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Business Driven Technology

EIGHTH EDITION

Paige Baltzan

Daniels College of Business

University of Denver

Mc Graw Hill Education

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BUSINESS DRIVEN TECHNOLOGY, EIGHTH EDITION

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DEDICATION

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

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ABOUT THE AUTHOR

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Paige Baltzan is an Assistant Teaching Professor in the department of Business Information and Analytics at the Daniels College of Business at the University of 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 joining the Daniels College faculty 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. Paige lives in Lakewood, Colorado, with her husband, Tony, and daughters, Hannah and Sophie.

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THE TECHNOLOGY PLUG-INS

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, Microsoft Access, and Microsoft Project with hands-on tutorials for comprehension and mastery. Plug-Ins T1 to T12 are located in McGraw-Hill Connect at **http://connect.mheducation.com.**

Plug-In	Description
T1. Personal Productivity Using IT	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: ■ 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	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: ■ Workbooks and worksheets. ■ Working with cells and cell data. ■ Printing worksheets. ■ Formatting worksheets. ■ Formulas. ■ Working with charts and graphics.
T3. Problem Solving Using Excel	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: ■ Lists ■ Conditional Formatting ■ AutoFilter ■ Subtotals ■ PivotTables
T4. Decision Making Using Excel	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 four topics covered in this plug-in are: ■ IF ■ Lookup ■ Goal Seek ■ Solver ■ Scenario Manager
T5. Designing Database Applications	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: ■ Entities and data relationships. ■ Documenting logical data relationships. ■ The relational data model. ■ Normalization.

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Plug-in	Description
T6. Basic Skills Using Access	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: ■ Create a new database file. ■ Create and modify tables.
T7. Problem Solving Using Access	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: ■ 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	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: ■ Creating, modifying, and running forms. ■ Creating, modifying, and running reports.
T9. Designing Web Pages	This plug-in provides a comprehensive assessment into the functional aspects of web design. Websites are beginning to look more alike and to employ the same metaphors and conventions. The web has now become an everyday thing whose design should not make users think. The topics in this plug-in are: ■ The World Wide Web. ■ Designing for the unknown(s). ■ The process of web design. ■ HTML basics. ■ Web fonts. ■ Web graphics.
T10. Creating Web Pages Using HTML	This plug-in provides an overview of creating web pages using the HTML language. HTML is a system of codes that you use to create interactive web pages. It provides a means to describe the structure of text-based information in a document—by denoting certain text as headings, paragraphs, lists, and so on. The topics in this plug-in are: ■ An introduction to HTML. ■ HTML tools. ■ Creating, saving, and viewing HTML documents. ■ Apply style tags and attributes. ■ Using fancy formatting. ■ Creating hyperlinks. ■ Displaying graphics.
T11. Creating Gantt Charts with Excel and Microsoft Project	This plug-in offers a quick and efficient way to manage projects. Excel and Microsoft Project are great for managing all phases of a project, creating templates, collaborating on planning processes, tracking project progress, and sharing information with all interested parties. The two topics in this plug-in are: ■ Creating Gantt Charts with Excel. ■ Creating Gantt Charts with Microsoft Project.

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PREFACE

Unlike any other MIS text, *Business Driven Technology, 8*e, 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 19 chapters (organized into five units), 12 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. While 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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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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Simple Assignment Management

With *Connect MIS,* creating assignments is easier than ever, so you can spend more time teaching and less time managing. The assignment management function enables you to:

- Create and deliver assignments easily with selectable interactive exercises, scenario-based questions, and test bank items.
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- Instructor's Manual with
  - Classroom openers and exercises for each chapter.
  - Case discussion points and solutions.
  - Answers to all chapter questions and cases.
  - Video guides–discussion points, questions and answers.
- PowerPoint Presentations with detail 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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Increase the attention paid to lecture discussion by decreasing the attention paid to note taking. For an additional charge Lecture Capture offers new ways for students to focus on the in-class discussion, knowing they can revisit important topics later. Lecture Capture enables you to:

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- Record and index PowerPoint presentations and anything shown on your computer so it is easily searchable, frame by frame.

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- 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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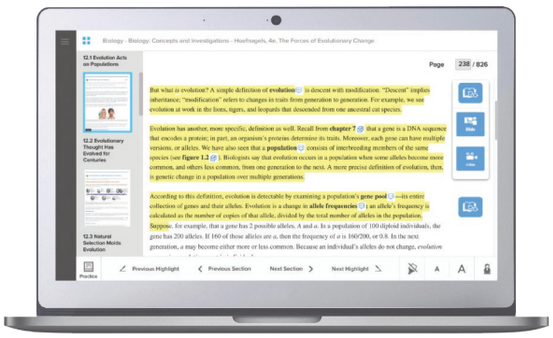

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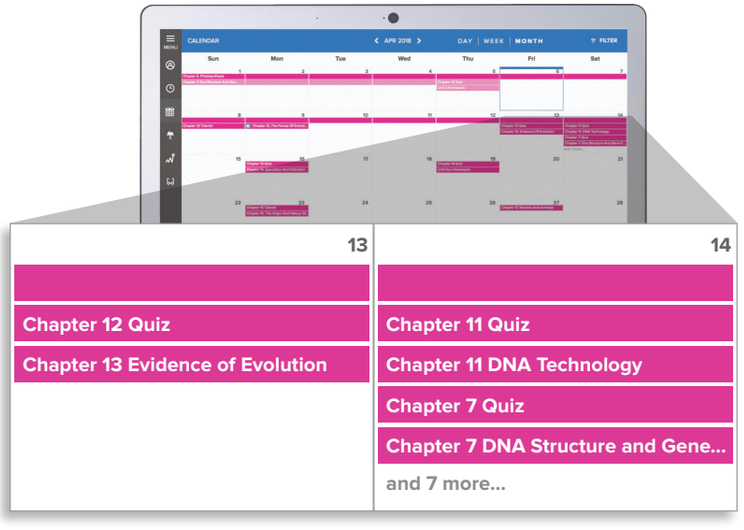

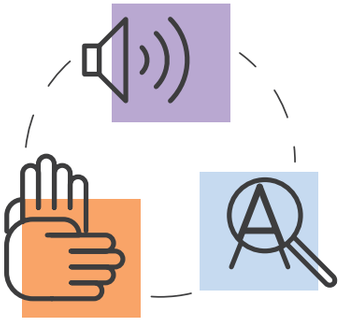

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Walkthrough

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
- 19 Chapters
- 12 Business Plug-Ins
- 11 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 Big Data and Its 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
   - Chapter 16: Integrating Wireless Technology in Business
5. **Transforming Organizations**
   - Chapter 17: Developing Software to Streamline Operations
   - Chapter 18: Methodologies for Supporting Agile Organizations
   - Chapter 19: Managing Organizational Projects

BUSINESS PLUG-INS

B1 Business Basics
B2 Business Process
B3 Hardware and Software Basics
B4 MIS Infrastructures
B5 Networks and Telecommunications
B6 Information Security
B7 Ethics
B8 Operations Management
B9 Sustainable MIS Infrastructures
B10 Business Intelligence
B11 Global Information Systems
B12 Global Trends

TECHNOLOGY PLUG-INS (CONNECT ONLY)

T1 Personal Productivity Using IT
T2 Basic Skills Using Excel
T3 Problem Solving Using Excel
T4 Decision Making Using Excel
T5 Designing Database Applications
T6 Basic Skills Using Access
T7 Problem Solving Using Access
T8 Decision Making Using Access
T9 Designing Web Pages
T10 Creating Web Pages Using HTML
T11 Creating Gantt Charts with Excel and Microsoft Project

Apply Your Knowledge Projects
Notes
Glossary
Index

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Format, Features, and Highlights

Business Driven Technology, 8e, 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).

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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.

Introduction

Information is everywhere. Most organizations value information as a strategic asset. Organizational success depends heavily on the ability to gather and analyze information about operations, suppliers, customers, and markets. Information can answers such questions as who are your best and worst customers? How much inventory do you need to meet demand? Where can you source the cheapest raw materials? How can you increase sales or reduce costs? Answering these questions incorrectly can lead directly to business failure. Estimating too many buyers will lead to an excess of inventory; estimating too few buyers will potentially lead to lost sales due to lack of product (resulting in even more lost revenues).

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—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.

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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 is the conducting of business on the Internet, not only buying and selling, but also serving customers and collaborating with business partners. (Unit 4 discusses ebusiness in detail.) 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 3.3). 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 five main types.

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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

Big Data, Big Analytics

Imagine working 10 years to become the lead marketing executive at a large retail organization only to find that your competitor is invading your market share by 20 percent each year. You quickly decided to launch several online marketing promotions while improving your products, only to find your efforts are fruitless as your competitor continues to steal your customers, destroying your profits while raising its own.

As you begin to analyze your competitor's business strategy, you find that while you were focused on sales reports, product inventory analysis, and other traditional marketing efforts, your competitor was making a massive investment in upgrading all of its management information systems. This included systems capable of collecting, storing, and analyzing data from every store, product, and sales representative in the market. In fact, your competitor now knows more about your products and sales cycles than you do. The new systems not only collect data throughout its company, but also from a group of suppliers, retailers, and distributors around the globe. These new systems provide your competitor with the ability to adjust prices instantly based on daily customer traffic patterns, reorder automatically from every entity in the supply chains, and even move items within a store or between stores for maximum selling efficiencies.

Your competitor has won and not because it had a higher-quality product or better sales and marketing strategies, but because it identified the value of management information systems coupled with the ability to instantly access big data within and beyond the organization. You quickly realize that your competitor's agility simply cannot be mimicked, offering it a huge competitive advantage. You sigh as you realize your company is in big trouble because it did not understand the dynamics of the big data age.

We are all familiar with the information age and the improvements made to organizations around the world as they are able to better manage employees, track sales information, and

OPENING CASE STUDY QUESTIONS

1. You have landed your dream job working for Steve Evert. Unfortunately, Steve does not understand the difference between difference between efficiency MIS metrics and effectiveness MIS metrics. Provide Steve with an overview of the importance of metrics and the difference between efficiency MIS metrics and effectiveness MIS metrics.

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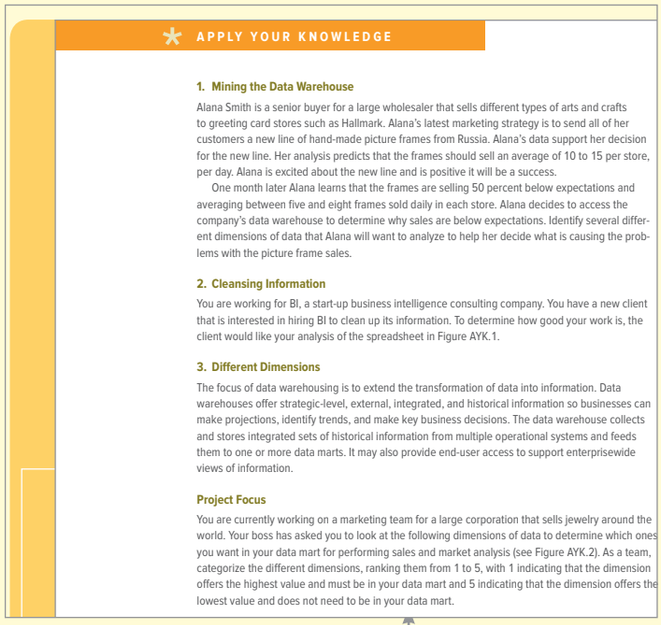
Projects and Case Studies

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.



APPLY YOUR KNOWLEDGE

1. Mining the Data Warehouse

Alana Smith is a senior buyer for a large wholesaler that sells different types of arts and crafts to greeting card stores such as Hallmark. Alana's latest marketing strategy is to send all of her customers a new line of hand-made picture frames from Russia. Alana's data support her decision for the new line. Her analysis predicts that the frames should sell an average of 10 to 15 per store, per day. Alana is excited about the new line and is positive it will be a success.

One month later Alana learns that the frames are selling 50 percent below expectations and averaging between five and eight frames sold daily in each store. Alana decides to access the company's data warehouse to determine why sales are below expectations. Identify several different dimensions of data that Alana will want to analyze to help her decide what is causing the problems with the picture frame sales.

