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Paige Baltzan

Business Driven Technology

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Tenth Edition



Business Driven Technology

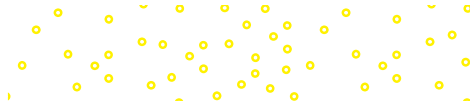
TENTH EDITION

Paige Baltzan

University of Colorado Denver

**Mc
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Hill**





BUSINESS DRIVEN TECHNOLOGY

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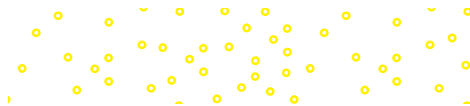
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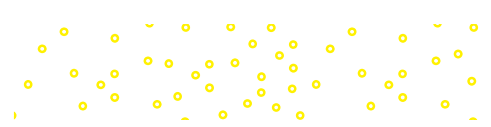




DEDICATION

In memory of Allan R. Biggs, my father, my mentor,
and my inspiration.

Paige



BRIEF TABLE OF CONTENTS

UNITS

1. Achieving Business Success

- Chapter 1: Business Driven Technology
- Chapter 2: Identifying Competitive Advantages
- Chapter 3: Strategic Initiatives for Implementing Competitive Advantages
- Chapter 4: Measuring the Success of Strategic Initiatives
- Chapter 5: Organizational Structures That Support Strategic Initiatives

2. Exploring Business Intelligence

- Chapter 6: Valuing and Storing Organizational Information—Databases
- Chapter 7: Accessing Organizational Information—Data Warehouses
- Chapter 8: Understanding Data's Impact on Business

3. Streamlining Business Operations

- Chapter 9: Enabling the Organization—Decision Making
- Chapter 10: Extending the Organization—Supply Chain Management
- Chapter 11: Building a Customer-centric Organization—Customer Relationship Management
- Chapter 12: Integrating the Organization from End to End—Enterprise Resource Planning

4. Building Innovation

- Chapter 13: Creating Innovative Organizations
- Chapter 14: Ebusiness
- Chapter 15: Creating Collaborative Partnerships

5. Transforming Organizations

- Chapter 16: Integrating Wireless Technology in Business
- Chapter 17: Developing Software to Streamline Operations
- Chapter 18: Managing Organizational Projects

BUSINESS PLUG-INS

B1	Business Basics	B6	Information Security
B2	Business Process	B7	Ethics
B3	Hardware and Software Basics	B8	Sustainable MIS Infrastructures
B4	MIS Infrastructures	B9	Business Intelligence
B5	Networks and Telecommunications	B10	Global Trends

TECHNOLOGY PLUG-INS

T1	Personal Productivity Using IT	T5	Designing Database Applications
T2	Basic Skills Using Excel	T6	Basic Skills Using Access
T3	Problem Solving Using Excel	T7	Problem Solving Using Access
T4	Decision Making Using Excel	T8	Decision Making Using Access

Apply Your Knowledge Projects
Notes

Glossary
Index

TABLE OF CONTENTS

About the Author x

Preface xiii

UNIT 1 2

Achieving Business Success 2

Data Analytics Careers: Top Skills for Your Future 3

CHAPTER 1: BUSINESS DRIVEN TECHNOLOGY 6

Competing in the Information Age 6

Data 8

Information 10

Business Intelligence 12

Knowledge 14

Systems Thinking and Management Information Systems 15

The MIS Solution 17

Systems Thinking 18

Chapter One Case: Do You Trust Your Data? 22

Learning Outcome Review 23

Review Questions 23

Making Business Decisions 24

Key Terms 26

CHAPTER 2: IDENTIFYING COMPETITIVE ADVANTAGES 27

Identifying Competitive Advantages 27

SWOT Analysis: Understanding Business Strategies 29

The Five Forces Model—Evaluating Industry Attractiveness 30

Buyer Power 30

Supplier Power 31

Threat of Substitute Products or Services 31

Threat of New Entrants 32

Rivalry Among Existing Competitors 32

Analyzing the Airline Industry 33

The Three Generic Strategies—Choosing a Business Focus 34

Value Chain Analysis—Executing Business Strategies 35

Chapter Two Case: SWOT Yourself 38

Learning Outcome Review 39

Review Questions 40

Making Business Decisions 40

Key Terms 43

CHAPTER 3: STRATEGIC INITIATIVES FOR IMPLEMENTING COMPETITIVE ADVANTAGES 44

Business Process Analysis 44

Supply Chain Management 47

Customer Relationship Management 48

Enterprise Resource Planning 50

Chapter Three Case: Data Bits 54

Learning Outcome Review 55

Review Questions 56

Making Business Decisions 56

Key Terms 57

CHAPTER 4: MEASURING THE SUCCESS OF STRATEGIC INITIATIVES 58

MIS Roles and Responsibilities 58

Metrics: Measuring Success 60

Efficiency and Effectiveness Metrics 62

The Interrelationship of Efficiency and Effectiveness

MIS Metrics 63

Metrics for Strategic Initiatives 64

Chapter Four Case: Is It Effective or Is It Efficient? 67

Learning Outcome Review 68

Review Questions 68

Making Business Decisions 69

Key Terms 72

CHAPTER 5: ORGANIZATIONAL STRUCTURES THAT SUPPORT STRATEGIC INITIATIVES 73

Information Ethics 73

Legal vs. Ethical 74

Information Does Not Have Ethics;

People Do 76

Information Security 77

Hackers: A Dangerous Threat to Business 80

Viruses: A Dangerous Threat to Business 81

Chapter Five Case: Data Analysis

Gone Wrong 84

Learning Outcome Review 85

Review Questions 85

Making Business Decisions 85

Unit Summary 88

Key Terms 88

Unit Closing Case One: The Internet of Things 89

Unit Closing Case Two: The Fourth Industrial Revolution: The Backdoor to Reengineering Reality 90

UNIT 2 92

Exploring Business Intelligence 92

Envision 2030: 17 Goals to Transform the World for Persons with Disabilities 93

Introduction 95

CHAPTER 6: VALUING AND STORING ORGANIZATIONAL INFORMATION—DATABASES 96

The Business Benefits of High-Quality Data 96

- Data Type: Transactional and Analytical 96
- Data Timeliness 98
- Data Quality 98
- Data Governance 100

Storing Data Using a Relational Database Management System 101

- Storing Data Elements in Entities and Attributes 102
- Creating Relationships Through Keys 103
- Coca-Cola Relational Database Example 104

Using a Relational Database for Business Advantages 104

- Increased Flexibility 104
- Increased Scalability and Performance 106
- Reduced Data Redundancy 106
- Increased Data Integrity (Quality) 106
- Increased Data Security 107

Chapter Six Case: Determining Data Quality Issues 108

Learning Outcome Review 109

Review Questions 109

Making Business Decisions 110

Key Terms 111

CHAPTER 7: ACCESSING ORGANIZATIONAL INFORMATION—DATA WAREHOUSES 112

Business Intelligence 112

- The Problem: Data Rich, Information Poor 112
- The Solution: Data Aggregation 113

Data Warehousing: Supporting Decisions with Business Intelligence 114

- Integrations: The Primary Goal of the Data Warehouse 116
- Data Analysis 118
- Data Lake 119
- Data Cleansing (or Scrubbing) 120

Chapter Seven Case: Data Cleansing: Can You Do It? 123

Learning Outcome Review 125

Review Questions 125

Making Business Decisions 126

Key Terms 128

CHAPTER 8: UNDERSTANDING DATA'S IMPACT ON BUSINESS 129

Storytelling with Data Visualizations 129

Distributed Hyperledgers: Blockchain 133

- How Blockchains Work 134
- Blockchain Advantages 137
- Non-fungible Tokens (NFTs) 138

Chapter Eight Case: Data Warehouse or Data Lake? 139

Learning Outcome Review 140

Review Questions 140

Making Business Decisions 140

Unit Summary 142

Key Terms 142

Unit Closing Case One: Data Visualization: Storytelling with Data 143

Unit Closing Case Two: Changing the Way You Think about Data 145

UNIT 3 148

Streamlining Business Operations 148

Attention, People, We Are Tracking You Right Now, with Facial Recognition 149

Introduction 150

CHAPTER 9: ENABLING THE ORGANIZATION—DECISION MAKING 151

Making Organizational Business Decisions 151

- The Decision-Making Process 152

Using MIS to Make Business Decisions 155

- Operational Support Systems 155
- Managerial Support Systems 156
- Strategic Support Systems 158

Using AI to Make Business Decisions 162

- Machine Learning 163
- Neural Networks 165
- Virtual Reality 167

Chapter Nine Case: Alexa: Can You Hear Me? 168

Learning Outcome Review 169

Review Questions 170

Making Business Decisions 170

Key Terms 173

CHAPTER 10: EXTENDING THE ORGANIZATION—SUPPLY CHAIN MANAGEMENT 174

Information Technology's Role in the Supply Chain 174

Technologies Reinventing the Supply Chain 176

- 3D Printing Supports Procurement 178
- RFID Supports Logistics 180
- Drones Support Logistics 182
- Robotics Supports Materials Management 183
- Blockchain Revamping the Supply Chain 184

