organization's cooperation and then turn around and publish its problems.

However, we do believe students need to see examples of the role of MIS in actual organizations to help them bridge the chapter content to the real world. Hence, each chapter concludes with a case that illustrates some aspect of the chapter's contents in a real-world company.

Active Reviews

Each chapter includes an Active Review at the end. These reviews help students ensure that they have learned the most essential material. They also serve as a list of potential exam questions and thus help students prepare for exams.

Application Exercises

For courses that involve a Microsoft Office component, we have developed a set of Excel and Access exercises for all chapters. These exercises, which assume the student has beginner's level expertise with these products, appear beginning on page 448. They are listed approximately in increasing order of difficulty.

What We Left Out

We chose to keep this book to the traditional 12-chapter length because we find that this number of chapters fits best into the number of class lessons of most courses. Because we are adding substantial process-oriented material, however, that meant we needed to remove some content from the typical Introduction to MIS text.

In this text, we have reduced and simplified the discussions of hardware, software, and data communications. Furthermore, we simplified and shortened the discussion of information systems development. Finally, you will find no mention of IS departmental management in this text. It is not that we believe the shortened and omitted content is unimportant; rather, we think the opportunity cost is the least for these topics.

This text includes some material that has been previously published in David Kroenke's text *Using MIS*. The two texts differ in that *Using MIS* makes information systems primary, whereas

this text makes business processes primary. Both texts will continue to be published. Because of this difference, however, every sentence that was brought over was examined from the perspective of business processes and much of that content was changed in both minor and major ways. The discussion of collaboration, for example, is reframed into the context of dynamic business processes. That said, the majority of the material in this text is new.

Chapter Outline

This text is organized into four parts: Introduction, Technology, Structured Processes, and Dynamic Processes.

Introduction

Chapter 1 sets the stage by illustrating the need for this course and especially for the behaviors and skills that students gain in the course. It defines *MIS* and summarizes the means by which organizations obtain goals and objectives. Porter's industry, five forces, and value chain models are presented.

Chapter 2 defines and illustrates processes, information systems, and information. It uses a common fast food restaurant to illustrate the relationship of processes and information systems. It also defines information using the Gregory Bateson definition that *information* is a difference that makes a difference.

Technology

Chapters 3, 4 and 5 address technology. Chapter 3 provides a quick summary of networks and the cloud. Chapter 4 discusses database processing. Security is the topic of Chapter 5. These chapters serve as a technology platform for the discussions in the remaining chapters.

Structured Processes

Chapters 6 through 9 discuss structured processes and related information systems and information. Chapter 6 provides an overview of the scope and objectives of business processes. It also discusses process adaptation and improvement and the use of process objectives and measures in making process changes. Chapter 7 is a survey of ERP information systems, their benefits, and their challenges.

Chapters 8 and 9 are "applied" chapters. They show how SAP is used in two representative processes: procurement and sales. Two processes were chosen so that students could begin to see what is common to all processes and what might differ between processes. These two processes, buying and selling, are fundamental to business and are widely used. Each chapter includes a student lab exercise appendix that uses the Global Bikes case from the SAP Alliance's curriculum.

Dynamic Processes

Chapters 10 through 12 address what we term *dynamic processes*. Such processes are neither as structured nor as rigid as the more structured operational processes. We dislike the term *unstructured processes* because we believe that such processes do have structure, at least at a meta-level. Each of the three chapters follows a similar flow: The IS that supports each process is discussed first, followed by the activities in the process, and concluding with the business processes supported by the dynamic process.

Chapter 10 discusses collaboration processes for both project management and workflow applications. Chapter 11 addresses the use of social media in organizations. We discuss Lin's theory of social capital, apply that theory to organizational use of social media systems, and survey the processes supported by social media systems. Chapter 12 considers business processes supported by business intelligence (BI) systems and discusses BI systems, data warehouses, data mining, and Big Data.

Extensions

We added 5 new Extensions to this edition of the textbook. These extensions discuss, in order, IS Careers, Software and Hardware, Process Management and IS Design, Robots and AI, and Location Based Data IS.

Appendix

With this edition we added a third structured process SAP tutorial. This tutorial takes a student through the SAP inputs required to accomplish the Production process.