2. Cleansing Information

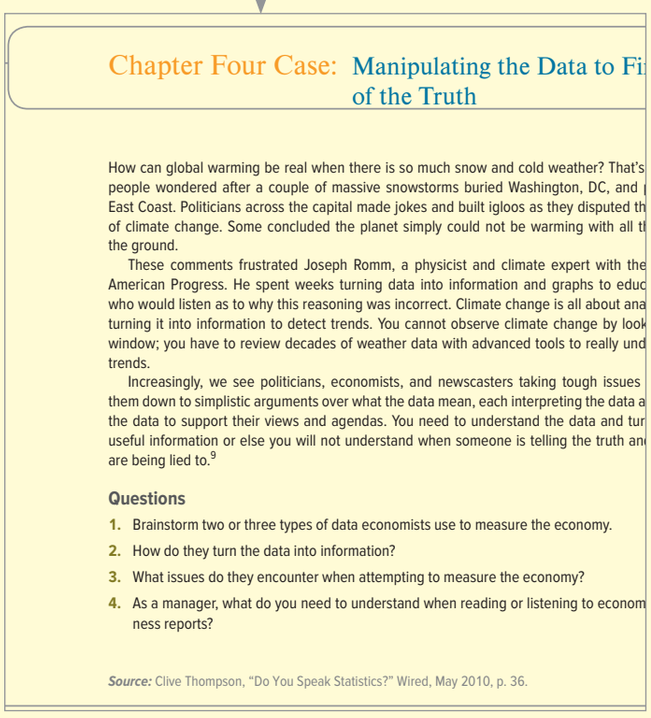
You are working for BI, a start-up business intelligence consulting company. You have a new client that is interested in hiring BI to clean up its information. To determine how good your work is, the client would like your analysis of the spreadsheet in Figure AYK.1.

3. Different Dimensions

The focus of data warehousing is to extend the transformation of data into information. Data warehouses offer strategic-level, external, integrated, and historical information so businesses can make projections, identify trends, and make key business decisions. The data warehouse collects and stores integrated sets of historical information from multiple operational systems and feeds them to one or more data marts. It may also provide end-user access to support enterprisewide views of information.

Project Focus

You are currently working on a marketing team for a large corporation that sells jewelry around the world. Your boss has asked you to look at the following dimensions of data to determine which ones you want in your data mart for performing sales and market analysis (see Figure AYK.2). As a team, categorize the different dimensions, ranking them from 1 to 5, with 1 indicating that the dimension offers the highest value and must be in your data mart and 5 indicating that the dimension offers the lowest value and does not need to be in your data mart.



Chapter Four Case: Manipulating the Data to Fi
of the Truth

How can global warming be real when there is so much snow and cold weather? That's people wondered after a couple of massive snowstorms buried Washington, DC, and East Coast. Politicians across the capital made jokes and built igloos as they disputed th of climate change. Some concluded the planet simply could not be warming with all t the ground.

These comments frustrated Joseph Romm, a physicist and climate expert with the American Progress. He spent weeks turning data into information and graphs to educ who would listen as to why this reasoning was incorrect. Climate change is all about ana turning it into information to detect trends. You cannot observe climate change by look window; you have to review decades of weather data with advanced tools to really und trends.

Increasingly, we see politicians, economists, and newscasters taking tough issues them down to simplistic arguments over what the data mean, each interpreting the data a the data to support their views and agendas. You need to understand the data and tur useful information or else you will not understand when someone is telling the truth an are being lied to.[9]

Questions

1. Brainstorm two or three types of data economists use to measure the economy.
2. How do they turn the data into information?
3. What issues do they encounter when attempting to measure the economy?
4. As a manager, what do you need to understand when reading or listening to econom ness reports?

Source: Clive Thompson, "Do You Speak Statistics?" Wired, May 2010, p. 36.

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.

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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. Who Really Won the Winter Olympics?

If you were watching the 2014 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 Sochie Olympic website, the United States ranked fourth. The simple question of who won the 2014 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?

Winter Olympics 2014 Medal Ranking According to NBC News

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

Winter Olympics 2014 Medal Ranking According to Official Sochie Olympic Website

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. Starting Your Own Business

Josh James recently sold his web analytics company, Omniture, to Adobe for $1.8 billion. Yes,

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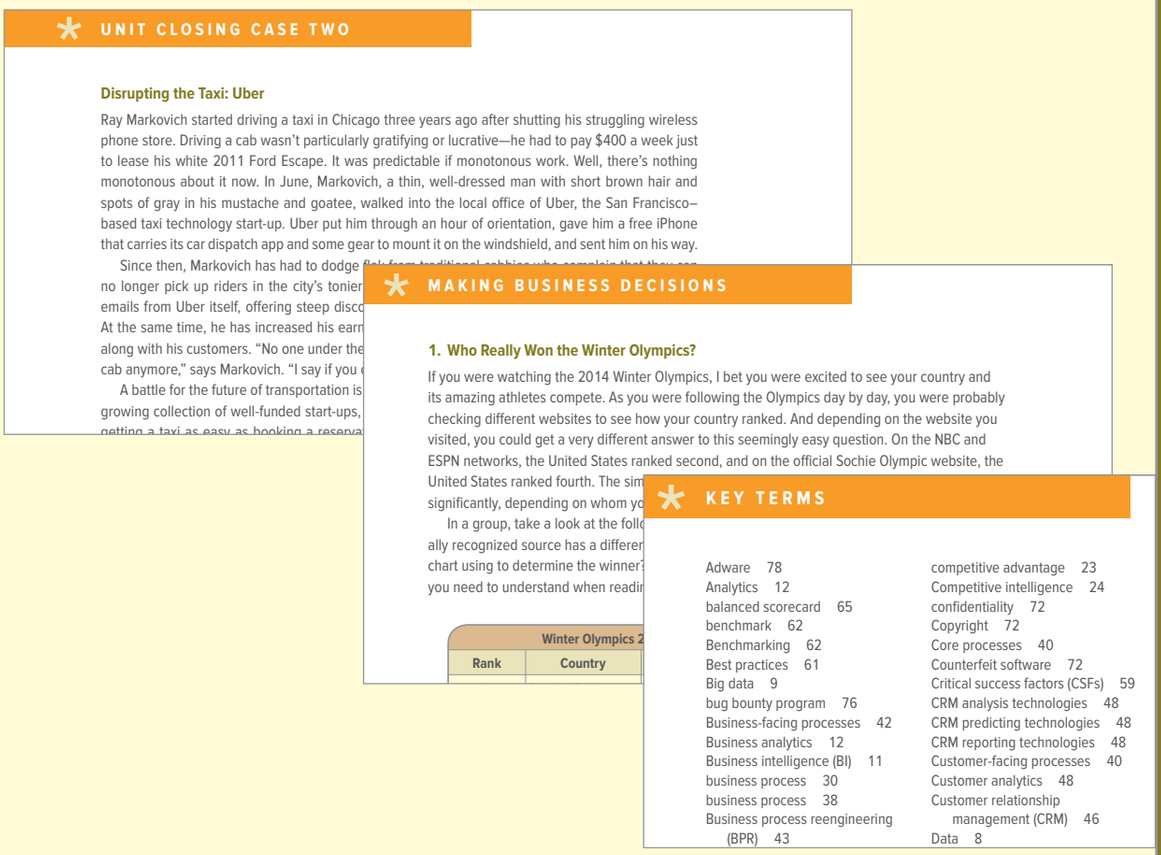
End-of-Unit Elements



UNIT CLOSING CASE TWO

Disrupting the Taxi: Uber

Ray Markovich started driving a taxi in Chicago three years ago after shutting his struggling wireless phone store. Driving a cab wasn't particularly gratifying or lucrative—he had to pay $400 a week just to lease his white 2011 Ford Escape. It was predictable if monotonous work. Well, there's nothing monotonous about it now. In June, Markovich, a thin, well-dressed man with short brown hair and spots of gray in his mustache and goatee, walked into the local office of Uber, the San Francisco–based taxi technology start-up. Uber put him through an hour of orientation, gave him a free iPhone that carries its car dispatch app and some gear to mount it on the windshield, and sent him on his way.

Since then, Markovich has had to dodge
no longer pick up riders in the city's tonier
emails from Uber itself, offering steep disco
At the same time, he has increased his earn
along with his customers. "No one under the
cab anymore," says Markovich. "I say if you

A battle for the future of transportation is
growing collection of well-funded start-ups,
getting a taxi as easy as booking a reserva

MAKING BUSINESS DECISIONS

1. Who Really Won the Winter Olympics?

If you were watching the 2014 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 Sochie Olympic website, the United States ranked fourth. The sim
significantly, depending on whom yo

In a group, take a look at the follo
ally recognized source has a differer
chart using to determine the winner?
you need to understand when readir

Winter Olympics 2	
Rank	Country

KEY TERMS

Adware 78
Analytics 12
balanced scorecard 65
benchmark 62
Benchmarking 62
Best practices 61
Big data 9
bug bounty program 76
Business-facing processes 42
Business analytics 12
Business intelligence (BI) 11
business process 30
business process 38
Business process reengineering (BPR) 43
competitive advantage 23
Competitive intelligence 24
confidentiality 72
Copyright 72
Core processes 40
Counterfeit software 72
Critical success factors (CSFs) 59
CRM analysis technologies 48
CRM predicting technologies 48
CRM reporting technologies 48
Customer-facing processes 40
Customer analytics 48
Customer relationship management (CRM) 46
Data 8

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.** In-depth projects that help students focus on applying the skills and concepts they have learned throughout the unit.
- **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.

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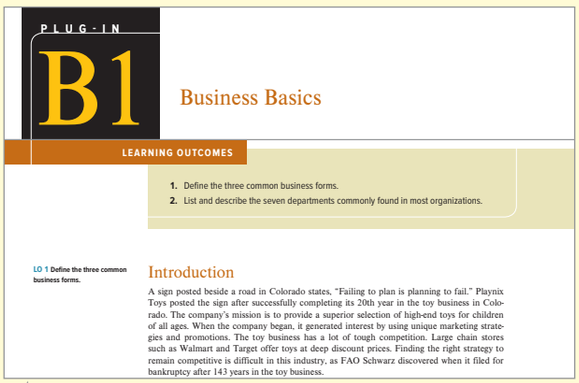
About the Plug-Ins

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.



PLUG-IN

B1

Business Basics

LEARNING OUTCOMES

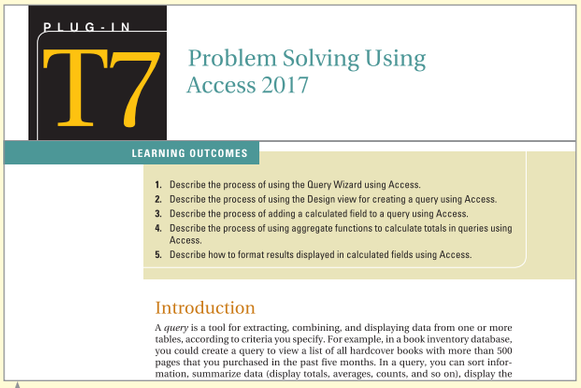
1. Define the three common business forms.
2. List and describe the seven departments commonly found in most organizations.

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 Walmart and Target offer toys at deep discount prices. Finding the right strategy to remain competitive is difficult in this industry, as FAO Schwarz discovered when it filed for bankruptcy after 143 years in the toy business.

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



PLUG-IN

T7

Problem Solving Using Access 2017

LEARNING OUTCOMES

1. Describe the process of using the Query Wizard using Access.
2. Describe the process of using the Design view for creating a query using Access.
3. Describe the process of adding a calculated field to a query using Access.
4. Describe the process of using aggregate functions to calculate totals in queries using Access.
5. Describe how to format results displayed in calculated fields using Access.

Introduction

A *query* is a tool for extracting, combining, and displaying data from one or more tables, according to criteria you specify. For example, in a book inventory database, you could create a query to view a list of all hardcover books with more than 500 pages that you purchased in the past five months. In a query, you can sort information, summarize data (display totals, averages, counts, and so on), display the

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

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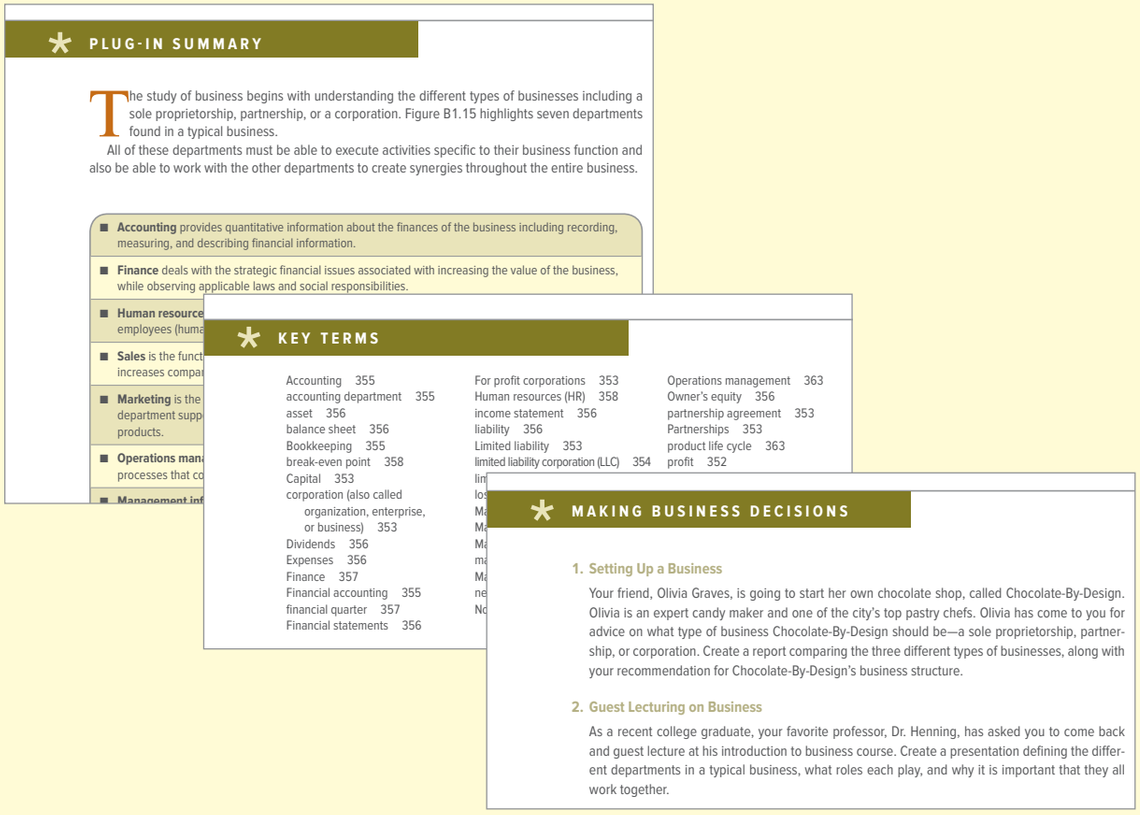
End-of-Plug-In Elements

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

- **Plug-in Summary.** Revisiting the plug-in highlights in summary format.
- **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.