Chapter Ten Case: Blockchain Is Disrupting the Supply Chain 186

Learning Outcome Review 188

Review Questions 188

Making Business Decisions 189

Key Terms 190

CHAPTER 11: BUILDING A CUSTOMER-CENTRIC ORGANIZATION—CUSTOMER RELATIONSHIP MANAGEMENT 191

Customer Relationship Management 191

- The Power of the Customer 192

Operational and Analytical CRM 192

- Marketing and Operational CRM 192
- Sales and Operational CRM 195
- Customer Service and Operational CRM 197
- Analytical CRM 197

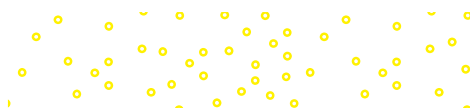
Chapter Eleven Case: Robots Took My Job 199

Learning Outcome Review 201

Review Questions 201

Making Business Decisions 201

Key Terms 203



CHAPTER 12: INTEGRATING THE ORGANIZATION FROM END TO END—ENTERPRISE RESOURCE PLANNING 204

Enterprise Resource Planning (ERP) 204

The Evolution of ERP 206

Integration Tools 207

Core and Extended ERP Components 208

Core ERP Components 209

Extended ERP Components 209

Measuring ERP Success 210

Organizational Integration with ERP 211

On-Premise ERP 212

Cloud ERP 212

Hybrid ERP 214

Chapter Twelve Case: Five Famous ERP Failures 216

Learning Outcome Review 218

Review Questions 218

Making Business Decisions 219

Unit Summary 222

Key Terms 222

Unit Closing Case One: Hootsuite 223

Unit Closing Case Two: Dream It, Design It, 3D Print It 224

UNIT 4 226

Building Innovation 226

The Warby Parker Way 227

Introduction 228

CHAPTER 13: CREATING INNOVATIVE ORGANIZATIONS 229

Disruptive Technologies and Web 1.0 229

Disruptive versus Sustaining Technology 229

The Internet and World Wide Web—The Ultimate Business

Disruptors 230

Advantages of Ebusiness 231

Web 1.0: The Catalyst for Ebusiness 231

Expanding Global Reach 232

Opening New Markets 233

Reducing Costs 233

Improving Effectiveness 234

Analyzing Website Data 235

Chapter Thirteen Case: Liberating Drivers and Riders: Uber 237

Learning Outcome Review 238

Review Questions 238

Making Business Decisions 238

Key Terms 241

CHAPTER 14: EBUSINESS 242

Ebusiness Models 242

Business-to-Business (B2B) 242

Business-to-Consumer (B2C) 243

Consumer-to-Business (C2B) 243

Consumer-to-Consumer (C2C) 243

Ebusiness Forms and Revenue-Generating Strategies 243

Search Engines 244

Ebusiness Fraud 245

Ebusiness Tools for Connecting and Communicating 246

Email 246

Instant Messaging 247

Podcasting 247

Video Chat 247

Content Management Systems 248

Chapter Fourteen Case: Are You Ready for Your Next Gig? 249

Learning Outcome Review 250

Review Questions 250

Making Business Decisions 250

Key Terms 252

CHAPTER 15: CREATING COLLABORATIVE PARTNERSHIPS 253

Web 2.0: Advantages of Business 2.0 253

Content Sharing through Open Sourcing 254

User-Contributed Content 255

Collaboration Inside the Organization 255

Collaboration Outside the Organization 256

Business 2.0: All About Social 257

Social Tagging 258

Social Collaboration 258

Blogs 259

Wikis 259

Social Trust 260

Web 3.0: Defining the Next Generation of Online Business Opportunities 261

Deep Web 261

Dark Web 262

Semantic Web 262

Chapter Fifteen Case: Coronavirus Collaboration 263

Learning Outcome Review 264

Review Questions 264

Making Business Decisions 265

Key Terms 266

Unit Closing Case One: Spotify: Music as a Mobile Service 267

Unit Closing Case Two: Social Media: The Weapon of Mass Destruction 268

UNIT 5 270

Transforming Organizations 270

Let My People Go Surfing: The Education of a Reluctant Businessman 271

Introduction 273

CHAPTER 16: INTEGRATING WIRELESS TECHNOLOGY IN BUSINESS 274

Understanding the Connected World 274

Measuring Wireless Network Performance 276

Wireless Networks Benefits 276

Wireless Network Categories 277

Personal Area Networks 278

Wireless LANs 278

Wireless MANs 279

Wireless WAN—Cellular Communication System 280



5G Networks: Disruption in Cellular Networks	280
5G and Wi-Fi 6	283
Wireless WAN—Satellite Communication System	284
Protecting Wireless Networks	284
Mobile Enterprise Management	286
Mobile Device Management	287
Mobile Application Management	288
Mobile Information Management	289
Business Applications of Wireless Networks	291
Radio-Frequency Identification (RFID)	291
Global Positioning System (GPS)	292
Geographic Information Systems (GIS)	293
<i>Chapter Sixteen Case: The Connected Car Revolution</i>	295
Learning Outcome Review	297
Review Questions	298
Making Business Decisions	298
Key Terms	302
CHAPTER 17: DEVELOPING SOFTWARE TO STREAMLINE OPERATIONS	303
The Systems Development Life Cycle (SDLC)	303
Phase 1: Planning	305
Phase 2: Analysis	305
Phase 3: Design	306
Phase 4: Development	307
Phase 5: Testing	309
Phase 6: Implementation	309
Phase 7: Maintenance	311
Software Development Methodologies	312
Agile Software Development Methodologies	313
<i>Chapter Seventeen Case: Fitness-as-a-Service</i>	316
Learning Outcome Review	317
Review Questions	318
Making Business Decisions	318
Key Terms	322
CHAPTER 18: MANAGING ORGANIZATIONAL PROJECTS	323
Using Project Management to Deliver Successful Projects	323
Unclear or Missing Business Requirements	324
Skipped Phases	324
Changing Technology	326
The Cost of Finding Errors in the SDLC	326
Balance of the Triple Constraints	326
Primary Project Planning Diagrams	328
Work Breakdown Structure	330
Outsourcing Projects	331
<i>Chapter Eighteen Case: Gamer Delight</i>	332
Learning Outcome Review	334
Review Questions	334
Making Business Decisions	335
Unit Summary	338
Key Terms	338
<i>Unit Closing Case One: Reducing Ambiguity in Business Requirements</i>	339
<i>Unit Closing Case Two: Stitch Fix</i>	340

Business Plug-Ins 342

B1: Business Basics 342

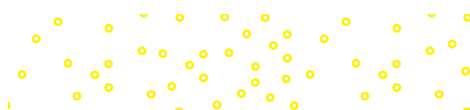
Introduction	342
Types of Business	342
Sole Proprietorship	343
Partnership	343
Corporation	343
Internal Operations of a Corporation	345
Accounting	345
Financial Statements	345
Finance	347
Financial Analysis	347
Human Resources	348
Management Techniques	348
Sales	349
The Sales Process	349
Market Share	350
Marketing	351
Marketing Mix	351
Customer Segmentation	351
The Product Life Cycle	353
Operations/Production	353
Transforming Corporations	353
Management Information Systems	354
Key Terms	356
Making Business Decisions	356

B2: Business Process 358

Business Process Modeling	358
Using MIS to Improve Business Processes	362
Operational Business Processes—Automation	362
Managerial Business Processes—Streamlining	364
Strategic Business Processes—Reengineering	365
Systems Thinking and BPR	366
Key Terms	369
Making Business Decisions	369

B3: Hardware and Software Basics 372

Introduction	372
Hardware Basics	372
Central Processing Unit	373
Primary Storage	374
Secondary Storage	376
Input Devices	378
Output Devices	379
Communication Devices	379
Computer Categories	379
Software Basics	382
System Software	382
Application Software	383
Distributing Application Software	383
Key Terms	385
Making Business Decisions	385



B4: MIS Infrastructures 386

The Business Benefits of a Solid MIS Infrastructure	386
Supporting Operations: Information MIS Infrastructure	388
Backup and Recovery Plan	389
Disaster Recovery Plan	389
Business Continuity Plan	392
Supporting Change: Agile MIS Infrastructure	394
Accessibility	394
Availability	395
Maintainability	396
Portability	396
Reliability	396
Scalability	397
Usability	397
Key Terms	399
Making Business Decisions	399

B5: Networks and Telecommunications 402

Introduction	402
Network Basics	402
Architecture	404
Peer-to-Peer Networks	404
Client/Server Networks	404
Topology	405
Protocols	405
Ethernet	406
Transmission Control Protocol/Internet Protocol	407
Media	408
Wire Media	408
Wireless Media	409
Key Terms	410
Making Business Decisions	410

B6: Information Security 412

The First Line of Defense—People	412
The Second Line of Defense—Technology	414
People: Authentication and Authorization	414
Defending with Authentication and Authorization	416
Data: Prevention and Resistance	417
Attack: Detection and Response	419
Key Terms	421
Making Business Decisions	421

B7: Ethics 424

Developing Information Management Policies	424
Ethical Computer Use Policy	424
Information Privacy Policy	425
Acceptable Use Policy	426
Email Privacy Policy	427
Social Media Policy	428
Workplace Monitoring Policy	429
Key Terms	431
Making Business Decisions	431