Supplements

The following supplements are available at the Online Instructor Resource Center, accessible through www.pearsonhighered.com/kroenke.

Instructor's Manual

The Instructor's Manual, prepared by Hasan Bassam of the University of Toledo, includes a chapter outline, list of key terms, suggested answers to the MIS InClass questions, and answers to all end-of-chapter questions.

Test Item File

This Test Item File, prepared by Noreen Power of Bentley University, contains more than 1,500 questions, including multiple-choice, true/false, and essay questions. Each question is followed by the correct answer, the learning objective it ties to, page reference, AACSB category, and difficulty rating.

PowerPoint Presentations

The PowerPoints, prepared by Nancy Lamm of N. Lamm Consulting Associates, Ltd., highlight text learning objectives and key topics and serve as an excellent aid for classroom presentations and lectures.

Image Library

This collection of the figures and tables from the text offers another aid for classroom presentations and PowerPoint slides.

TestGen

Pearson Education's test-generating software is available from www.pearsonhighered.com/irc. The software is PC/MAC compatible and preloaded with all of the Test Item File questions. You can manually or randomly view test questions and drag and drop to create a test. You can add or modify test bank questions as needed. Our TestGens are converted for use in BlackBoard, WebCT, Moodle, D2L, and Angel. These conversions can be found on the Instructor's Resource Center. The TestGen is also available in Respondus and can be found on www.respondus.com.

CourseSmart

CourseSmart eTextbooks were developed for students looking to save on required or recommended textbooks. Students simply select their eText by title or author and purchase immediate access to the content for the duration of the course using any major credit card. With a CourseSmart eText, students can search for specific keywords or page numbers, take notes online, print out reading assignments that incorporate lecture notes, and bookmark important passages for later review. For more information or to purchase a CourseSmart eTextbook, visit www.coursesmart.com.

Acknowledgments

First, we thank the numerous fellow-traveler professors and professionals who encouraged the development of this text and who have helped us in many ways along our path. In particular, we thank:

Yvonne Antonucci, *Widener University*
 Cynthia Barnes, *Lamar University*
 John Baxter, *SAP*
 William Cantor, *Pennsylvania State University–York Campus*
 Thomas Case, *Georgia Southern University*
 Gail Corbitt, *SAP*
 Darice Corey, *Albertus Magnus College*
 Mike Curry, *Oregon State University*
 Heather Czech, *SAP*
 Peter Daboul, *Western New England University*
 Janelle Daugherty, *Microsoft Dynamics*
 Peter DeVries, *University of Houston, Downtown*
 Lauren Eder, *Rider University*
 Kevin Elder, *Georgia Southern University*
 John Erickson, *University of Nebraska at Omaha*
 Donna Everett, *Morehead State University*
 David Firth, *The University of Montana*
 Jerry Flatto, *University of Indianapolis*
 Kent Foster, *Microsoft*
 Biswadip Ghosh, *Metropolitan State College of Denver*
 Bin Gu, *University of Texas at Austin*
 William Haseman, *University of Wisconsin–Milwaukee*
 Jun He, *University of Michigan–Dearborn*
 Mark Hwang, *Central Michigan University*
 Gerald Isaacs, *Carroll University*
 Stephen Klein, *Ramapo University*
 Ben Martz, *University of Northern Kentucky*
 William McMillan, *Madonna University*
 Natalie Nazarenko, *SUNY College at Fredonia*
 Timothy O’Keefe, *University of North Dakota*
 Tony Pittarese, *East Tennessee State University*
 Martin Ruddy, *Bowling Green State University*
 James Sager, *California State University–Chico*
 Narcissus Shambare, *College of Saint Mary*
 Robert Szymanski, *Georgia Southern University*
 Lou Thompson, *University of Texas, Dallas*
 Ming Wang, *California State University*
 Harold Webb, *University of Tampa*

We wish to thank the unique production team that helped us bring this book into existence. First and foremost, we thank Samantha Lewis, our editor, for her vision for a process-oriented introductory MIS text, for her untiring support throughout the process and her many excellent additions. Thanks, too, to Nancy Lamm, our developmental editor, whose direction, guidance,