PLUG-IN SUMMARY

The study of business begins with understanding the different types of businesses including a sole proprietorship, partnership, or a corporation. Figure B1.15 highlights seven departments found in a typical business.

All of these departments must be able to execute activities specific to their business function and also be able to work with the other departments to create synergies throughout the entire business.

- **Accounting** provides quantitative information about the finances of the business including recording, measuring, and describing financial information.
- **Finance** deals with the strategic financial issues associated with increasing the value of the business, while observing applicable laws and social responsibilities.
- **Human resource** employees (huma
- **Sales** is the funct increases compa
- **Marketing** is the department supp products.
- **Operations mana** processes that co
- **Management inf**

KEY TERMS

Accounting 355
accounting department 355
asset 356
balance sheet 356
Bookkeeping 355
break-even point 358
Capital 353
corporation (also called organization, enterprise, or business) 353
Dividends 356
Expenses 356
Finance 357
Financial accounting 355
financial quarter 357
Financial statements 356
For profit corporations 353
Human resources (HR) 358
income statement 356
liability 356
Limited liability 353
limited liability corporation (LLC) 354
Operations management 363
Owner's equity 356
partnership agreement 353
Partnerships 353
product life cycle 363
profit 352

MAKING BUSINESS DECISIONS

1. **Setting Up a Business**

   Your friend, Olivia Graves, is going to start her own chocolate shop, called Chocolate-By-Design. Olivia is an expert candy maker and one of the city's top pastry chefs. Olivia has come to you for advice on what type of business Chocolate-By-Design should be—a sole proprietorship, partnership, or corporation. Create a report comparing the three different types of businesses, along with your recommendation for Chocolate-By-Design's business structure.

2. **Guest Lecturing on Business**

   As a recent college graduate, your favorite professor, Dr. Henning, has asked you to come back and guest lecture at his introduction to business course. Create a presentation defining the different departments in a typical business, what roles each play, and why it is important that they all work together.

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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 faculty in accomplishing course objectives.

Video Exercises. Many of the videos that accompany the text are supported by detailed teaching notes on how to turn the videos into classroom exercises where your students can apply the knowledge they are learning after watching the videos.

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" where 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 IM.
- **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 Cafe 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.
- **Video Content.** More than 20 videos accompany this text and cover topics from entrepreneurship to disaster recovery. Video IMs are also available so you can turn the videos into engaging classroom activities.

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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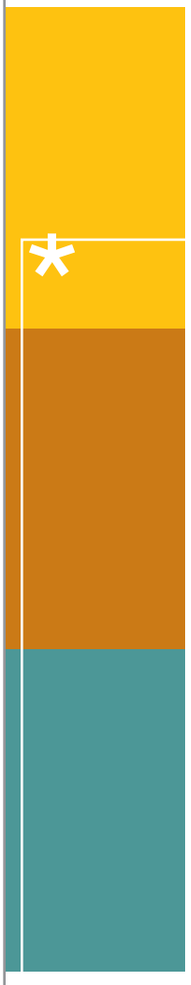
Business Driven Technology



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UNIT 1

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 technology 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 technology is shown as a key enabler to help organizations operate successfully in highly competitive environments.

You, as a business student, must recognize the tight correlation between business and technology. You must first understand information technology's role in daily business activities, and then understand information technology's role in supporting and implementing enterprisewide initiatives and global business strategies. After reading this unit, you should have acquired a solid grasp of business driven information systems, technology fundamentals, and business strategies. You should also have gained an appreciation of the various kinds of information systems employed by organizations and how you can use them to help make strategically informed decisions. All leaders must appreciate the numerous ethical and security concerns voiced by customers today. These concerns directly influence a customer's likelihood to embrace electronic technologies and conduct business over the web. In this sense, these concerns affect a company's bottom line. You can find evidence in recent news reports about how the stock price of organizations dramatically falls when information privacy and security breaches are publicized. Further, organizations face potential litigation if they fail to meet their ethical, privacy, and security obligations concerning the handling of information in their companies.

UNIT ONE OPENING CASE

Big Data, Big Analytics

Imagine working 10 years to become the lead marketing executive at a large retail organization only to find that your competitor is invading your market share by 20 percent each year. You quickly decided to launch several online marketing promotions while improving your products, only to find your efforts are fruitless as your competitor continues to steal your customers, destroying your profits while raising its own.

As you begin to analyze your competitor's business strategy, you find that while you were focused on sales reports, product inventory analysis, and other traditional marketing efforts, your competitor was making a massive investment in upgrading all of its management information systems. This included systems capable of collecting, storing, and analyzing data from every store, product, and sales representative in the market. In fact, your competitor now knows more about your products and sales cycles than you do. The new systems not only collect data throughout its company, but also from a group of suppliers, retailers, and distributors around the globe. These new systems provide your competitor with the ability to adjust prices instantly based on daily customer traffic patterns, reorder automatically from every entity in the supply chains, and even move items within a store or between stores for maximum selling efficiencies.

Your competitor has won and not because it had a higher-quality product or better sales and marketing strategies, but because it identified the value of management information systems coupled with the ability to instantly access big data within and beyond the organization. You quickly realize that your competitor's agility simply cannot be mimicked, offering it a huge competitive advantage. You sigh as you realize your company is in big trouble because it did not understand the dynamics of the big data age.

We are all familiar with the information age and the improvements made to organizations around the world as they are able to better manage employees, track sales information, and analyze customer purchasing patterns. However, this scenario is an example of the game-changing impact of big data, the massive amounts of data being collected by humans and machines over the last few years. Companies are now capturing hundreds of terabytes of data on everything from operations and finances to weather patterns and stock market trends. Sensors are now embedded in everything from products and machines to store floors, collecting real-time data on operations and customers. Radical customization, continuous experimentation, and information-driven business models are the new trademarks of competition

as organizations analyze massive volumes of data. Data volumes are exploding, and more data has been created in the past 2 years than in the entire previous history of the human race. Here are the top 20 facts every manager should know about big data, according to *Forbes* magazine.[1]

- Data is growing faster than ever before, and by the year 2020, about 1.7 megabytes of new information will be created every second for every human being on the planet.
- By 2020, our accumulated digital universe of data will grow from 4.4 zettabytes today to around 44 zettabytes, or 44 trillion gigabytes.
- Every second we create new data. For example, we perform 40,000 search queries every second on Google alone, which amounts to 3.5 searches per day and 1.2 trillion searches per year.
- In 2015, over 1 billion people used Facebook each day.
- Facebook users send on average 31.25 million messages and view 2.77 million videos every minute.
- Every minute up to 300 hours of video are uploaded to YouTube alone.
- In 2015, a staggering 1 trillion photos will be taken, and billions of them will be shared online. By 2017, nearly 80 percent of photos will be taken on smart phones.
- This year, over 1.4 billion smart phones will be shipped—all packed with sensors capable of collecting all kinds of data, not to mention the data the users create themselves.
- By 2020, we will have over 6.1 billion smart phone users globally (overtaking basic fixed phone subscriptions).
- Within 5 years, there will be over 50 billion smart connected devices in the world, all developed to collect, analyze, and share data.
- By 2020, at least a third of all data will pass through the cloud (a network of servers connected over the Internet).
- Distributed computing (performing computing tasks using a network of computers in the cloud) is very real. Google uses it every day to involve about 1,000 computers in answering a single search query, which takes no more than a second to complete.
- The market for Hadoop (open source software for distributed computing) is forecast to grow at a compound annual growth rate of 58 percent, surpassing $1 billion by 2020.
- Estimates suggest that by better integrating big data, healthcare could save as much as $300 billion a year—that's equal to reducing costs by $1,000 a year for every man, woman, and child.

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- The White House has already invested more than $200 million in big data projects.
- For a typical Fortune 1000 company, just a 10 percent increase in data accessibility will result in more than $65 million additional net income.
- Retailers who leverage the full power of big data could increase their operating margins by as much as 60 percent.
- Almost 80 percent of organizations have already invested or plan to invest in big data.
- At the moment, less than 0.5 percent of all data is ever analyzed or used.

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Introduction

Information is everywhere. Most organizations value information as a strategic asset. Organizational success depends heavily on the ability to gather and analyze information about operations, suppliers, customers, and markets. Information can answers such questions as who are your best and worst customers? How much inventory do you need to meet demand? Where can you source the cheapest raw materials? How can you increase sales or reduce costs? Answering these questions incorrectly can lead directly to business failure. Estimating too many buyers will lead to an excess of inventory; estimating too few buyers will potentially lead to lost sales due to lack of product (resulting in even more lost revenues).

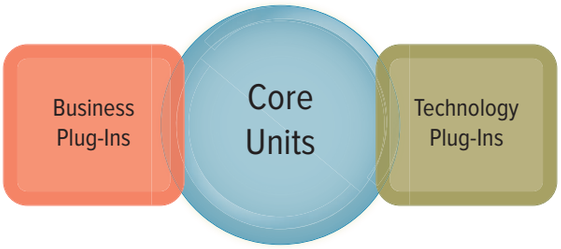
Understanding the direct impact information has on an organization's bottom line is crucial to running a successful business. This text focuses on information, business, technology, and the integrated set of activities used to run most organizations. Many of these activities are the hallmarks of business today—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.



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CHAPTER 1

Business Driven Technology

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.

Competing in the Information Age

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

Did you know that . . .

- The movie *Avatar* took more than four years to create and cost $450 million.
- Lady Gaga's real name is Stefani Joanne Angelina Germanotta.
- Customers pay $2.6 million for a 30-second advertising time slot during the Super Bowl.[2]

A ***fact*** is the confirmation or validation of an event or object. In the past, people primarily learned facts from books. Today, by simply pushing a button people can find out anything, from anywhere, at any time. We live in the ***information age***, when 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 startups 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 his or her 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 examples:

- Amazon is not a technology company; its original business focus was to sell books, and it now sells nearly everything including technology services.
- Netflix is not a technology company; its primary business focus is to rent videos.
- Zappos is not a technology company; its primary business focus is to sell shoes, bags, clothing, and accessories.

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.

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The founders of Netflix and Zappos have done the same thing for videos 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.

Over 20 years ago a few professors at MIT began describing the ***Internet of Things (IoT)*** a world where interconnected Internet-enabled devices or "things" have the ability to collect and share data without human intervention. Another term commonly associated with The Internet of Things is ***machine-to-machine (M2M)***, which refers to devices that connect directly to other devices. With advanced technologies devices are connecting in ways not previously thought possible and researchers predict that over 50 billion IoT devices will be communicating by 2020. Kevin Ashton, cofounder and executive director of the Auto-ID Center at MIT, first mentioned the Internet of Things in a presentation he made to Procter & Gamble. Here's Ashton explanation of the Internet of Things:

"Today computers—and, therefore, the Internet—are almost wholly dependent on human beings for information. Nearly all of the roughly 50 petabytes (a petabyte is 1,024 terabytes) of data available on the Internet were first captured and created by human beings by typing, pressing a record button, taking a digital picture or scanning a bar code.

The problem is, people have limited time, attention and accuracy—all of which means they are not very good at capturing data about things in the real world. If we had computers that knew everything there was to know about things—using data they gathered without any help from us—we would be able to track and count everything and greatly reduce waste, loss and cost. We would know when things needed replacing, repairing or recalling and whether they were fresh or past their best."[3]

IoT is transforming our world into a living information system as we control our intelligent lighting from our smart phone to a daily health check from our smart toothbrush. 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 are 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. Our primary goal in this course is to arm you with the knowledge you need to compete in the information age. The core drivers of the information age include:

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

DATA

Data are raw facts that describe the characteristics of an event or object. 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. ***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*** is 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*** is data that humans, in interaction with computers, generate. Human-generated structured data includes input data, click-stream data, or gaming data.