B8: Sustainable MIS Infrastructures 434

MIS and the Environment	434
Increased Electronic Waste	435
Increased Energy Consumption	435
Increased Carbon Emissions	435
Supporting the Environment: Sustainable MIS Infrastructure	436
Grid Computing	436
Virtualized Computing	438
Cloud Computing	442
Utility Computing	447
Key Terms	450
Making Business Decisions	450

B9: Business Intelligence 454

Operational, Tactical, and Strategic BI	454
BI's Operational Value	455
Data Mining	456
Data Mining Process Model	457
Data Mining Analysis Techniques	457
Data Mining Modeling Techniques for Predictions	460
Business Benefits of BI	462
Categories of BI Benefits	463
Key Terms	465
Making Business Decisions	465

B10: Global Trends 468

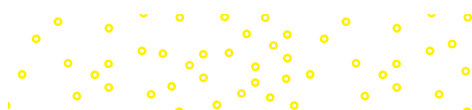
Reasons to Watch Trends	468
Trends Shaping Our Future	469
The World's Population Will Double over 40 Years	469
People in Developed Countries Are Living Longer	470
The Growth in Information Industries Is Creating a Knowledge-Dependent Global Society	471
The Global Economy Is Becoming More Integrated	471
The Economy and Society Are Dominated by Technology	471
Pace of Technological Innovation Is Increasing	472
Time Is Becoming One of the World's Most Precious Commodities	472
Technologies Shaping Our Future	472
The Digital Mesh	472
Smart Machines	473
The New IT Reality	474
Key Terms	475
Making Business Decisions	475

Apply Your Knowledge Projects AYK-478

Notes N-1

Glossary G-1

Index I-1



ABOUT THE AUTHOR

Paige Baltzan

Paige Baltzan is an Assistant Teaching Professor in the department of Business at the University of Colorado Denver. She holds a BSBA specializing in Accounting/MIS from Bowling Green State University and an MBA specializing in MIS from the University of Denver. She is a coauthor of several books, including *Business Driven Information Systems*, *Essentials of Business Driven Information Systems*, and *I-Series*, and is a contributor to *Management Information Systems for the Information Age*.

Before starting her teaching career in 1999, Paige spent several years working for a large telecommunications company and an international consulting firm where she participated in client engagements in the United States as well as South America and Europe.

The overall goal of the Technology Plug-Ins is to provide additional information not covered in the text such as personal productivity using information technology, problem solving using Excel, and decision making using Access. These plug-ins also offer an all-in-one text to faculty, avoiding their having to purchase an extra book to support Microsoft Office. These plug-ins offer integration with the core chapters and provide critical knowledge using essential business applications such as Microsoft Excel and Microsoft Access with hands-on tutorials for comprehension and mastery.

Plug-In	Description
T1. Personal Productivity Using IT	<p>This plug-in covers a number of things to do to keep a personal computer running effectively and efficiently. The topics covered in this plug-in are:</p> <ul style="list-style-type: none"> ■ Creating strong passwords. ■ Performing good file management. ■ Implementing effective backup and recovery strategies. ■ Using Zip files. ■ Writing professional emails. ■ Stopping spam. ■ Preventing phishing. ■ Detecting spyware. ■ Threads to instant messaging. ■ Increasing PC performance. ■ Using antivirus software. ■ Installing a personal firewall.
T2. Basic Skills Using Excel	<p>This plug-in introduces the basics of using Microsoft Excel, a spreadsheet program for data analysis, along with a few fancy features. The topics covered in this plug-in are:</p> <ul style="list-style-type: none"> ■ Workbooks and worksheets. ■ Working with cells and cell data. ■ Printing worksheets. ■ Formatting worksheets. ■ Formulas. ■ Working with charts and graphics.
T3. Problem Solving Using Excel	<p>This plug-in provides a comprehensive tutorial on how to use a variety of Microsoft Excel functions and features for problem solving. The areas covered in this plug-in are:</p> <ul style="list-style-type: none"> ■ Lists ■ Conditional formatting ■ AutoFilter ■ Subtotals ■ PivotTables
T4. Decision Making Using Excel	<p>This plug-in examines a few of the advanced business analysis tools used in Microsoft Excel that have the capability to identify patterns, trends, and rules, and create “what-if” models. The five topics covered in this plug-in are:</p> <ul style="list-style-type: none"> ■ IF ■ Lookup ■ Goal Seek ■ Solver ■ Scenario Manager

Plug-In	Description
T5. Designing Database Applications	<p>This plug-in provides specific details on how to design relational database applications. One of the most efficient and powerful information management computer-based applications is the relational database. The topics covered in this plug-in are:</p> <ul style="list-style-type: none"> ■ Entities and data relationships. ■ Documenting logical data relationships. ■ The relational data model. ■ Normalization.
T6. Basic Skills Using Access	<p>This plug-in focuses on creating a Microsoft Access database file. One of the most efficient information management computer-based applications is Microsoft Access. Access provides a powerful set of tools for creating and maintaining a relational database. The topics covered in this plug-in are:</p> <ul style="list-style-type: none"> ■ Create a new database file. ■ Create and modify tables.
T7. Problem Solving Using Access	<p>This plug-in provides a comprehensive tutorial on how to query a database in Microsoft Access. Queries are essential for problem solving, allowing a user to sort information, summarize data (display totals, averages, counts, and so on), display the results of calculations on data, and choose exactly which fields are shown. The topics in this plug-in are:</p> <ul style="list-style-type: none"> ■ Create simple queries using the simple query wizard. ■ Create advanced queries using calculated fields. ■ Format results displayed in calculated fields.
T8. Decision Making Using Access	<p>This plug-in provides a comprehensive tutorial on entering data in a well-designed form and creating functional reports using Microsoft Access. A form is essential to use for data entry, and a report is an effective way to present data in a printed format. The topics in this plug-in are:</p> <ul style="list-style-type: none"> ■ Creating, modifying, and running forms. ■ Creating, modifying, and running reports.

PREFACE

Unlike any other MIS text, *Business Driven Technology*, 10e, discusses various business initiatives first and how technology supports those initiatives second. The premise for this unique approach is that business initiatives should drive technology choices. Every discussion in the text first addresses the business needs and then addresses the technology that supports those needs.

Business Driven Technology offers you the flexibility to customize courses according to your needs and the needs of your students by covering only essential concepts and topics in the five core units, while providing additional in-depth coverage in the business and technology plug-ins.

Business Driven Technology contains 18 chapters (organized into five units), 10 business plug-ins, and 11 technology plug-ins offering you the ultimate flexibility in tailoring content to the exact needs of your MIS course. The unique construction of this text allows you to cover essential concepts and topics in the five core units while providing you with the ability to customize a course and explore certain topics in greater detail with the business and technology plug-ins.

Plug-ins are fully developed modules of text that include student learning outcomes, case studies, business vignettes, and end-of-chapter material such as key terms, individual and group questions and projects, and case study exercises.

We realize that instructors today require the ability to cover a blended mix of topics in their courses. Whereas some instructors like to focus on networks and infrastructure throughout their course, others choose to focus on ethics and security. *Business Driven Technology* was developed to easily adapt to your needs. Each chapter and plug-in is independent so you can:

- Cover any or all of the *chapters* as they suit your purpose.
- Cover any or all of the *business plug-ins* as they suit your purpose.
- Cover any or all of the *technology plug-ins* as they suit your purpose.
- Cover the plug-ins in any order you wish.



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MCGRAW HILL *CONNECT MIS* FEATURES

Connect MIS offers a number of powerful tools and features to make managing assignments easier, so faculty can spend more time teaching. With *Connect MIS*, students can engage with their coursework anytime and anywhere, making the learning process more accessible and efficient. *Connect MIS* offers you the features described next.

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- Access and review each response; manually change grades or leave comments for students to review.
- Reinforce classroom concepts with practice tests and instant quizzes.

Instructor Library

The *Connect MIS* Instructor Library is your repository for additional resources to improve student engagement in and out of class. You can select and use any asset that enhances your lecture. The *Connect MIS* Instructor Library includes:

- Instructor's Manual with
 - Classroom openers and exercises for each chapter.
 - Case discussion points and solutions.
 - Answers to all chapter questions and cases.
- PowerPoint Presentations with detailed lecture notes.
- Solution files to all Apply Your Knowledge problems.

Student Study Center

- The *Connect MIS* Student Study Center is the place for students to access additional data files, student versions of the PowerPoint slides, and more.

Student Progress Tracking

Connect MIS keeps instructors informed about how each student, section, and class is performing, allowing for more productive use of lecture and office hours. The progress-tracking function enables you to:

- View scored work immediately and track individual or group performance with assignment and grade reports.
- Access an instant view of student or class performance relative to learning objectives.
- Collect data and generate reports required by many accreditation organizations, such as AACSB.

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- Record and index PowerPoint presentations and anything shown on your computer so it is easily searchable, frame by frame.
- Offer access to lectures anytime and anywhere by computer, iPod, or mobile device.
- Increase intent listening and class participation by easing students' concerns about note taking. Lecture Capture will make it more likely you will see students' faces, not the tops of their heads.

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Many educational institutions today are focused on the notion of *assurance of learning*, an important element of some accreditation standards. *Business Driven Technology*, 10e, is designed specifically to support your assurance of learning initiatives with a simple yet powerful solution.