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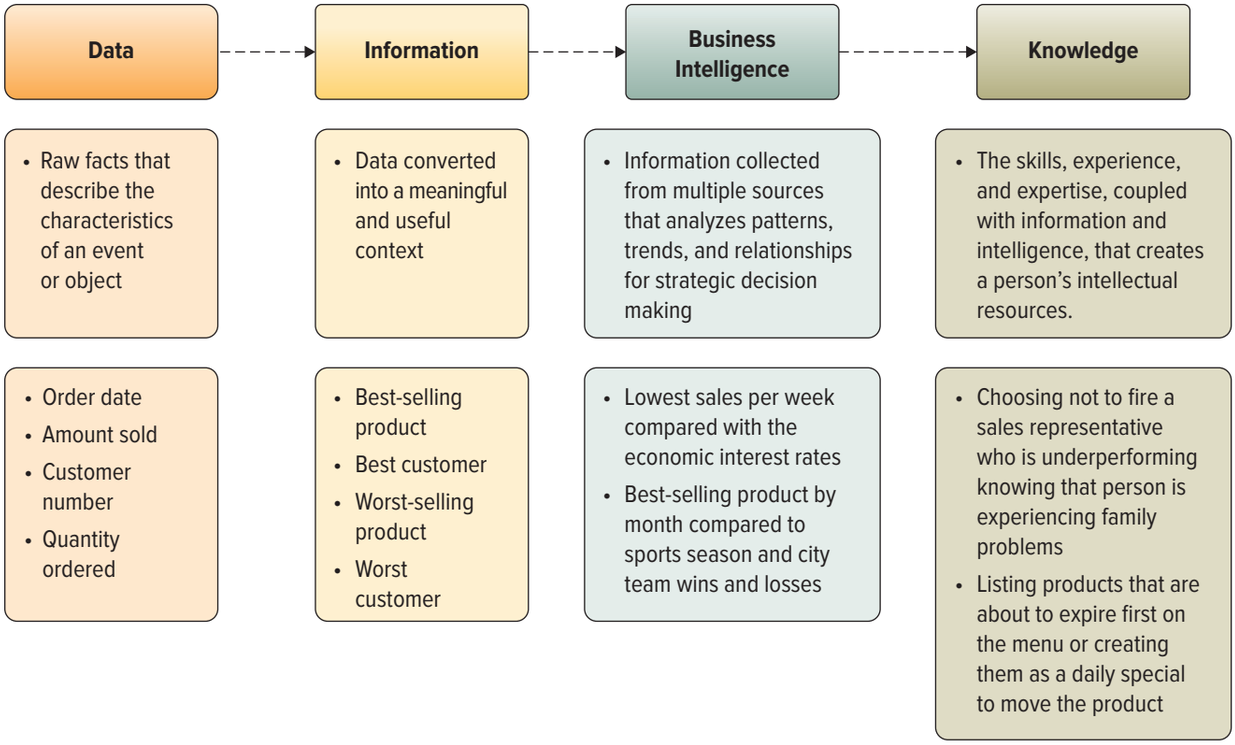

FIGURE 1.1
The Differences among Data, Information, Business Intelligence, and Knowledge.

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 80 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.

Big data is a collection of large complex data sets, including structured and unstructured data, which cannot be analyzed using traditional database methods and tools. Lacking data, managers often found themselves making business decisions about how many products to make, how much material to order, or how many employees to hire based on intuition or gut feelings. In the information age, successful managers compile, analyze, and comprehend massive amounts of data daily, which helps them make more successful business decisions.

A ***snapshot*** is a view of data at a particular moment in time. Figure 1.2 provides a snapshot of sales data for Tony's Wholesale Company, a fictitious business that supplies snacks to stores. The data highlight characteristics such as order date, customer, sales representative, product, quantity, and profit. The second line in Figure 1.2, for instance, shows that Roberta Cross sold 90 boxes of Ruffles to Walmart for $1,350, resulting in a profit of $450 (note that Profit = Sales − Costs). These data are useful for understanding individual sales; however, they do not provide us much insight into how Tony's business is performing as a whole. Tony needs to answer questions that will help him manage his day-to-day operations such as:

- Who are my best customers?
- Who are my least-profitable customers?
- What is my best-selling product?
- What is my slowest-selling product?
- Who is my strongest sales representative?
- Who is my weakest sales representative?

What Tony needs, in other words, is not data but *information.*

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FIGURE 1.2

Tony's Snack Company Data.

Source: Tony's Snack Company

Order Date	Customer	Sales Representative	Product	Qty	Unit Price	Total Sales	Unit Cost	Total Cost	Profit
4-Jan	Walmart	PJ Helgoth	Doritos	41	$24	$ 984	$18	$738	$246
4-Jan	Walmart	Roberta Cross	Ruffles	90	$15	$ 1,350	$10	$900	$450
5-Jan	Safeway	Craig Schultz	Ruffles	27	$15	$ 405	$10	$270	$135
6-Jan	Walmart	Roberta Cross	Ruffles	67	$15	$ 1,005	$10	$670	$335
7-Jan	7-Eleven	Craig Schultz	Pringles	79	$12	$ 948	$ 6	$474	$474
7-Jan	Walmart	Roberta Cross	Ruffles	52	$15	$ 780	$10	$520	$260
8-Jan	Kroger	Craig Schultz	Ruffles	39	$15	$ 585	$10	$390	$195
9-Jan	Walmart	Craig Schultz	Ruffles	66	$15	$ 990	$10	$660	$330
10-Jan	Target	Craig Schultz	Ruffles	40	$15	$ 600	$10	$400	$200
11-Jan	Walmart	Craig Schultz	Ruffles	71	$15	$ 1,065	$10	$710	$355

INFORMATION

Information is data converted into a meaningful and useful context. The simple difference between data and information is that computers or machines need data and humans need information. Data is a raw building block that has not been shaped, processed, or analyzed and frequently appears disorganized and unfriendly. Information gives meaning and context to analyzed data making it insightful for humans providing context and structure that is extremely valuable when making informed business decisions.

A ***report*** is a document containing data organized in a table, matrix, or graphical format allowing users to easily comprehend and understand information. Reports can cover a wide range of subjects or specific subject for a certain time period or event. A ***static report*** is created once based on data that does not change. Static reports can include a sales report from last year or salary report from five years ago. A ***dynamic report*** changes automatically during creation. Dynamic reports can include updating daily stock market prices or the calculation of available inventory.

Having the right information at the right moment in time can be worth a fortune. Having the wrong information at the right moment; or the right information at the wrong moment can be disastrous. The truth about information is that its value is only as good as the people who use it. People using the same information can make different decisions depending on how they interpret or analyze the information. Thus information has value only insofar as the people using it do as well.

Tony can analyze his sales data and turn them into information to answer all the above questions and understand how his business is operating. Figures 1.3 and 1.4, for instance, show us that Walmart is Roberta Cross's best customer, and that Ruffles is Tony's best product measured in terms of total sales. Armed with this information, Tony can identify and then address such issues as weak products and under-performing sales representatives.

A ***variable*** is a data characteristic that stands for a value that changes or varies over time. For example, in Tony's data, price and quantity ordered can vary. Changing variables allows managers to create hypothetical scenarios to study future possibilities. Tony may find it valuable to anticipate how sales or cost increases affect profitability. To estimate how a 20 percent increase in prices might improve profits, Tony simply changes the price variable for all orders, which automatically calculates the amount of new profits. To estimate how a 10 percent increase in costs hurts profits, Tony changes the cost variable for all orders, which automatically calculates the amount of lost profits. Manipulating variables is an important tool for any business.

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Order Date	Customer	Sales Representative	Product	Quantity	Unit Price	Total Sales	Unit Cost	Total Cost	Profit
26-Apr	Walmart	Roberta Cross	Fritos	86	$ 19	$ 1,634	$ 17	$ 1,462	$ 172
29-Aug	Walmart	Roberta Cross	Fritos	76	$ 19	$ 1,444	$ 17	$ 1,292	$ 152
7-Sep	Walmart	Roberta Cross	Fritos	20	$ 19	$ 380	$ 17	$ 340	$ 40
22-Nov	Walmart	Roberta Cross	Fritos	39	$ 19	$ 741	$ 17	$ 663	$ 78
30-Dec	Walmart	Roberta Cross	Fritos	68	$ 19	$ 1,292	$ 17	$ 1,156	$ 136
7-Jul	Walmart	Roberta Cross	Pringles	79	$ 18	$ 1,422	$ 8	$ 632	$ 790
6-Aug	Walmart	Roberta Cross	Pringles	21	$ 12	$ 252	$ 6	$ 126	$ 126
2-Oct	Walmart	Roberta Cross	Pringles	60	$ 18	$ 1,080	$ 8	$ 480	$ 600
15-Nov	Walmart	Roberta Cross	Pringles	32	$ 12	$ 384	$ 6	$ 192	$ 192
21-Dec	Walmart	Roberta Cross	Pringles	92	$ 12	$ 1,104	$ 6	$ 552	$ 552
28-Feb	Walmart	Roberta Cross	Ruffles	67	$ 15	$ 1,005	$ 10	$ 670	$ 335
6-Mar	Walmart	Roberta Cross	Ruffles	8	$ 15	$ 120	$ 10	$ 80	$ 40
16-Mar	Walmart	Roberta Cross	Ruffles	68	$ 15	$ 1,020	$ 10	$ 680	$ 340
23-Apr	Walmart	Roberta Cross	Ruffles	34	$ 15	$ 510	$ 10	$ 340	$ 170
4-Aug	Walmart	Roberta Cross	Ruffles	40	$ 15	$ 600	$ 10	$ 400	$ 200
18-Aug	Walmart	Roberta Cross	Ruffles	93	$ 15	$ 1,395	$ 10	$ 930	$ 465
5-Sep	Walmart	Roberta Cross	Ruffles	41	$ 15	$ 615	$ 10	$ 410	$ 205
12-Sep	Walmart	Roberta Cross	Ruffles	8	$ 15	$ 120	$ 10	$ 80	$ 40
28-Oct	Walmart	Roberta Cross	Ruffles	50	$ 15	$ 750	$ 10	$ 500	$ 250
21-Nov	Walmart	Roberta Cross	Ruffles	79	$ 15	$ 1,185	$ 10	$ 790	$ 395
29-Jan	Walmart	Roberta Cross	Sun Chips	5	$ 22	$ 110	$ 18	$ 90	$ 20
12-Apr	Walmart	Roberta Cross	Sun Chips	85	$ 22	$ 1,870	$ 18	$ 1,530	$ 340
16-Jun	Walmart	Roberta Cross	Sun Chips	55	$ 22	$ 1,210	$ 18	$ 990	$ 220
				1,206	**$383**	**$20,243**	**$273**	**$14,385**	**$5,858**

Sorting the data reveals the information that Roberta Cross's total sales to Walmart were $20,243 resulting in a profit of $5,858. (Profit $5,858 = Sales $20,243 – Costs $14,385)

FIGURE 1.3

Tony's Data Sorted by Customer "Walmart" and Sales Representative "Roberta Cross."

Source: Tony's Snack Company

BUSINESS INTELLIGENCE

Business intelligence (BI) is information collected from multiple sources such as suppliers, customers, competitors, partners, and industries that analyzes patterns, trends, and relationships for strategic decision making. BI manipulates multiple variables and in some cases even hundreds of variables including such items as interest rates, weather conditions, and even gas prices. Tony could use BI to analyze internal data such as company sales, along with external data about the environment such as competitors, finances, weather, holidays, and even sporting events. Both internal and external variables affect snack sales, and analyzing these variables will help Tony determine ordering levels and sales forecasts. For instance, BI can predict inventory requirements for Tony's business for the week before the Super Bowl if, say, the home team is playing, average temperature is above 80 degrees, and the stock market is performing well. This is BI at its finest, incorporating all types of internal and external variables to anticipate business performance.

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FIGURE 1.4

Information Gained after Analyzing Tony's Data.

Source: Tony's Snack Company

Tony's Business Information	Name	Total Profit
Who is Tony's best customer by total sales?	Walmart	$ 560,789
Who is Tony's least-valuable customer by total sales?	Walgreens	$ 45,673
Who is Tony's best customer by profit?	7-Eleven	$ 324,550
Who is Tony's least-valuable customer by profit?	King Soopers	$ 23,908
What is Tony's best-selling product by total sales?	Ruffles	$ 232,500
What is Tony's weakest-selling product by total sales?	Pringles	$ 54,890
What is Tony's best-selling product by profit?	Tostitos	$ 13,050
What is Tony's weakest-selling product by profit?	Pringles	$ 23,000
Who is Tony's best sales representative by profit?	R. Cross	$ 1,230,980
Who is Tony's weakest sales representative by profit?	Craig Schultz	$ 98,980
What is the best sales representative's best-selling product by total profit?	Ruffles	$ 98,780
Who is the best sales representative's best customer by total profit?	Walmart	$ 345,900
What is the best sales representative's weakest-selling product by total profit?	Sun Chips	$ 45,600
Who is the best sales representative's weakest customer by total profit?	Krogers	$ 56,050

Analytics is the science of fact-based decision making. ***Business analytics*** is the scientific process of transforming data into insight for making better decisions. Analytics is thought of as a broader category than business analytics, encompassing the use of analytical techniques in the sciences and engineering fields as well as business. In this text, we will use the terms *analytics* and *business analytics* as synonymous.

Analytics is used for data-driven or fact-based decision making, helping managers ensure they make successful decisions. A study conducted by MIT's Sloan School of Management and the University of Pennsylvania concluded that firms guided by data-driven decision making have higher productivity and market value along with increased output and profitability. Analytics can range from simple reports to advanced optimization models (models that highlight the best course of actions). ***Descriptive analytics*** uses techniques that describe past performance and history. ***Predictive analytics*** uses techniques that extract information from data and use it to predict future trends and identify behavioral patterns. ***Prescriptive analytics*** uses techniques that create models indicating the best decision to make or course of action to take. Figure 1.5 displays the three broad categories of analytics.

KNOWLEDGE

Knowledge includes the skills, experience, and expertise, coupled with information and intelligence, that creates a person's intellectual resources. ***Knowledge workers*** are individuals valued for their ability to interpret and analyze information. Today's workers are commonly referred to as knowledge workers and they use BI along with personal experience to make decisions based on both information and intuition, a valuable resource for any company.

Knowledge assets, also called intellectual capital, are the human, structural, and recorded resources available to the organization. Knowledge assets reside within the minds of members, customers, and colleagues, and include physical structures and recorded media. ***Knowledge facilitators*** help harness the wealth of knowledge in the organization. Knowledge facilitators help acquire and catalog the knowledge assets in an organization.

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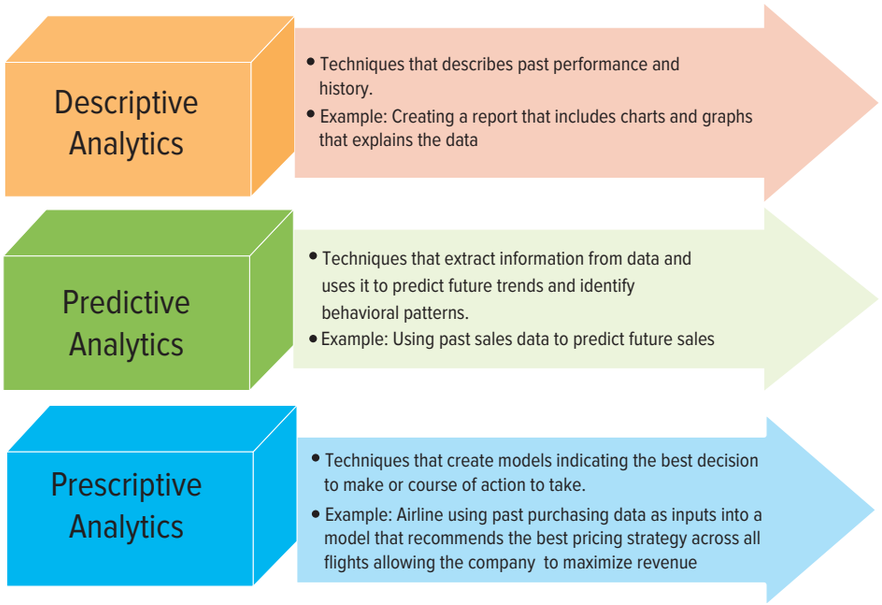

FIGURE 1.5

Three Categories of Analytics.

Imagine that Tony analyzes his data and finds his weakest sales representative for this period is Craig Schultz. If Tony considered only this information, he might conclude that firing Craig was a good business decision. However, because Tony has knowledge about how the company operates, he knows Craig has been out on medical leave for several weeks; hence, his sales numbers are low. Without this additional knowledge, Tony might have executed a bad business decision, delivered a negative message to the other employees, and sent his best sales representatives out to look for other jobs.

The key point in this scenario is that it is simply impossible to collect all the information about every situation, and yet without that, it can be easy to misunderstand the problem. Using data, information, business intelligence, and knowledge to make decisions and solve problems is the key to finding success in business. These core drivers of the information age are the building blocks of business systems. Figure 1.6 offers a few different examples of data through knowledge.

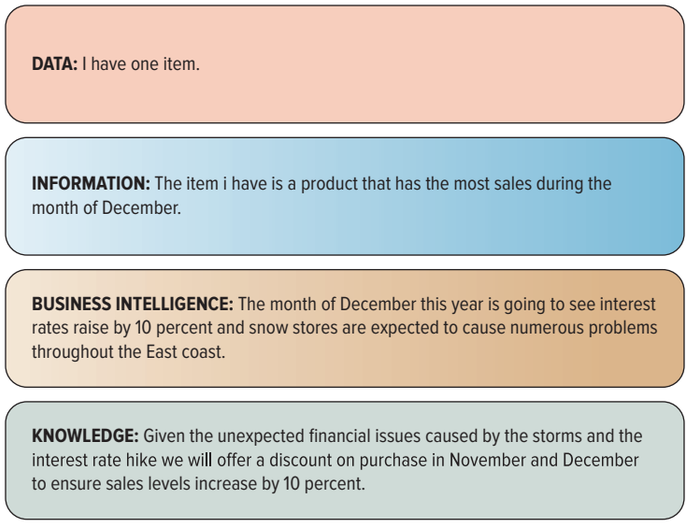

FIGURE 1.6

Transformation of Data to Knowledge.

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

Systems Thinking and Management Information Systems

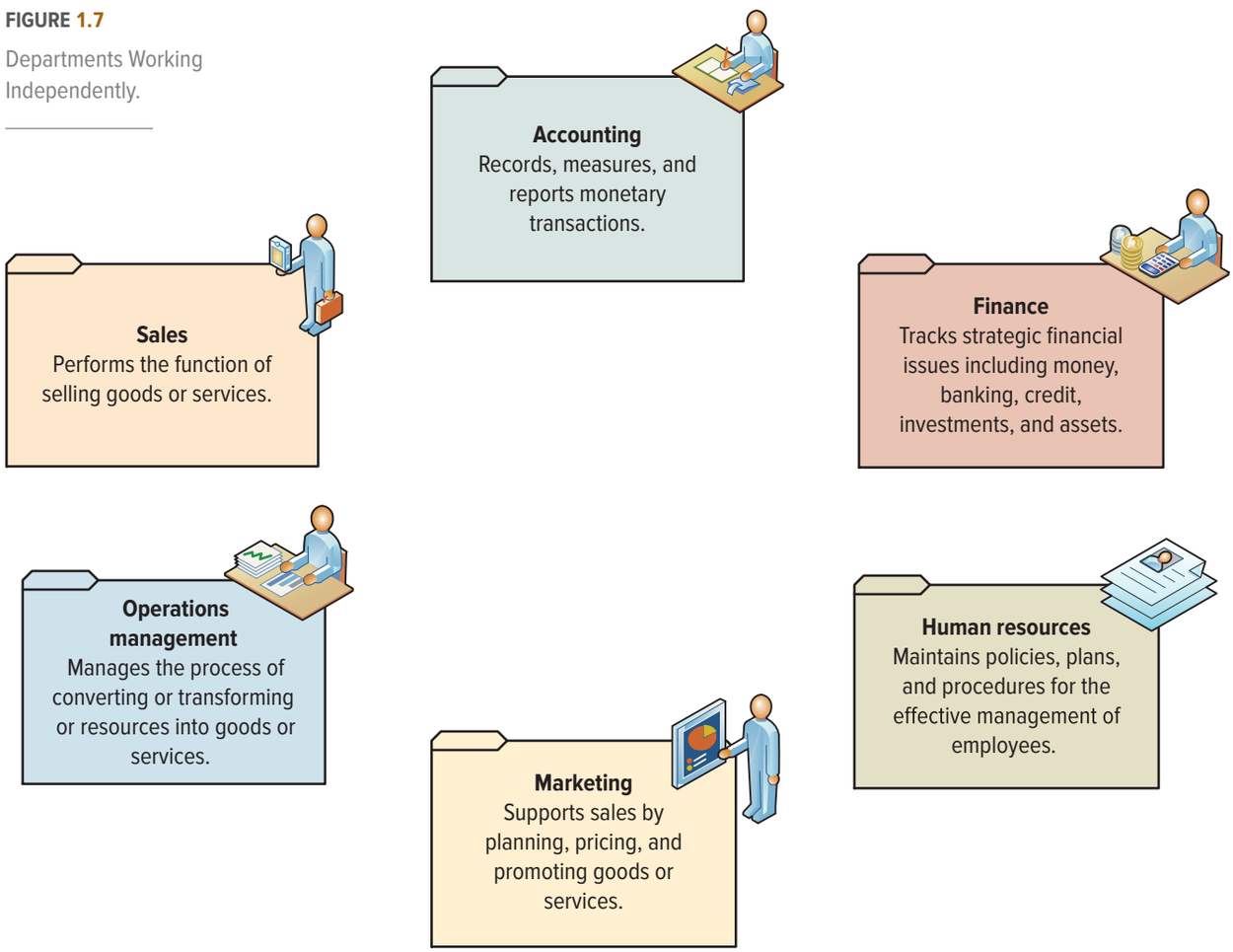
A ***business unit*** is a segment of a company (such as accounting, production, marketing) representing a specific business function. The terms department, functional area, and business unit are used interchangeably and corporations are typically organized by business unit such as:

- **Accounting:** Records, measures, and reports monetary transactions.
- **Finance:** Deals with strategic financial issues including money, banking, credit, investments, and assets.
- **Human resources:** Maintains policies, plans, and procedures for the effective management of employees.
- **Marketing:** Supports sales by planning, pricing, and promoting goods or services.
- **Operations management:** Manages the process of converting or transforming resources into goods or services.
- **Sales:** Performs the function of selling goods or services.

An ***information silo*** occurs when one business unit is unable to freely communicate with other business units making it difficult or impossible for organizations to work cross-functionally. Information silos exist because management does not believe there to be enough benefit from sharing information across business units and because information might not be useful to personnel in other business units. Figure 1.7 provides an example of how an organization operates

FIGURE 1.7

Departments Working Independently.



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functionally causing information silos as each department performs its own activities. Sales and marketing focus on moving goods or services into the hands of consumers; they maintain transactional data. Finance and accounting focus on managing the company's resources and maintain monetary data. Operations management focuses on manufacturing and maintains production data, while human resources focuses on hiring and training people and maintains employee data. Although each department has its own focus and data, none can work independently if the company is to operate as a whole.

It is easy to see how a business decision made by one department can affect other departments. Marketing needs to analyze production and sales data to come up with product promotions and advertising strategies. Production needs to understand sales forecasts to determine the company's manufacturing needs. Sales needs to rely on information from operations to understand inventory, place orders, and forecast consumer demand. All departments need to understand the accounting and finance departments' information for budgeting. For the firm to be successful, all departments must work together as a single unit sharing common information and not operate independently or in a silo (see Figure 1.8).

THE MIS SOLUTION

You probably recall the old story of three blind men attempting to describe an elephant. The first man, feeling the elephant's girth, said the elephant seemed very much like a wall. The second, feeling the elephant's trunk, declared the elephant was like a snake. The third man felt the elephant's tusks and said the elephant was like a tree or a cane. Companies that operate departmentally are seeing only one part of the elephant, a critical mistake that hinders successful operation.

Successful companies operate cross-functionally, integrating the operations of all departments. Systems are the primary enabler of cross-functional operations. A ***system*** is a collection of parts that link to achieve a common purpose. A car is a good example of a system, since removing a part, such as the steering wheel or accelerator, causes the entire system to stop working.