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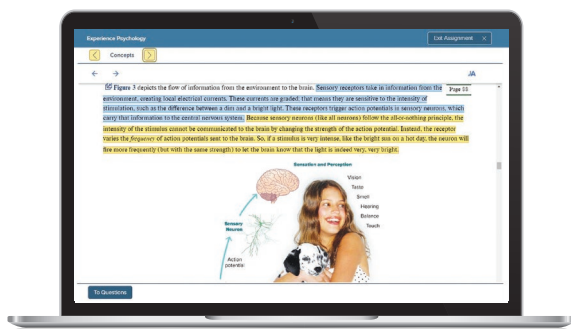
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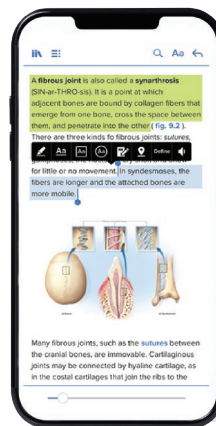
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- Jordan Cunningham,
Eastern Washington University

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Walkthrough

This text is organized around the traditional sequence of topics and concepts in information technology; however, the presentation of this material is nontraditional. That is to say, the text is divided into four major sections: (1) units, (2) chapters, (3) business plug-ins, and (4) technology plug-ins. This represents a substantial departure from existing traditional texts. The goal is to provide both students and faculty with only the most essential concepts and topical coverage in the text, while allowing faculty to customize a course by choosing from among a set of plug-ins that explore topics in more detail. All of the topics that form the core of the discipline are covered, including CRM, SCM, Porter's Five Forces Model, value chain analysis, competitive advantage, information security, and ethics.

Business Driven Technology

includes four major components:

- 5 Core Units
- 18 Chapters
- 10 Business Plug-Ins
- 8 Technology Plug-Ins

UNITS

1. Achieving Business Success

Chapter 1: Business Driven Technology
Chapter 2: Identifying Competitive Advantages
Chapter 3: Strategic Initiatives for Implementing Competitive Advantages
Chapter 4: Measuring the Success of Strategic Initiatives
Chapter 5: Organizational Structures That Support Strategic Initiatives

2. Exploring Business Intelligence

Chapter 6: Valuing and Storing Organizational Information—Databases
Chapter 7: Accessing Organizational Information—Data Warehouses
Chapter 8: Understanding Data's Impact on Business

3. Streamlining Business Operations

Chapter 9: Enabling the Organization—Decision Making
Chapter 10: Extending the Organization—Supply Chain Management
Chapter 11: Building a Customer-centric Organization—Customer Relationship Management
Chapter 12: Integrating the Organization from End to End—Enterprise Resource Planning

4. Building Innovation

Chapter 13: Creating Innovative Organizations
Chapter 14: Ebusiness
Chapter 15: Creating Collaborative Partnerships

5. Transforming Organizations

Chapter 16: Integrating Wireless Technology in Business
Chapter 17: Developing Software to Streamline Operations
Chapter 18: Managing Organizational Projects

BUSINESS PLUG-INS

B1	Business Basics	B6	Information Security
B2	Business Process	B7	Ethics
B3	Hardware and Software Basics	B8	Sustainable MIS Infrastructures
B4	MIS Infrastructures	B9	Business Intelligence
B5	Networks and Telecommunications	B10	Global Trends

TECHNOLOGY PLUG-INS

T1	Personal Productivity Using IT	T5	Designing Database Applications
T2	Basic Skills Using Excel	T6	Basic Skills Using Access
T3	Problem Solving Using Excel	T7	Problem Solving Using Access
T4	Decision Making Using Excel	T8	Decision Making Using Access

Apply Your Knowledge Projects
Notes

Glossary
Index

Format, Features, and Highlights

Business Driven Technology, 10e, is state of the art in its discussions, presents concepts in an easy-to-understand format, and allows students to be active participants in learning. The dynamic nature of information technology requires all students, more specifically business students, to be aware of both current and emerging technologies. Students are facing complex subjects and need a clear, concise explanation to be able to understand and use the concepts throughout their careers. By engaging students with numerous case studies, exercises, projects, and questions that enforce concepts, *Business Driven Technology* creates a unique learning experience for both faculty and students.

- **Logical Layout.** Students and faculty will find the text well organized with the topics flowing logically from one unit to the next and from one chapter to the next. The definition of each term is provided before it is covered in the chapter, and an extensive glossary is included at the back of the text. Each core unit offers a comprehensive opening case study, introduction, learning outcomes, unit summary, closing case studies, key terms, and making business decision questions. The plug-ins follow the same pedagogical elements with the exception of the exclusion of opening case and closing case studies in the technology plug-ins.
- **Thorough Explanations.** Complete coverage is provided for each topic that is introduced. Explanations are written so that students can understand the ideas presented and relate them to other concepts presented in the core units and plug-ins.
- **Solid Theoretical Base.** The text relies on current theory and practice of information systems as they relate to the business environment. Current academic and professional journals and websites upon which the text is based are found in the References at the end of the book—a road map for additional, pertinent readings that can be the basis for learning beyond the scope of the unit, chapter, or plug-in.
- **Material to Encourage Discussion.** All units contain a diverse selection of case studies and individual and group problem-solving activities as they relate to the use of information technology in business. Two comprehensive cases at the end of each unit reflect the concepts from the chapters. These cases encourage students to consider what concepts have been presented and then apply those concepts to a situation they might find in an organization. Different people in an organization can view the same facts from different points of view, and the cases will force students to consider some of those views.
- **Flexibility in Teaching and Learning.** While most textbooks that are “text only” leave faculty on their own when it comes to choosing cases, *Business Driven Technology* goes much further. Several options are provided to faculty with case selections from a variety of sources, including *CIO*, *Harvard Business Journal*, *Wired*, *Forbes*, and *Time*, to name just a few. Therefore, faculty can use the text alone, the text and a complete selection of cases, or anything in between.
- **Integrative Themes.** Several themes recur throughout the text, which adds integration to the material. Among these themes are value-added techniques and methodologies, ethics and social responsibility, globalization, and gaining a competitive advantage. Such topics are essential to gaining a full understanding of the strategies that a business must recognize, formulate, and, in turn, implement. In addition to addressing these in the chapter material, many illustrations are provided for their relevance to business practice. These include brief examples in the text as well as more detail presented in the corresponding plug-in(s) (business or technical).

Visual Content Map

Visual Content Map

Located at the beginning of the text and serving as a logical outline, the visual content map illustrates the relationship between each unit and its associated plug-ins.

Understanding the direct impact information has on an organization's bottom line is crucial to running a successful business. This text focuses on information, business, technology, and the integrated set of activities used to run most organizations. Many of these activities are the hallmarks of business today—analytics, machine learning, artificial intelligence, supply chain management, customer relationship management, enterprise resource planning, outsourcing, integration, ebusiness, and others. The five core units of this text cover these important activities in detail. Each unit is divided into chapters that provide individual learning outcomes and case studies. In addition to the five core units, there are technology and business “plug-ins” (see Figure Unit 1.1) that further explore topics presented in the five core units.

The chapters in Unit 1 are:

- Chapter 1—Business Driven Technology.
- Chapter 2—Identifying Competitive Advantages.
- Chapter 3—Strategic Initiatives for Implementing Competitive Advantages.
- Chapter 4—Measuring the Success of Strategic Initiatives.
- Chapter 5—Organizational Structures That Support Strategic Initiatives.

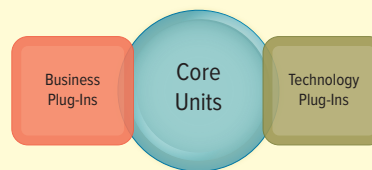


FIGURE UNIT 1.1
The Format and Approach of This Text.

Introduction and Learning Outcomes

Introduction. Located after the Unit Opening Case, the introduction familiarizes students with the overall tone of the chapters. Thematic concepts are also broadly defined.

Learning Outcomes. These outcomes focus on what students should learn and be able to answer upon completion of the chapter or plug-in.

Introduction

Decision making and problem solving in today's electronic world encompass large-scale, opportunity-oriented, strategically focused solutions. The traditional "cookbook" approach to decisions simply will not work in the ebusiness world. Decision-making and problem-solving abilities are now the most sought-after traits in up-and-coming executives. To put it mildly, decision makers and problem solvers have limitless career potential.

- **Ebusiness:** The conducting of business on the Internet, not only buying and selling, but also serving customers and collaborating with business partners.

With the fast growth of information technology and the accelerated use of the Internet, ebusiness is quickly becoming standard. This unit focuses on technology to help make decisions, solve problems, and find new innovative opportunities. The unit highlights how to bring people together with the best IT processes and tools in complete, flexible solutions that can seize business opportunities (see Figure Unit 3.1). The chapters in Unit 3 are:

- **Chapter 9**—Enabling the Organization—Decision Making.
- **Chapter 10**—Extending the Organization—Supply Chain Management.
- **Chapter 11**—Building a Customer-centric Organization—Customer Relationship Management.
- **Chapter 12**—Integrating the Organization from End to End—Enterprise Resource Planning.

LEARNING OUTCOMES

9.1 Explain the importance of decision making for managers at each of the three primary organization levels along with the associated decision characteristics.

9.2 Classify the different operational support systems, managerial support systems, and strategic support

systems, and explain how managers can use these systems to make decisions and gain competitive advantages.