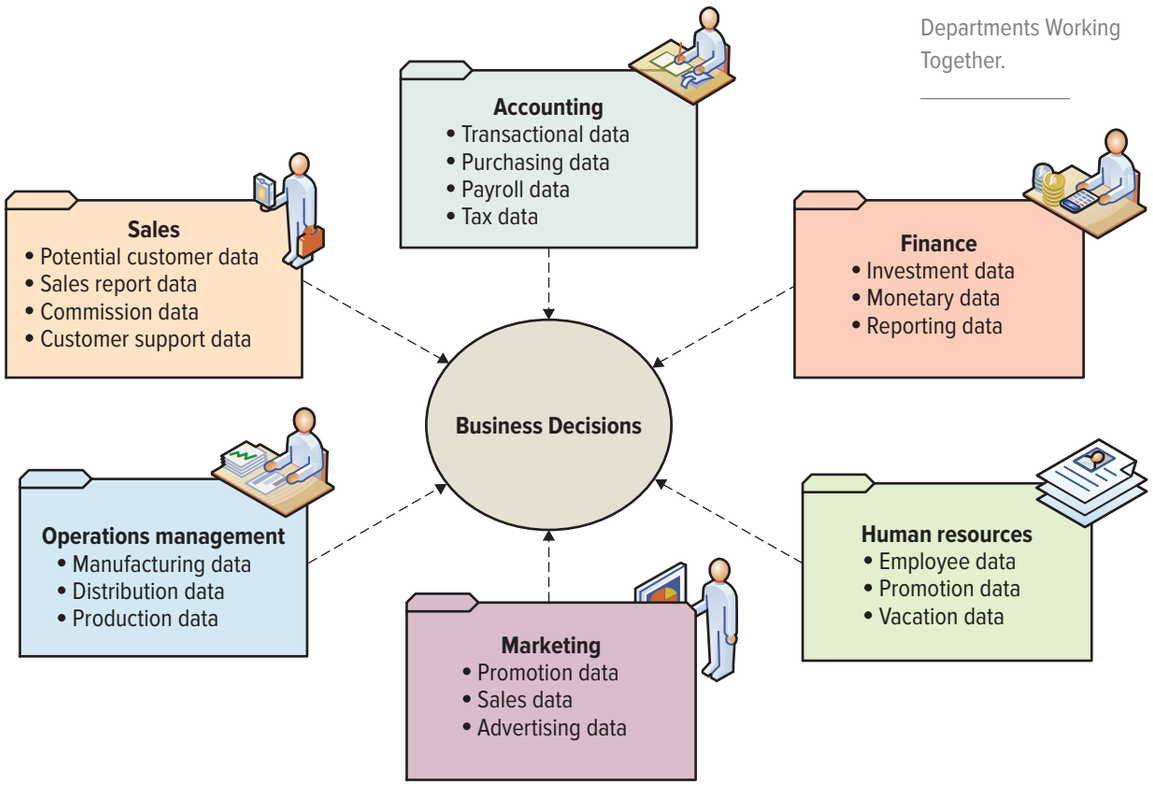

FIGURE 1.8
Departments Working Together.

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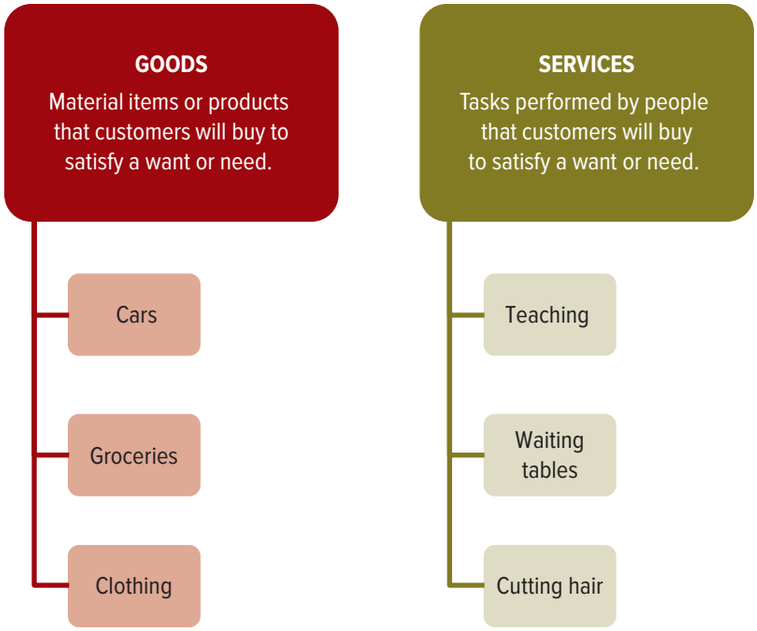
FIGURE 1.9

Different Types of Goods and Services.

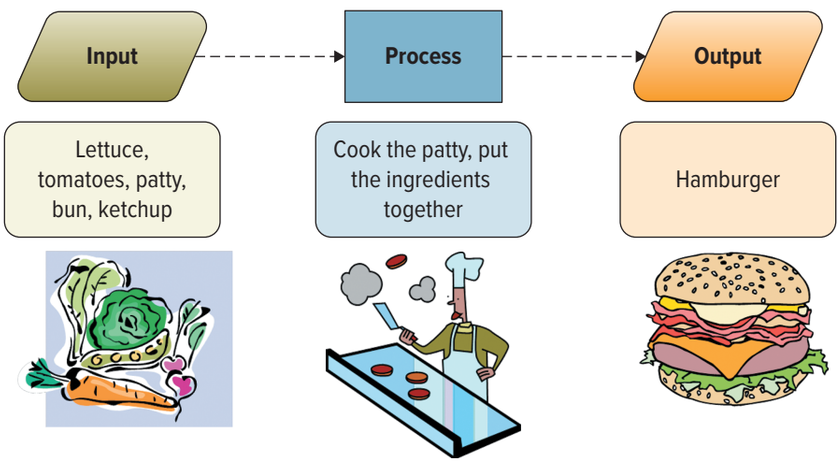


Before jumping into how systems work, it is important to have a solid understanding of the basic production process for goods and services. ***Goods*** are material items or products that customers will buy to satisfy a want or need. Clothing, groceries, cell phones, and cars are all examples of goods that people buy to fulfill their needs. ***Services*** are tasks performed by people that customers will buy to satisfy a want or need. Waiting tables, teaching, and cutting hair are all examples of services that people pay for to fulfill their needs (see Figure 1.9).

Production is the process in which a business takes raw materials and processes them or converts them into a finished product for its goods or services. Just think about making a hamburger (see Figure 1.10). First, you must gather all of the *inputs* or raw materials such as the bun, patty, lettuce, tomato, and ketchup. Second, you *process* the raw materials, so in this example you would need to cook the patty, wash and chop the lettuce and tomato, and place all of the items in the bun. Finally, you would have your *output* or finished product—your hamburger! ***Productivity*** is the rate at which goods and services are produced based upon total output given total inputs. Given our previous example, if a business could produce the same

FIGURE 1.10

Input, Process, Output Example.



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hamburger with less expensive inputs or more hamburgers with the same inputs, it would see a rise in productivity and possibly an increase in profits. Ensuring the input, process, and output of goods and services work across all of the departments of a company is where systems add tremendous value to overall business productivity.

SYSTEMS THINKING

Systems thinking is a way of monitoring the entire system by viewing multiple inputs being processed or transformed to produce outputs while continuously gathering feedback on each part (see Figure 1.11). ***Feedback*** is information that returns to its original transmitter (input, transform, or output) and modifies the transmitter's actions. Feedback helps the system maintain stability. For example, a car's system continuously monitors the fuel level and turns on a warning light if the gas level is too low. Systems thinking provides an end-to-end view of how operations work together to create a product or service. Business students who understand systems thinking are valuable resources because they can implement solutions that consider the entire process, not just a single component.

Management information systems (MIS) is a business function, such as accounting and human resources, that moves information about people, products, and processes across the company to facilitate decision making and problem solving. MIS incorporates systems thinking to help companies operate cross-functionally. For example, to fulfill product orders, an MIS for sales moves a single customer order across all functional areas, including sales, order fulfillment, shipping, billing, and finally customer service. Although different functional areas handle different parts of the sale, thanks to MIS, to the customer the sale is one continuous process. If one part of the company is experiencing problems, however, then, like the car without a steering wheel, the entire system fails. If order fulfillment packages the wrong product, it will not matter that shipping, billing, and customer service did their jobs right, since the customer will not be satisfied when he or she opens the package. Management information systems are the key to breaking down information silos by allowing information to flow across the organization.

MIS can be an important enabler of business success and innovation. This is not to say that MIS *equals* business success and innovation or that MIS *represents* business success and innovation. MIS is a tool that is most valuable when it leverages the talents of people who know how to use and manage it effectively. To perform the MIS function effectively, almost all companies, particularly large and medium-sized ones, have an internal MIS department, often called information technology (IT), information systems (IS), or management information systems (MIS). For the purpose of this text, we will refer to it as MIS.

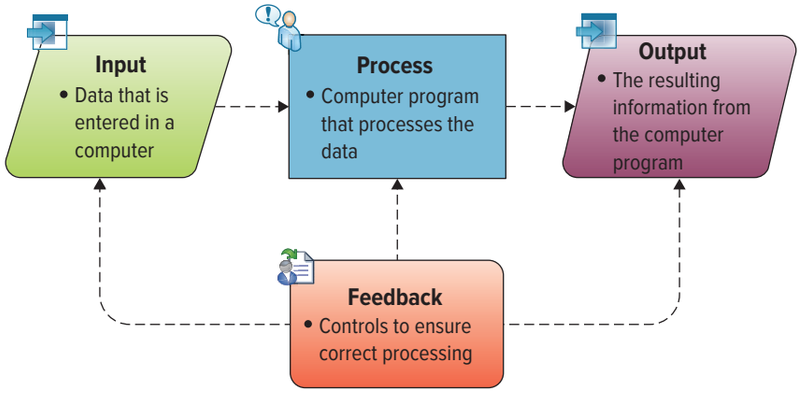

FIGURE 1.11
Overview of Systems Thinking.

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OPENING CASE STUDY QUESTIONS

1. You have landed your dream job working for Steve Evert. Unfortunately, Steve does not understand the difference between data, information, business intelligence, and knowledge. Choose a product or service and provide examples of data, information, business intelligence, and knowledge to help Steve understand these important concepts.
2. Steve does not understand why different departments across the company need to share data. Explain to Steve why it is important to share data across the accounting, marketing, sales, and operations management departments.
3. Steve does not understand systems thinking or how the MIS department enables business success. Explain systems thinking and how MIS solves the issue with information silos.

Chapter One Case: The World Is Flat—Thomas Friedman

In his book *The World Is Flat,* Thomas Friedman describes the unplanned cascade of technological and social shifts that effectively leveled the economic world and "accidentally made Beijing, Bangalore, and Bethesda next-door neighbors." Chances are good that Bhavya in Bangalore will read your next X-ray, or as Friedman learned firsthand, "Grandma Betty in her bathrobe" will make your JetBlue plane reservation from her Salt Lake City home.

Friedman believes this is Globalization 3.0. "In Globalization 1.0, which began around 1492, the world went from size large to size medium. In Globalization 2.0, the era that introduced us to multinational companies, it went from size medium to size small. And then around 2000 came Globalization 3.0, in which the world went from being small to tiny. There is a difference between being able to make long-distance phone calls cheaper on the Internet and walking around Riyadh with a PDA where you can have all of Google in your pocket. It is a difference in degree that's so enormous it becomes a difference in kind," Friedman states. Below are Friedman's list of "flatteners."

Thomas Friedman's 10 Forces That Flattened the World

1. Fall of the Berlin Wall	Opened the world to free markets.
2. Netscape IPO	Began the gigantic investments in connecting the world with fiber-optic cables.
3. Work flow software	Allowed employees to communicate and collaborate from all over the world.
4. Open-sourcing	Open source communities began creating free software.
5. Outsourcing	Using labor from third world countries allowed companies to grow while helping grow economies.
6. Offshoring	Using China to manufacture goods helped the world-wide global economy.
7. Supply-chaining	Businesses gained monumental efficiencies by connecting networks of suppliers, retailers, distributors, and customers.
8. Insourcing	Small business gained global momentum.
9. Informing	Search gave the intelligence to the masses.
10. Wireless	Business mobility gave the power of collaboration to the people.

Source: Thomas L. Friedman, *The World Is Flat* (New York: Farrar, Straus & Giroux, 2005), www.thomaslfriedman.com

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Friedman says these flatteners converged around the year 2000 and "created a flat world: a global, Web-enabled platform for multiple forms of sharing knowledge and work, irrespective of time, distance, geography, and increasingly, language." At the very moment this platform emerged, three huge economies materialized—those of India, China, and the former Soviet Union—"and 3 billion people who were out of the game, walked onto the playing field." A final convergence may determine the fate of the United States in this chapter of globalization. A "political perfect storm," as Friedman describes it—the dot-com bust, the attacks of 9/11, and the Enron scandal—"distract us completely as a country." Just when we need to face the fact of globalization and the need to compete in a new world, "we're looking totally elsewhere."

Friedman believes that the next great breakthrough in bioscience could come from a 5-year-old who downloads the human genome in Egypt. Bill Gates's view is similar: "Twenty years ago, would you rather have been a B-student in Poughkeepsie or a genius in Shanghai? Twenty years ago you'd rather be a B-student in Poughkeepsie. Today, it is not even close. You'd much prefer to be the genius in Shanghai because you can now export your talents anywhere in the world."[4]

Questions

1. Do you agree or disagree with Friedman's assessment that the world is flat? Be sure to justify your answer.
2. What are the potential impacts of a flat world for a student performing a job search?
3. What can students do to prepare themselves for competing in a flat world?
4. Identify a current flattener not mentioned on Friedman's list.

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LEARNING OUTCOME REVIEW

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

We live in the information age, when infinite quantities of facts are widely available to anyone who can use a computer. The core drivers of the information age include data, information, business intelligence, and knowledge. Data are raw facts that describe the characteristics of an event or object. Information is data converted into a meaningful and useful context. Business intelligence (BI) is information collected from multiple sources such as suppliers, customers, competitors, partners, and industries that analyzes patterns, trends, and relationships for strategic decision making. Knowledge includes the skills, experience, and expertise, coupled with information and intelligence, that create a person's intellectual resources. As you move from data to knowledge, you include more and more variables for analysis, resulting in better, more precise support for decision making and problem solving.

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

A system is a collection of parts that link to achieve a common purpose. Systems thinking is a way of monitoring the entire system by viewing multiple inputs being processed or transformed to produce outputs while continuously gathering feedback on each part. Feedback is information that returns to its original transmitter (input, transform, or output) and modifies the transmitter's actions. Feedback helps the system maintain stability. Management information systems (MIS) is a business function, such as accounting and human resources, that moves information about people, products, and processes across the company to facilitate decision making and problem solving. MIS incorporates systems thinking to help companies operate cross-functionally. For example, to fulfill product orders, an MIS for sales moves a single customer order across all functional areas, including sales, order fulfillment, shipping, billing, and finally customer service. Although different functional areas handle different parts of the sale, thanks to MIS, to the customer the sale is one continuous process.

REVIEW QUESTIONS

1. What is data? Why is data important to a business?
2. How can a manager turn data into information?
3. What is the relationship between data, information, business intelligence, and knowledge?
4. Why is it important for a company to operate cross-functionally?
5. What is MIS and what role does it plays in an organization?
6. Do you agree that MIS is essential for businesses operating in the information age? Why or why not?
7. What type of career are you planning to pursue? How will your specific career use data, information, business intelligence, and knowledge?
8. How does system thinking support business operations?
9. What are the three types of analytics?
10. What is the difference between a knowledge facilitator and knowledge assets?

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MAKING BUSINESS DECISIONS

1. View from a Flat World

Bill Gates, founder of Microsoft, stated that 20 years ago most people would rather have been a B student in New York City than a genius in China because the opportunities available to students in developed countries were limitless. Today, many argue that the opposite is now true due to technological advances making it easier to succeed as a genius in China than a B student in New York. As a group, discuss whether you agree or disagree with Bill Gates's statement.

2. Is Technology Making Us Dumber or Smarter?

There are numerous articles on how Facebook can make you dumber and Twitter can impede your ability to make sound decisions. Do you believe technology is making mankind dumber? Choose a side and debate the following:

Side A Living in the information age has made us smarter because we have a huge wealth of knowledge at our fingertips whenever or wherever we need it.

Side B Living in the information age has caused people to become lazy and dumber because they are no longer building up their memory banks to solve problems; machines give them the answers they need to solve problems.

3. The Internet of Everything Is Everywhere

IoT is transforming our world into a living information system as we control our intelligent lighting from our smart phone to 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 can 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.

In a group, identify a few IoT devices you are using today. These can include fitness trackers that report to your iPhone, sports equipment that provides immediate feedback to an app, or even smart vacuum cleaners. If you are not using any IoT devices today, brainstorm a few you might purchase in the future. How could a criminal or hacker use your IoT to steal your sensitive data? What potential problems or issues could you experience from these types of data thefts? What might be some of the signs that someone had accessed your IoT data illegally? What could you do to protect the data in your device?

4. Working for the Best

Each year, *Fortune* magazine creates a list of the top 100 companies to work for. Find the most recent list. What types of data do you think *Fortune* analyzed to determine the company ranking? What issues could occur if the analysis of the data was inaccurate? What types of information can you gain by analyzing the list? Create five questions a student performing a job search could answer by analyzing this list.

5. People in China and India Are Starving for Your Jobs

"When I was growing up in Minneapolis, my parents always said, 'Tom, finish your dinner. There are people starving in China and India.' Today I tell my girls, 'Finish your homework, because people in China and India are starving for your jobs.' And in a flat world, they can have them, because there's no such thing as an American job anymore." Thomas Friedman.

In his book, *The World Is Flat,* Thomas Friedman describes the unplanned cascade of technological and social shifts that effectively leveled the economic world, and "accidentally made Beijing,

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Bangalore, and Bethesda next-door neighbors." The video of Thomas Friedman's lecture at MIT discussing the flat world is available at http://mitworld.mit.edu/video/266. If you want to be prepared to compete in a flat world you must watch this video and answer the following questions:

- Do you agree or disagree with Friedman's assessment that the world is flat?
- What are the potential impacts of a flat world for a student performing a job search?
- What can students do to prepare themselves for competing in a flat world?

6. Teddy The Guardian

Two London-based entrepreneurs are building an Internet of huggable things for sick children to make any hospital visit more like a trip to Disneyland. Teddy The Guardian captures heart rate, temperatures, and blood-oxygen levels when a child grabs it by the paw to give it a cuddle. All measurements are sent wirelessly to nurses and parents, mobile devices. The new cute, cuddly teddy bear is packed full of sensors designed to track children's vital signs and help quickly find out potential issues. Teddy The Guardian takes from 5 to 7 seconds to record measurements and is programmed to run five times per hour. Future versions of Teddy The Guardian will be interactive, using machine learning to find out the child's favorite song or bedtime story and then play the related content for a more soothing hospital visit. Big pharmaceutical companies in the United States have already placed over $500,000 in orders and plan to donate the bears to hospitals and clinics.

This is clearly a brilliant idea, and soon we will see Teddy The Guardian in many local hospitals and clinics. Can you identify any additional markets where Teddy The Guardian should focus? Can you think of any ethical issues related to huggable things? Can you think of any security issues related to huggable things?

7. Categorizing Analytics

The three techniques for business analytics include descriptive analytics, predictive analytics, and prescriptive analytics. For each of the below examples, determine which analytical technique is being used.

EXAMPLE	DESCRIPTIVE ANALYTICS	PREDICTIVE ANALYTICS	PRESCRIPTIVE ANALYTICS
Which candidate will win the election?			
What price for a product will maximize profit?			
How much money do I need to save each year to have enough money for retirement?			
How many products were sold last year?			
What is the best route for the delivery person to drop off packages to minimize the time needed to deliver all the packages?			
How many Valentine's Day cards should Hallmark print to maximize expected profit?			
How will marketing affect the daily sales of a product?			
How can a company minimize the cost of shipping products from plants to customers?			
What team will win the Superbowl?			
How can I schedule my workforce to minimize operating costs?			
What was the average purchase price for new customers last year?			
How will the placement of a product in a store determine product sales?			
How many customers do we have, and where are they located?			

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CHAPTER 4

Measuring the Success of Strategic Initiatives

LEARNING OUTCOMES

4.1. Define the primary MIS roles along with their associated responsibilities.

4.2. Define critical success factors (CSFs) and key performance indicators (KPIs), and explain how managers use them to measure the success of MIS projects.

4.3. Explain why a business would use metrics to measure the success of strategic initiatives.

LO 4.1 Define the primary MIS roles along with their associated responsibilities.

MIS Roles and Responsibilities

Management information systems is a relatively new functional area, having been around formally in most organizations only for about 40 years. Job titles, roles, and responsibilities often differ dramatically from organization to organization. Nonetheless, clear trends are developing toward elevating some MIS positions within an organization to the strategic level.

Most organizations maintain positions such as chief executive officer (CEO), chief financial officer (CFO), and chief operations officer (COO) at the strategic level. Recently there are more MIS-related strategic positions such as chief information officer (CIO), chief data officer (CDO), chief technology officer (CTO), chief security officer (CSO), chief privacy officer (CPO), and chief knowledge officer (CKO). See Figure 4.1.

The ***chief information officer (CIO)*** is responsible for (1) overseeing all uses of information technology and (2) ensuring the strategic alignment of MIS with business goals and objectives. The CIO often reports directly to the CEO. CIOs must possess a solid and detailed understanding of every aspect of an organization coupled with tremendous insight into the capability of MIS. Broad functions of a CIO include:

1. *Manager*—ensure the delivery of all MIS projects, on time and within budget.
2. *Leader*—ensure the strategic vision of MIS is in line with the strategic vision of the organization.
3. *Communicator*—advocate and communicate the MIS strategy by building and maintaining strong executive relationships.

The ***chief data officer (CDO)*** is responsible for determining the types of information the enterprise will capture, retain, analyze, and share. The difference between the CIO and CDO is that the CIO is responsible for the *information systems* through which data is stored and processed, while the CDO is responsible for the *data,* regardless of the information system.

The ***chief technology officer (CTO)*** is responsible for ensuring the throughput, speed, accuracy, availability, and reliability of an organization's information technology. CTOs are similar to CIOs, except that CIOs take on the additional responsibility for effectiveness of ensuring that MIS is aligned with the organization's strategic initiatives. CTOs have direct responsibility for ensuring the *efficiency* of MIS systems throughout the organization.

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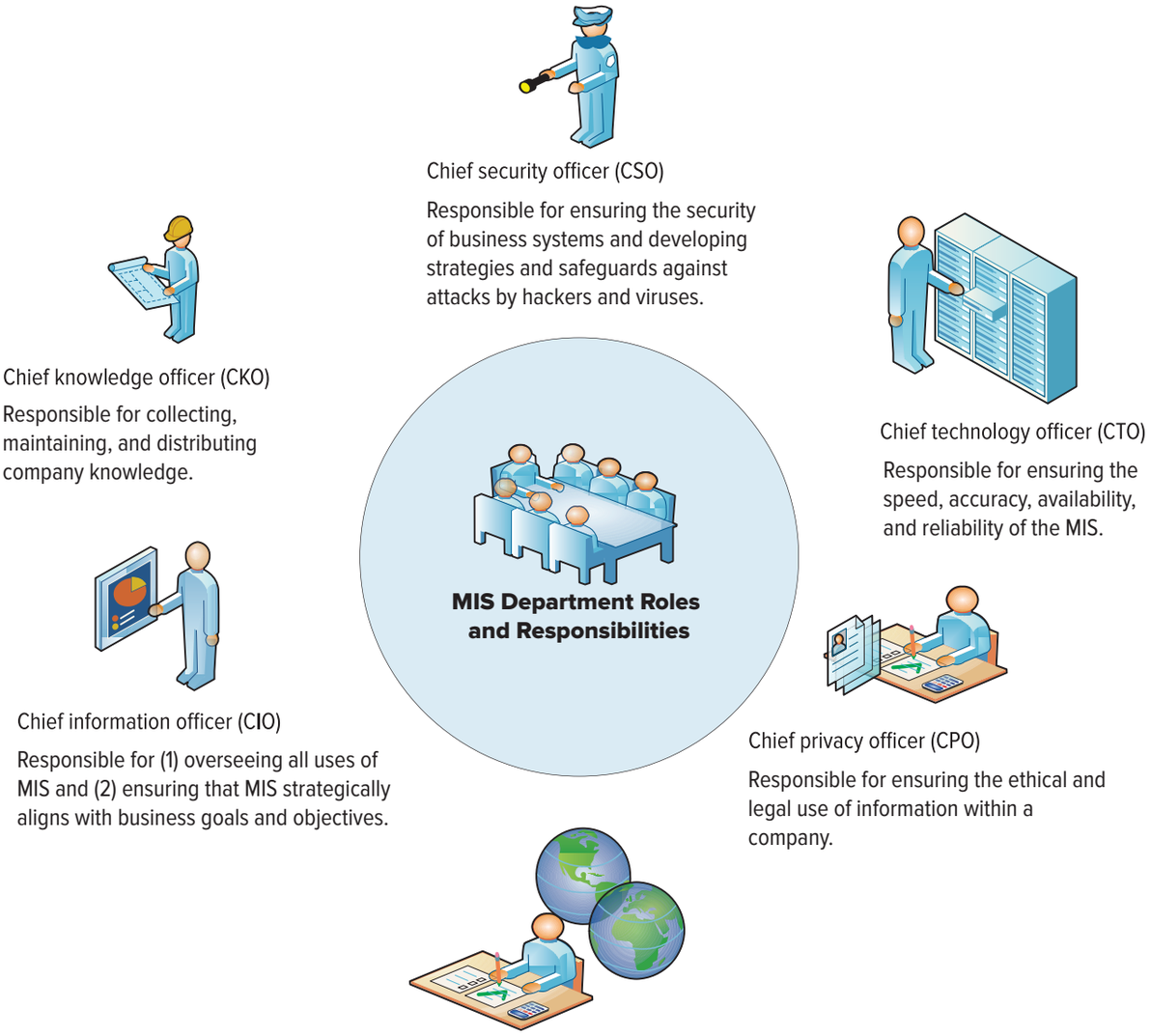

FIGURE 4.1
The Roles and Responsibilities of MIS.

Most CTOs possess well-rounded knowledge of all aspects of MIS, including hardware, software, and telecommunications.

The ***chief security officer (CSO)*** is responsible for ensuring the security of MIS systems and developing strategies and MIS safeguards against attacks from hackers and viruses. The role of a CSO has been elevated in recent years because of the number of attacks from hackers and viruses. Most CSOs possess detailed knowledge of networks and telecommunications because hackers and viruses usually find their way into MIS systems through networked computers.