9.3 Describe artificial intelligence and identify its three main types.

Unit Opening Case and Opening Case Study Questions

Unit Opening Case. To enhance student interest, each unit begins with an opening case study that highlights an organization that has been time-tested and value-proven in the business world. This feature serves to fortify concepts with relevant examples of outstanding companies. Discussion of the case is threaded throughout the chapters in each unit.

Opening Case Study Questions. Located at the end of each chapter, pertinent questions connect the Unit Opening Case with important chapter concepts.

UNIT ONE OPENING CASE

Data Analytics Careers: Top Skills for Your Future

Data analytics brings together theory and practice to identify and communicate data driven insights that allow managers, stakeholders, and other executives in an organization to make more informed decisions. Data is transforming and powering business everywhere—from smart homes and sustainable cities to online retail and green corporations. Business today is simple—it's data driven. Data in all forms and shapes provides insights into making strategic business decisions, including opening new markets, staffing hospitals and warehouses, and creating vaccines. Organizations in all industries increasingly rely on data to identify opportunities and solve business problems.

Any person competing in the business environment today must be able to capture, analyze, and decipher data to perform their jobs and advance their careers. We are living in the information age, a time when data is gold and offers the keys to the kingdom for running a successful business. Consider the following:

- **Uber does not own a single car**
- **Airbnb does not own a single hotel or rental property**
- **Facebook does not create any content**
- **Amazon does not make any products or own any inventory**
- **Zappos does not make any shoes**

It is really simple: Data is driving and transforming business. As a result, shifting workforces have companies searching for data-savvy candidates who understand how to work with data to sleuth the patterns that provide insights into the business. Providing communication with visualizations that influence decision making is also key.

The data analyst hiring market is hot, and there are more than 2.5 million job openings for data-related roles. In fact, the U.S. Bureau of Labor Statistics has indicated 11.5 million data job openings will be created by 2026.

OPENING CASE STUDY QUESTIONS

1. You have landed your dream job working for Steve Evert. Unfortunately, Steve doesn't know anything about making solid business decisions. Your first assignment is to help educate Steve on the difference between transactional and analytical information and how he can use a digital dashboard to consolidate data and drill down into the details of data to help run his business.
2. Steve would also like you to create a document highlighting the different types of artificial intelligence systems and how each system might help support making business decisions.

Projects and Case Studies

Case Studies. This text is packed with case studies illustrating how a variety of prominent organizations and businesses have successfully implemented many of this text's concepts. All cases promote critical thinking. Company profiles are especially appealing and relevant to your students, helping to stir classroom discussion and interest.

Project 1:
Financial Destiny

You have been introduced to Microsoft Excel and are ready to begin using it to help track your monthly expenses and take charge of your financial destiny. The first step is to create a personal budget so you can see where you are spending money and if you need to decrease your monthly expenses or increase your monthly income.

Project Focus

Create a template for a monthly budget of your income and expenditures, with some money set aside for savings (or you can use the data file, *AYK1_Data.xlsx*, we created). Create variations of this budget to show how much you could save if you cut back on certain expenses, found a roommate, or got a part-time job. Compare the costs of a meal plan to costs of groceries. Consider how much interest would be earned if you saved \$100 a month, or how much debt paid on student loans or credit card bills. To expand your data set, make a fantasy budget for 10 years from now, when you might own a home, have student loan payments, and have a good salary.

Data File: *AYK1_Data.xlsx*

Chapter One Case: Do You Trust Your Data?

Data is the new oil. Data drives fact-based decisions. As a manager, you are going to rely on data to drive your business decisions. Can you imagine making a critical business decision on bad data? Have you ever stopped to ask yourself if you trust your data? What will happen if you make a business decision on incorrect, inaccurate, or low-quality data? Obviously, chances are high you will make the wrong decision, and that is the primary risk when using data to drive your decisions. Here are a few examples of organizations that fell into the trap of making important decisions on incorrect data.

- **Fidelity:** A missing negative sign on a dividend report cost this financial company \$2.6 billion.
- **Harvard:** Two professors reached an incorrect conclusion with an average formula that failed to pull all of the data.
- **London Olympics:** An accidental typo of 20,000 instead of 10,000 caused the sale of 10,000 additional tickets for the synchronized swimming event.
- **MIS:** The British intelligence agency accidentally bugged more than 1,000 wrong telephones based on a formatting error on a spreadsheet.
- **TransAlta:** This Canadian power company made a simple cut-and-paste error for buying power at the wrong price, which cost it \$24 million.
- **University of Toledo:** A typo in a spreadsheet formula led to an overestimate of enrollment, over-inflating revenue by \$2.4 million.³

There is a famous saying in the tech industry: "Garbage in is garbage out" (GIGO). I can be the greatest data analyst in my company, but if the data I am analyzing is wrong, then my analysis will be wrong. But many of us forget to ask about the quality of our data, and we respond too quickly and confidently. There is a common statistic stating that over 80 percent of spreadsheets have errors. Why are there so many errors in spreadsheets? It is simple. Spreadsheets are created by people and people make mistakes! It is important to remember that you should never assume that you have high-quality data. You should always do the upfront work to verify the quality of your data. This will require a great deal of work before you even begin your analysis but can pay off tremendously as you make decisions with greater confidence.

Bad data is costly. With data driving so many decisions in our lives, the cost of bad data truly impacts us all, whether or not we realize it. IBM estimates that bad data costs U.S. businesses over \$3 trillion yearly. Most people who deal with data realize that bad data can be extremely costly, but this number is truly stunning. The majority of businesses analyze customer data, but there is little chance of the business succeeding if the data is wrong.

Apply Your Knowledge. At the end of this text is a set of 33 projects aimed at reinforcing the business initiatives explored in the text. These projects help to develop the application and problem-solving skills of your students through challenging and creative business-driven scenarios.

Making Business Decisions

Making Business Decisions.

Small scenario-driven projects help students focus on decision making as they relate to the topical elements in the chapters and plug-ins.

* MAKING BUSINESS DECISIONS

1. ANALYTICS: Who Really Won the Winter Olympics?

If you were watching the Winter Olympics, I bet you were excited to see your country and its amazing athletes compete. As you were following the Olympics day by day, you were probably checking different websites to see how your country ranked. And depending on the website you visited, you could get a very different answer to this seemingly easy question. On the NBC and ESPN networks, the United States ranked second, and on the official Sochi Olympics website, the United States ranked fourth. The simple question of who won the Winter Olympics changes significantly, depending on whom you asked.

In a group, take a look at the following two charts and brainstorm the reasons each internationally recognized source has a different listing for the top five winners. What measurement is each chart using to determine the winner? Who do you believe is the winner? As a manager, what do you need to understand when reading or listening to business forecasts and reports?

Rank	Country	Gold	Silver	Bronze	Total
1	Russian Fed.	13	11	9	33
2	United States	9	7	12	28
3	Norway	11	5	10	26
4	Canada	10	10	5	25
5	Netherlands	8	7	9	24

Rank	Country	Gold	Silver	Bronze	Total
1	Russian Fed.	13	11	9	33
2	Norway	11	5	10	26
3	Canada	10	10	5	25
4	United States	9	7	12	28
5	Netherlands	8	7	9	24

2. CAREER OPPORTUNITY: Starting Your Own Business

Josh James sold his web analytics company, Omniture, to Adobe for \$1.8 billion. Yes, James started Omniture from his dorm room! Have you begun to recognize the unbelievable opportunities available to those students who understand the power of MIS, regardless of their major? What's stopping you from starting your own business today? You are living in the information age and, with the power of MIS, it is easier than ever to jump into the business game with very little capital investment. Why not start your own business today?

End-of-Unit Elements

* UNIT CLOSING CASE TWO

Dream It, Design It, 3D Print It

Have you ever lost a beloved pet? No worries, just draw a picture of your pet and print a plastic replica from your 3D desktop printer so your cat or dog can sit on your desk forever. Can you imagine printing your drawing in 3D? Well, there is no need to imagine this because you can do it today for as little as \$300. Just think of all the problems you can solve by having your own 3D printer. Did you recently lose the key to your car's roof rack? No worries, just download the specifications and print one. Did you forget your girlfriend's birthday? No worries, just download and customize a silver bracelet with her initials, and in less than 30 minutes, you'll have the beautiful custom piece of jewelry on her wrist—without ever leaving your apartment.

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* MAKING BUSINESS DECISIONS

1. ANALYTICS: Big Business Decisions: Excel vs. Access

Excel is a great tool with which to perform business analytics. Your friend John Cross owns a successful publishing company specializing in do-it-yourself books. John started the business 10 years ago, and it has slowly grown to 50 employees and \$1 million in sales. John has been using Excel to run the majority of his business, tracking book orders, production orders, shipping orders, and billing. John even uses Excel to track employee payroll and vacation dates. To date, Excel has done the job, but as the company continues to grow, the tool is becoming inadequate.

You believe John could benefit because Excel has done the job processes and technology. John has Excel and the benefits of Access to make the switch.

2. DISCUSSION: Data Timeliness

Data timeliness is a major consideration of backups and updates to a database.

* KEY TERMS

Analytical data, 97	Data redundancy, 106	Metadata, 102
Attributes, 102	Data steward, 100	Physical view of data, 104
Business-critical integrity constraints, 107	Data stewardship, 100	Primary key, 103
Business rule, 106	Data validation, 101	Query-by-example (QBE) tool, 101
Data dictionary, 102	Database, 101	Real-time data, 98
Data element (or data field), 102	Database management system (DBMS), 101	Real-time systems, 98
Data gap analysis, 100	Entity, 102	Record, 102
Data governance, 101	Foreign key, 103	Relational database management system, 102
Data granularity, 96	Identity management, 107	Relational database model, 102
Data inconsistency, 98	Integrity constraints, 106	Relational integrity constraints, 107
Data integrity, 98	Logical view of data, 104	Structured query language (SQL), 101
Data latency, 106	Master data management (MDM), 101	Transactional data, 96
Data models, 102		

Each unit contains complete pedagogical support in the form of:

- **Unit Summary.** Revisiting the unit highlights in summary format.
- **Key Terms.** With page numbers referencing where they are discussed in the text.
- **Two Closing Case Studies.** Reinforcing important concepts with prominent examples from businesses and organizations. Discussion questions follow each case study.
- **Apply Your Knowledge Application Projects.** Highlights the different AYK projects available at the end of the text that takes the MIS concepts and challenges the students to apply them using Excel, Access, and other tools.

The plug-ins are designed to allow faculty to customize their course and cover selected topics in more detail. Students will read core material related to all of the plug-ins in the five units.

As an example, students will learn about various facets of customer relationship management (CRM) most notably in Chapter 11. However, customer relationship management has its own business plug-in. The CRM business plug-in gives both faculty and students the ability to cover CRM in more detail if desired. Likewise, students will receive an introduction to decision making in Unit 3. The Excel technology plug-ins allow coverage of decision-making tools such as PivotTables, Goal Seek, and Scenario Manager.

About the Plug-Ins

PLUG-IN
B1
Business Basics

LEARNING OUTCOMES

- 1 Define the three common business forms.
- 2 List and describe the seven departments commonly found in most organizations.

LO 1 Define the three common business forms.

Introduction

A sign posted beside a road in Colorado states, "Failing to plan is planning to fail." Playnix Toys posted the sign after successfully completing its 20th year in the toy business in Colorado. The company's mission is to provide a superior selection of high-end toys for children of all ages. When the company began, it generated interest by using unique marketing strategies and promotions. The toy business has a lot of tough competition. Large chain stores such as

Management Focus. By focusing on the business plug-ins, your course will take on a managerial approach to MIS.

PLUG-IN
T3
Problem Solving Using Excel 2019

LEARNING OUTCOMES

1. Describe how to create and sort a list in Excel.
2. Explain why you would use conditional formatting in Excel.
3. Describe the use of the Excel AutoFilter feature.
4. Explain how to use the Excel Subtotal command.
5. Describe the use of the Excel PivotTable feature.

Introduction

If you routinely track large amounts of information, such as customer mailing lists, phone lists, product inventories, sales transactions, and so on, you can use the extensive list management capabilities of Excel to make your job easier.

In this plug-in you will learn how to create a list in a workbook, sort the list based on one or more fields, locate important records by using filters, organize and analyze entries by using subtotals, and create summary information by using pivot tables and pivot charts. The lists that you create will be compatible with Microsoft Access, and if you are not already

Technical Focus. If hands-on, technical skills are more important, include technical plug-ins in your MIS course.

End-of-Plug-In Elements

Each business plug-in contains complete pedagogical support in the form of:

- **Key Terms.** With page numbers referencing where they are discussed in the text.
- **Making Business Decisions.** Small scenario-driven projects that help students focus individually on decision making as they relate to the topical elements in the chapters.

* KEY TERMS

Accounting, 345	For-profit corporations, 343	Operations management, 353
Accounting department, 345	Human resources (HR), 348	Owner's equity, 346
Asset, 346	Income statement, 346	Partnership agreement, 343
Balance sheet, 346	Liability, 346	Partnerships, 343
Bookkeeping, 345	Limited liability, 343	Product life cycle, 353
Break-even point, 348	Limited liability corporation (LLC), 344	Profit, 342
Capital, 343	Limited partnership, 343	Revenue, 346
Corporation (also called organization, enterprise, or business), 343	Loss, 342	Sales, 349
Dividends, 346	Managerial accounting, 345	Shareholder, 343
Expenses, 346	Market segmentation, 351	Sole proprietorship, 343
Finance, 347	Marketing, 351	Solvency, 346
Financial accounting, 345	Marketing communications, 351	Statement of cash flows, 347
Financial quarter, 347	Marketing mix, 351	Statement of owner's equity, 346
Financial statements, 346	Net income, 346	Transaction, 345
	Not-for-profit (or nonprofit) corporations, 343	

* MAKING BUSINESS DECISIONS

1. STRATEGY: Identifying and Following Trends

DigitalMarketingExperts.com is a new business that specializes in helping companies identify and follow significant trends in their industries. You have recently been hired as a new business analyst and your first task is to highlight current trends in the ebusiness industry. Using the Internet and any other resources you have available, highlight five significant trends not discussed in this text. Prepare a PowerPoint presentation that lists the trends and discusses the potential business impacts for each trend.

2. INFORMATION SYSTEMS: NAO Robots

NAO (pronounced *now*) robots are about as cute as anything ever created, and boy, can they dance. A NAO robot is an autonomous, programmable, humanoid robot developed by Aldebaran Robotics, a French robotics company headquartered in Paris. NAO robots have been used for research and education purposes in numerous academic institutions worldwide. As of 2015, over 5,000 NAO units are in use in more than 50 countries. Visit the web to search for NAO robot videos and create a new product or service for a NAO robot.

3. CAREER OPPORTUNITIES: Educational Robots

Robots have always grabbed the attention and imagination of kids (of all ages). RobotLAB uses this attention to build core 21st-century skills such as programming and computational thinking. Using advanced robots, RobotLAB makes abstract math and computer science real by focusing lessons around complex problems that become intuitive through interaction and manipulation of the robots. Visit <http://www.robotlab.com/> and review the many robots they are creating to help education. Create a new robot that could help you with your college experience.

4. DISCUSSION: Less Is More

Your organization is teetering on the edge of systems chaos. Your systems administrator is stressed beyond tolerance by too many systems, too many applications, too few resources, and too little time. The scope, frequency, and diversity of demand are causing greater risk than anyone dares to admit. Automating (and reducing complexity of) the operating environment is critical for

Support and Supplemental Material

All of the supplemental material supporting *Business Driven Technology* was developed by the author to ensure you receive accurate, high-quality, and in-depth content. Included are a complete set of materials that will assist students and learning outcomes.

Test Bank. This computerized package allows instructors to custom design, save, and generate tests. The test program permits instructors to edit, add, or delete questions from the test banks; analyze test results; and organize a database of tests and student results.

- **Instructor's Manual (IM).** The IM, written by the author, includes suggestions for designing the course and presenting the material. Each chapter is supported by answers to end-of-chapter questions and problems and suggestions concerning the discussion topics and cases.
- **PowerPoint Presentations.** A set of PowerPoint slides, created by the author, accompanies each chapter that features bulleted items that provide a lecture outline, plus key figures and tables from the text, and detailed teaching notes on each slide.
- **Classroom Exercises.** Choose from over 30 detailed classroom exercises that engage and challenge students. For example, if you are teaching systems development, start the class with the "Skyscraper Activity" in which the students build a prototype that takes them through each phase of the systems development life cycle. All classroom exercises can be found in the instructor PowerPoints and the Instructor Manuals.
- **Project Files.** The author has provided files for all projects that need further support, such as data files.
- **Cohesion Case.** Now assignable through Connect, The Broadway Café is a running case instructors can use to reinforce core material such as customer relationship management, supply chain management, business intelligence, and decision making. The case has 15 sections that challenge students to develop and expand their grandfather's coffee shop. Students receive hands-on experience in business and learn technology's true value of enabling business. Please note that the Cohesion Case is not a McGraw Hill product but a Baltzan direct product.

Supplements:

- Business Driven Teaching Notes
- Instructor Resource Library in McGraw Hill Connect
- Instructor's Manual and Video Case Guide
- PowerPoint Presentations
- Classroom Exercises
- Project Files

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Business Driven Technology



Achieving Business Success

What's in IT for Me?

This unit sets the stage for diving into *Business Driven Technology*. It starts from the ground floor by providing a clear description of what information is and how it fits into business strategies and organizational activities. It then provides an overview of how organizations operate in competitive environments and must continually define and redefine their business strategies to create competitive advantages. Doing so allows organizations to not only survive but also thrive. Individuals who understand and can access and analyze the many different enterprisewide information systems dramatically improve their decision-making and problem-solving abilities. Most importantly, information systems are key business enablers for successful operations in competitive environments.

You, as a business student, must understand the tight correlation between business and technology. You must first recognize information's role in daily business activities and then understand how information supports and helps implement global business strategies and competitive advantages. After reading this chapter, you should have a solid understanding of business driven information systems and their role in managerial decision making and problem solving.

UNIT ONE OPENING CASE

Data Analytics Careers: Top Skills for Your Future

Data analytics brings together theory and practice to identify and communicate data driven insights that allow managers, stakeholders, and other executives in an organization to make more informed decisions. Data is transforming and powering business everywhere—from smart homes and sustainable cities to online retail and green corporations. Business today is simple—it's data driven. Data in all forms and shapes provides insights into making strategic business decisions, including opening new markets, staffing hospitals and warehouses, and creating vaccines. Organizations in all industries increasingly rely on data to identify opportunities and solve business problems.

Any person competing in the business environment today must be able to capture, analyze, and decipher data to perform their jobs and advance their careers. We are living in the information age, a time when data is gold and offers the keys to the kingdom for running a successful business. Consider the following:

- **Uber does not own a single car**
- **Airbnb does not own a single hotel or rental property**
- **Facebook does not create any content**
- **Amazon does not make any products or own any inventory**
- **Zappos does not make any shoes**

It is really simple: Data is driving and transforming business. As a result, shifting workforces have companies searching for data-savvy candidates who understand how to work with data to sleuth the patterns that provide insights into the business. Providing communication with visualizations that influence decision making is also key.

The data analyst hiring market is hot, and there are more than 2.5 million job openings for data-related roles. In fact, the U.S. Bureau of Labor Statistics has indicated 11.5 million data job openings will be created by 2026.

The explosion of data in all areas of business around the world has given rise to one of the most in-demand, booming fields today: analytics. The average salary for data analysts ranges between \$85,000 and \$138,000. Surprisingly, almost 50% of corporations report having issues finding qualified data analysts and data scientist professionals even with such high salaries.

If you believe the ability to analyze data will help your career path, then this course is perfect for you. Throughout this course, you will learn the following:

- **Data analysis techniques**
- **Data transformation styles**



- **Data governance**
- **Data compliance**
- **Data warehousing**
- **Data driven business process automation**
- **Data ethics and privacy**
- **Data security**

According to the McKinsey Global Institute, 30 percent of the hours worked globally could be automated by 2030, depending on the speed of adoptions, technical feasibility, the pace of technology development, and social and regulatory compliance. Of course, this is not always a bad thing as automation can also lead to an increase in new jobs. When the ATM was first introduced, it actually caused an increase in the number of bank tellers as banks competed to provide increased customer satisfaction with personal customer service. The invention of the personal computer destroyed 3.5 million jobs, including typewriter manufacturing, secretarial work, and bookkeeping. However, 19 million jobs were created, including computer manufacturing, computer scientists, and business computer specialists. Current estimates conclude that this new era could create 20 to 50 million new jobs globally.¹

Understanding the direct impact information has on an organization's bottom line is crucial to running a successful business. This text focuses on information, business, technology, and the integrated set of activities used to run most organizations. Many of these activities are the hallmarks of business today—analytics, machine learning, artificial intelligence, supply chain management, customer relationship management, enterprise resource planning, outsourcing, integration, ebusiness, and others. The five core units of this text cover these important activities in detail. Each unit is divided into chapters that provide individual learning outcomes and case studies. In addition to the five core units, there are technology and business “plug-ins” (see Figure Unit 1.1) that further explore topics presented in the five core units.

The chapters in Unit 1 are:

- Chapter 1—Business Driven Technology.
- Chapter 2—Identifying Competitive Advantages.
- Chapter 3—Strategic Initiatives for Implementing Competitive Advantages.
- Chapter 4—Measuring the Success of Strategic Initiatives.
- Chapter 5—Organizational Structures That Support Strategic Initiatives.

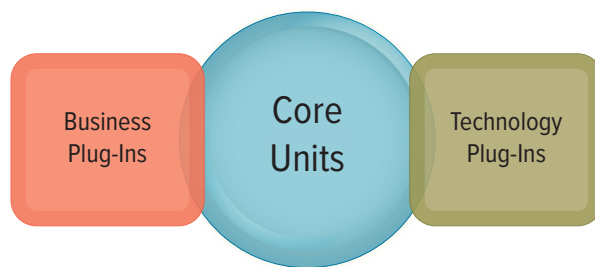


FIGURE UNIT 1.1

The Format and Approach of This Text.

LEARNING OUTCOMES

1.1 Describe the information age and the differences among data, information, business intelligence, and knowledge.

1.2 Explain systems thinking and how management information systems enable business communications.

LO 1.1 Describe the information age and the differences among data, information, business intelligence, and knowledge.

Competing in the Information Age

Did you know that . . .

- The movie *Avatar* took more than 4 years to create and cost \$450 million.
- Lady Gaga's real name is Stefani Joanne Angelina Germanotta.
- Customers pay \$3.7 million for a 30-second advertising time slot during the Super Bowl.²

Today, by simply pushing a button people can find out anything, from anywhere, at any time.

- **Fact:** The confirmation or validation of an event or object. In the past, people primarily learned facts from books.
- **Information age:** The present time, during which infinite quantities of facts are widely available to anyone who can use a computer.

The impact of information technology on the global business environment is equivalent to the printing press's impact on publishing and electricity's impact on productivity. College student start-ups were mostly unheard of before the information age. Now, it's not at all unusual to read about a business student starting a multimillion-dollar company from their dorm room. Think of Mark Zuckerberg, who started Facebook from his dorm, or Michael Dell (Dell Computers) and Bill Gates (Microsoft), who both founded their legendary companies as college students.

You may think only students well versed in advanced technology can compete in the information age. This is simply not true. Many business leaders have created exceptional opportunities by coupling the power of the information age with traditional business methods. Here are just a few historical examples:

- Amazon's original business focus was to sell books.
- Netflix's original business focus was to rent videos via mailboxes.
- Zappos's original business focus was to sell shoes.

Amazon's founder, Jeff Bezos, at first saw an opportunity to change the way people purchase books. Using the power of the information age to tailor offerings to each customer and speed the payment process, he in effect opened millions of tiny virtual bookstores, each with a vastly larger selection and far cheaper product than traditional bookstores. The success of his original business model led him to expand Amazon to carry many other types of products. The founders of Netflix and Zappos have done the same thing for movies and shoes. All these entrepreneurs were business professionals, not technology experts. However, they understood enough about the information age to apply it to a particular business, creating innovative companies that now lead entire industries. Students who understand business along with the

power associated with the information age will create their own opportunities and perhaps even new industries.

- **Internet of Things (IoT):** A world where interconnected Internet-enabled devices or “things” can collect and share data without human intervention.
- **Machine-to-machine (M2M):** Refers to devices that connect directly to other devices. Just think of your smart watch directly connecting with your smart phone.

You might be wearing a smartwatch (IoT device) that is tracking each time your heart beats and every single calorie you burn during your day. Today devices are connecting in ways not previously thought possible, and researchers predict that over 100 billion IoT devices will be communicating by 2025 creating petabytes of data. Just imagine the amount of data being sent via Wi-Fi between these devices without any human intervention. This was not even possible a few decades ago as devices didn’t have enough capacity to store the massive amounts of data and Wi-Fi networks didn’t exist.

IoT is transforming our world into a living information system as we control our intelligent lighting from our smart phone and perform a daily health check from our smart toilet. Of course with all great technological advances come unexpected risks, and you have to be prepared to encounter various security issues with IoT. Just imagine if your devices were hacked by someone who now has the ability to shut off your water, take control of your car, or unlock the doors of your home from thousands of miles away. We are just beginning to understand the security issues associated with IoT and M2M, and you can be sure that sensitive data leakage from your IoT device is something you will most likely encounter in your life.

Students who understand business along with the power associated with the information age will create their own opportunities and perhaps even new industries. Realizing the value of obtaining real-time data from connected “things” will allow you to make more informed decisions, identify new opportunities, and analyze customer patterns to predict new behaviors. Learning how to collect, analyze, and communicate data is a critical skill for all business managers that want to lead by making data driven decisions. The core drivers of the information age include:

- Data.
- Information.
- Business intelligence.
- Knowledge (see Figure 1.1).

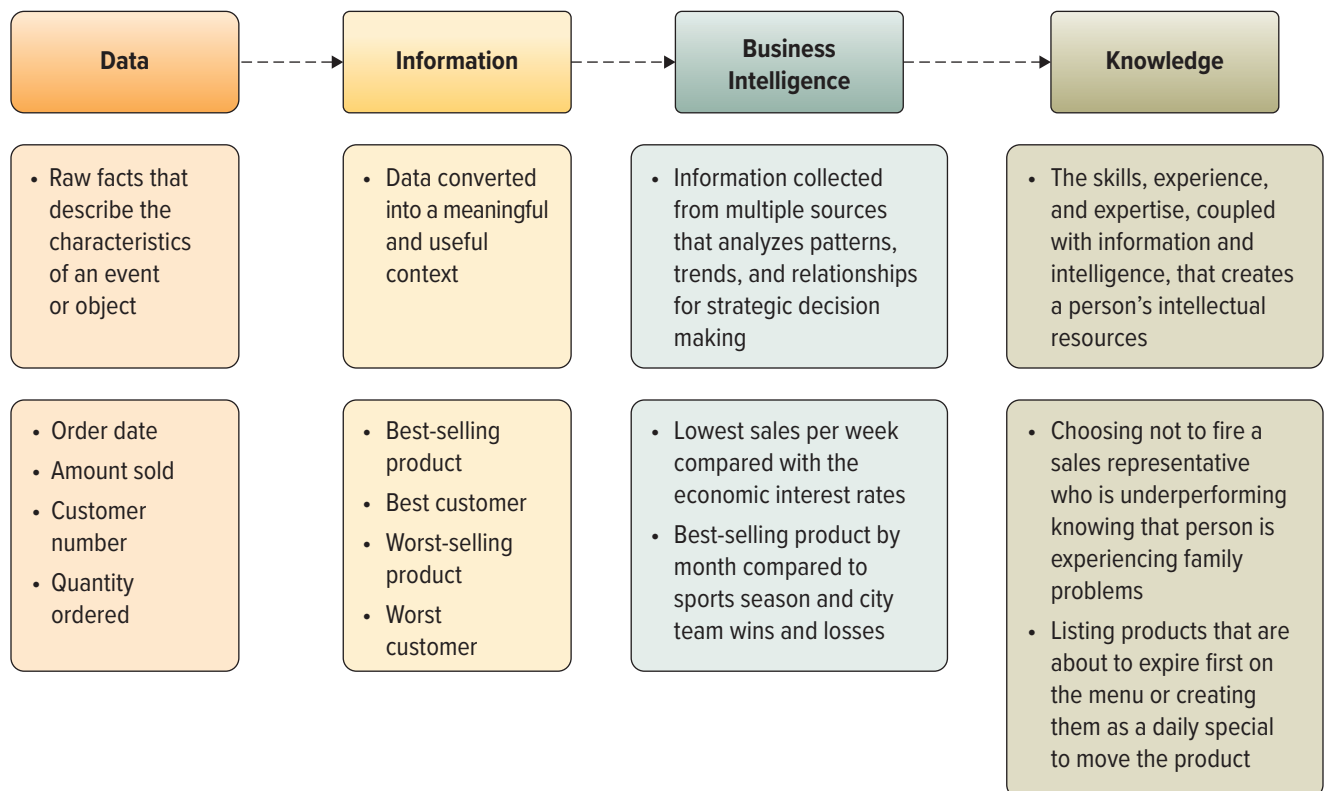


FIGURE 1.1
The Differences among Data, Information, Business Intelligence, and Knowledge.

DATA

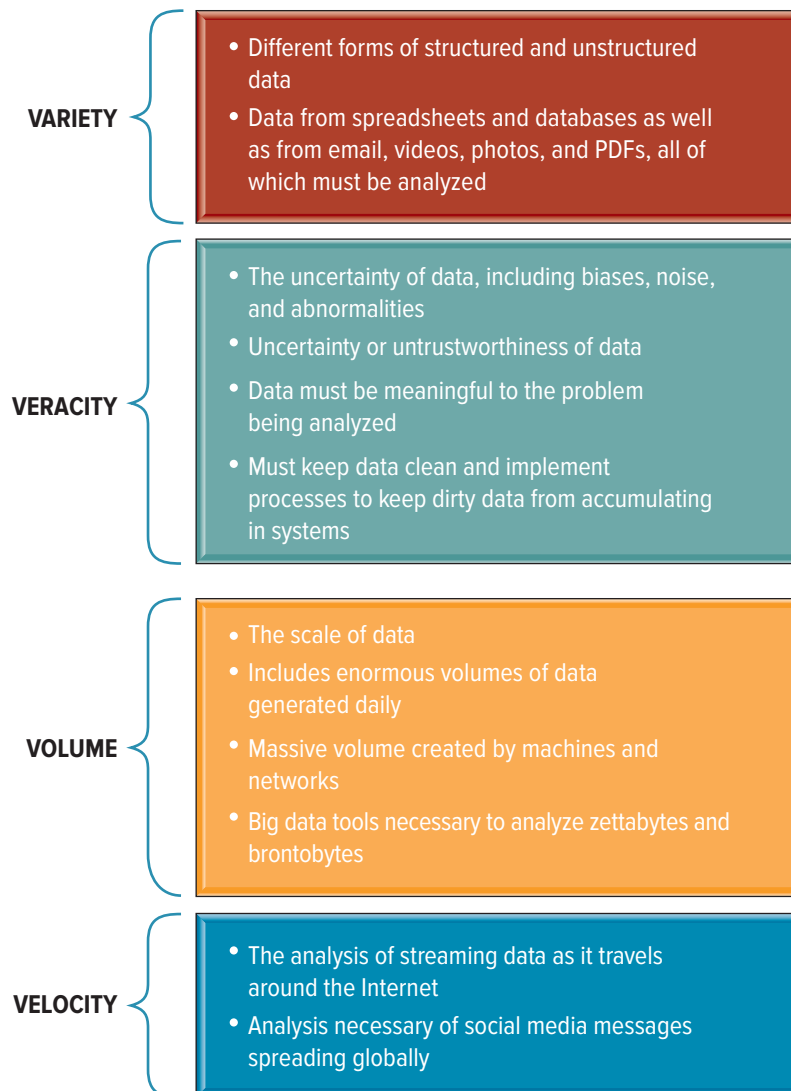
Today, data is your competitive advantage. It allows you to make evidence-based decisions to help you run your operations and analyze past data to make future predictions. Before the information age, managers manually collected and analyzed data, a time-consuming and complicated task without which they would have little insight into how to run their business. Data-driven decisions enable savvy companies to create business strategies that increase profits, reduce risk, and optimize business processes.

- **Data:** Raw facts that describe the characteristics of an event or object.
- **Big data:** A collection of large complex datasets, including structured and unstructured data, which cannot be analyzed using traditional database methods and tools.

A simple way to think of big data is that it is too large to fit on a single computer. The move to big data combines business with science and research activities and includes petabytes of data, which is equivalent to 20 million four-drawer file cabinets filled with text files, or 13 years of HDTV content. The emergence of big data is a result of the last 50 years of technology evolution, and its four common characteristics include large data volumes, high velocity, wide variety, and veracity. A company can now analyze petabytes of data for patterns, trends, and anomalies, gaining insights into data in new and exciting ways. The four common characteristics of big data are detailed in Figures 1.2 and 1.3.

FIGURE 1.2

Four Common Characteristics of Big Data.



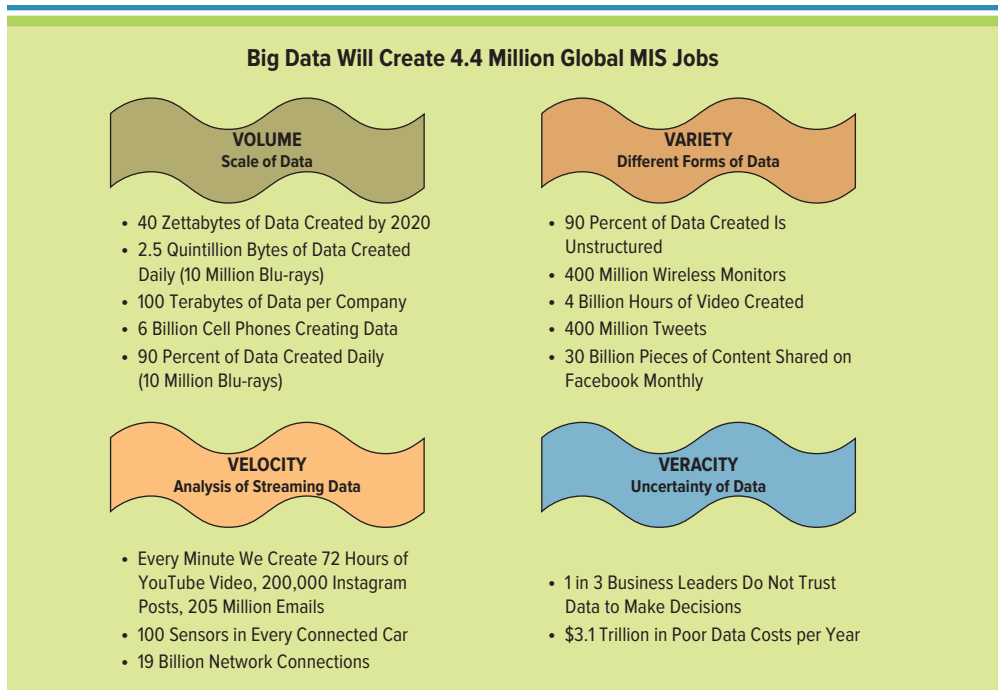


FIGURE 1.3
Big Data Will Create 4.4 Million Global MIS Jobs.

Structured data has a defined length, type, and format and includes numbers, dates, or strings such as Customer Address. Structured data is typically stored in a traditional system such as a relational database or spreadsheet and accounts for about 20 percent of the data that surrounds us. The sources of structured data include:

- **Machine-generated data:** Created by a machine without human intervention. Machine-generated structured data includes sensor data, point-of-sale data, and web log data.
- **Human-generated data:** Data that humans, in interaction with computers, generate. Human-generated structured data includes input data, click-stream data, or gaming data.

Unstructured data is not defined and does not follow a specified format and is typically free-form text such as emails, Twitter tweets, and text messages. Unstructured data accounts for about 90 percent of the data that surrounds us. The sources of unstructured data include:

- **Machine-generated unstructured data:** Includes satellite images, scientific atmosphere data, and radar data.
- **Human-generated unstructured data:** Includes text messages, social media data, and emails. (See Figure 1.4.)

STRUCTURED DATA	UNSTRUCTURED DATA
Sensor data	Satellite images
Weblog data	Photographic data
Financial data	Video data
Clickstream data	Social media data
Point-of-sale data	Text message
Accounting data	Voice mail data

FIGURE 1.4
Structured and Unstructured Data Examples.