The ***chief privacy officer (CPO)*** is responsible for ensuring the ethical and legal use of information within an organization. CPOs are the newest senior executive position in MIS. Recently, 150 of the *Fortune* 500 companies added the CPO position to their list of senior executives. Many CPOs are lawyers by training, enabling them to understand the often complex legal issues surrounding the use of information.[1]

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The ***chief knowledge officer (CKO)*** is responsible for collecting, maintaining, and distributing the organization's knowledge. The CKO designs programs and systems that make it easy for people to reuse knowledge. These systems create repositories of organizational documents, methodologies, tools, and practices, and they establish methods for filtering the information. The CKO must continuously encourage employee contributions to keep the systems up-to-date. The CKO can contribute directly to the organization's bottom line by reducing the learning curve for new employees or employees taking on new roles.

Danny Shaw was the first CKO at Children's Hospital in Boston. His initial task was to unite information from disparate systems to enable analysis of both the efficiency and effectiveness of the hospital's care. Shaw started by building a series of small, integrated information systems that quickly demonstrated value. He then gradually built on those successes, creating a knowledge-enabled organization one layer at a time. Shaw's information systems have enabled administrative and clinical operational analyses.[2]

With the election of President Barack Obama came the appointment of the first-ever national chief technology officer (CTO). The job description, as listed on Change.gov, states that the first CTO must "ensure the safety of our networks and lead an interagency effort, working with chief technology and chief information officers of each of the federal agencies, to ensure that they use best-in-class technologies and share best practices." A federal-level CTO demonstrates the ongoing growth of technology positions outside corporate America. In the future expect to see many more technology positions in government and nonprofit organizations.

All of the above MIS positions and responsibilities are critical to an organization's success. While many organizations may not have a different individual for each of these positions, they must have leaders taking responsibility for all these areas of concern. The individuals responsible for enterprisewide MIS and MIS-related issues must provide guidance and support to the organization's employees. According to *Fast Company* magazine a few executive levels you might see created over the next decade include:

- ***Chief intellectual property officer*** will manage and defend intellectual property, copyrights, and patents. The world of intellectual property law is vast and complicated as new innovations continually enter the market. Companies in the near future will need a core leadership team member who can not only wade through the dizzying sea of intellectual property laws and patents to ensure their own compliance, but also remain vigilant to protect their own company against infringement.
- ***Chief automation officer*** determines if a person or business process can be replaced by a robot or software. As we continue to automate jobs a member of the core leadership team of the future will be put in charge of identifying opportunities for companies to become more competitive through automation.
- ***Chief user experience officer*** will create the optimal relationship between user and technology. User experience used to be an afterthought for hardware and software designers. Now that bulky instruction manuals are largely (and thankfully) a thing of the past, technology companies need to ensure that their products are intuitive from the moment they are activated.[3]

MIS skills gap is the difference between existing MIS workplace knowledge and the knowledge required to fulfill the business goals and strategies. Closing the MIS skills gap by aligning the current workforce with potential future business needs is a complicated proposition. Today, employers often struggle to locate and retain qualified MIS talent, especially individuals with application development, information security, and data analysis skills.

Common approaches to closing an MIS skills gap include social recruiting, off-site training, mentoring services, and partnerships with universities. In many instances, an MIS job will remain unfilled for an extended period of time when an employer needs to hire someone who has a very specific set of skills. In recruiting lingo, such candidates are referred to as purple squirrels. Because squirrels in the real world are not often purple, the implication is that finding the perfect job candidate with exactly the right qualifications, education, and salary expectations can be a daunting—if not impossible—task.

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Metrics: Measuring Success

LO 4.2 **Define critical success factors (CSFs) and key performance indicators (KPIs), and explain how managers use them to measure the success of MIS projects.**

A ***project*** is a temporary activity a company undertakes to create a unique product, service, or result. For example, the construction of a new subway station is a project, as is a movie theater chain's adoption of a software program to allow online ticketing. Peter Drucker, a famous management writer, once said that if you cannot measure something, you cannot manage it. How do managers measure the progress of a complex business project?

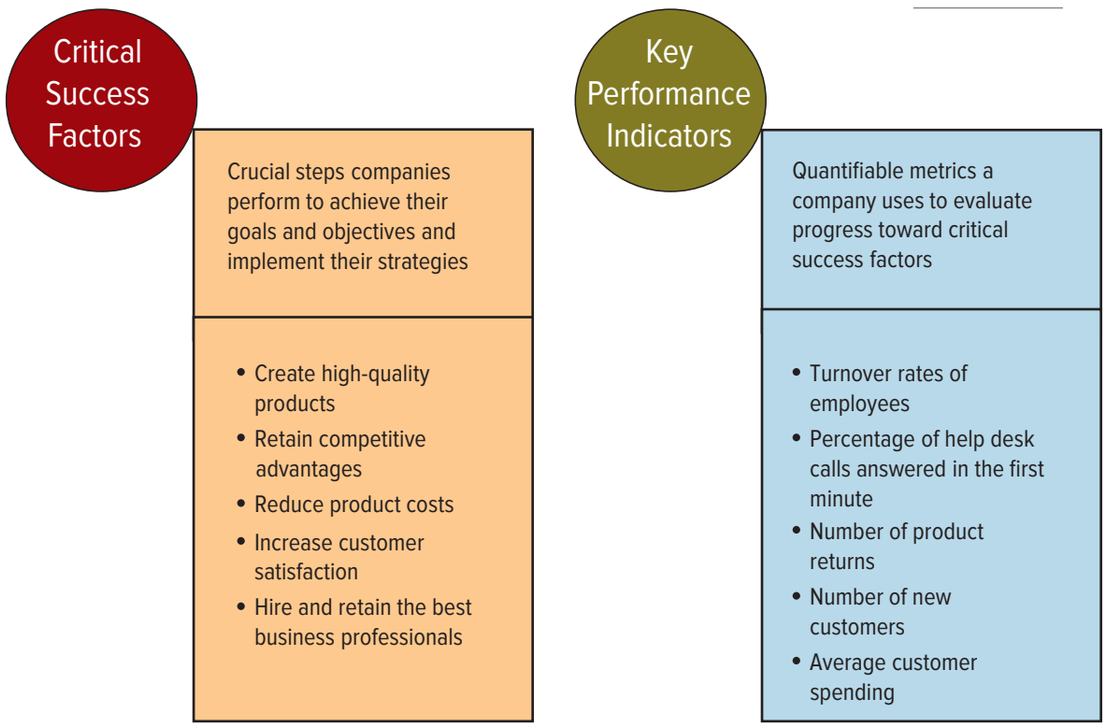
Metrics are measurements that evaluate results to determine whether a project is meeting its goals. Two core metrics are critical success factors and key performance indicators. ***Critical success factors (CSFs)*** are the crucial steps companies perform to achieve their goals and objectives and implement their strategies (see Figure 4.2). ***Key performance indicators (KPIs)*** are the quantifiable metrics a company uses to evaluate progress toward critical success factors. KPIs are far more specific than CSFs.

The purpose of using KPIs is to focus attention on the tasks and processes that management has determined are most important for making progress toward declared goals and targets. KPIs differ per organization. For example, a KPI for a public company may be its stock price, whereas a KPI in government might be a low unemployment rate. KPIs will also differ for roles people play in the same organization. For example, a chief executive officer (CEO) might consider profitability as the most important KPI, whereas a sales team manager in the same company might consider successful service level agreement (SLA) delivery numbers as the most important KPI.

It is important to understand the relationship between critical success factors and key performance indicators. CSFs are elements crucial for a business strategy's success. KPIs measure the progress of CSFs with quantifiable measurements, and one CSF can have several KPIs. Of course, both categories will vary by company and industry. Imagine *improve graduation rates* as a CSF for a college. The KPIs to measure this CSF can include:

- Average grades by course and gender.
- Student dropout rates by gender and major.
- Average graduation rate by gender and major.
- Time spent in tutoring by gender and major.

FIGURE 4.2
CSF and KPI Metrics.



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KPIs can focus on external and internal measurements. A common external KPI is ***market share***, or the proportion of the market that a firm captures. We calculate it by dividing the firm's sales by the total market sales for the entire industry. Market share measures a firm's external performance relative to that of its competitors. For example, if a firm's total sales (revenues) are $2 million and sales for the entire industry are $10 million, the firm has captured 20 percent of the total market (2/10 = 20%) or a 20 percent market share.

A common internal KPI is ***return on investment (ROI)***, which indicates the earning power of a project. We measure it by dividing the profitability of a project by the costs. This sounds easy, and for many departments where the projects are tangible and self-contained it is; however, for projects that are intangible and cross departmental lines (such as MIS projects), ROI is challenging to measure. Imagine attempting to calculate the ROI of a fire extinguisher. If the fire extinguisher is never used, its ROI is low. If the fire extinguisher puts out a fire that could have destroyed the entire building, its ROI is astronomically high.

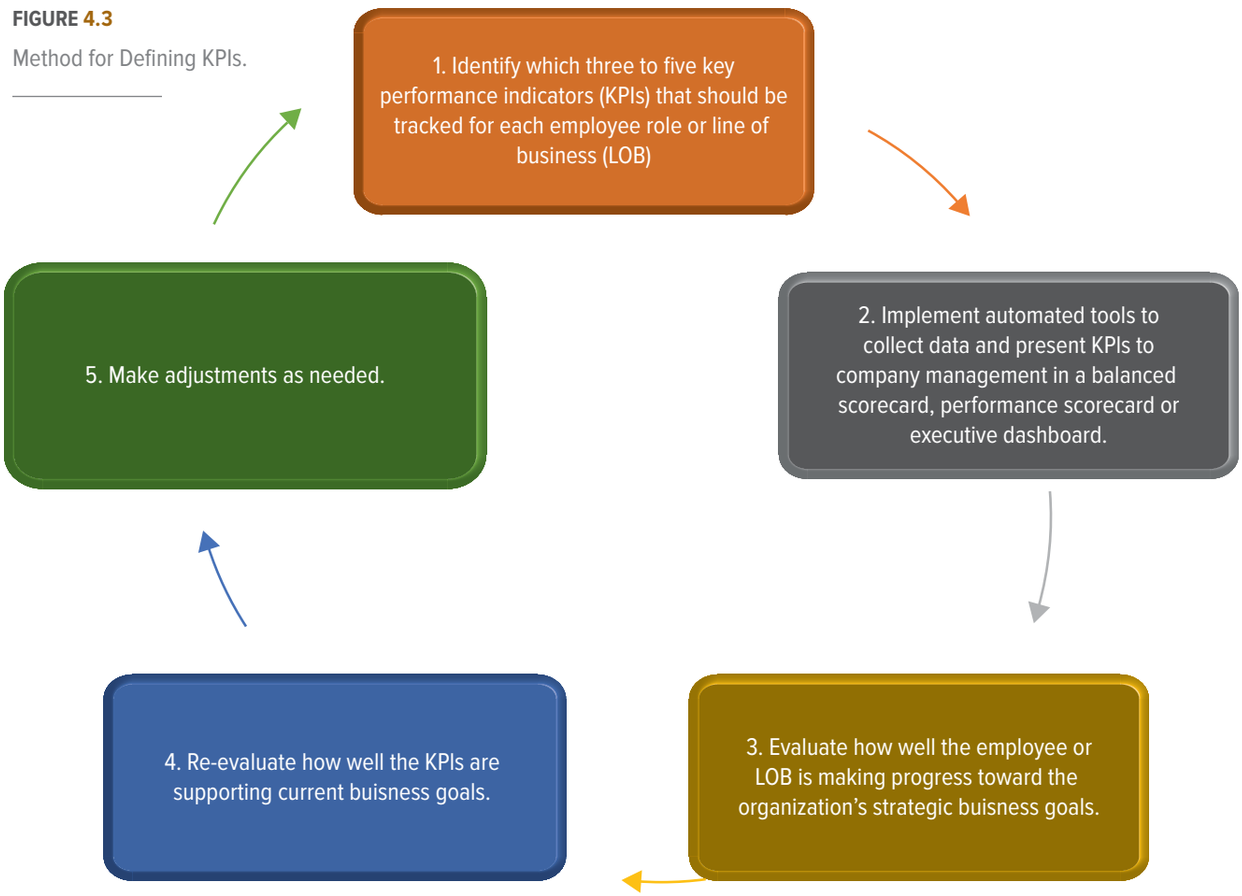
Although monitoring KPIs can help management identify deficiencies within an organization, it is up to management to decide how to correct them. Having too many KPIs can be problematic. It not only dilutes employee attention, it also makes it difficult for managers to prioritize indicators and make sure the key indicators get the attention they deserve.

To avoid this problem, many successful companies limit KPI scope to small sets of indicators that evaluate the success of individuals in the organization. Figure 4.3 displays a common approach is to defining KPIs.

Creating KPIs to measure the success of an MIS project offers similar challenges. Think about a firm's email system. How could managers track departmental costs and profits associated with company email? Measuring by volume does not account for profitability, because one

FIGURE 4.3

Method for Defining KPIs.



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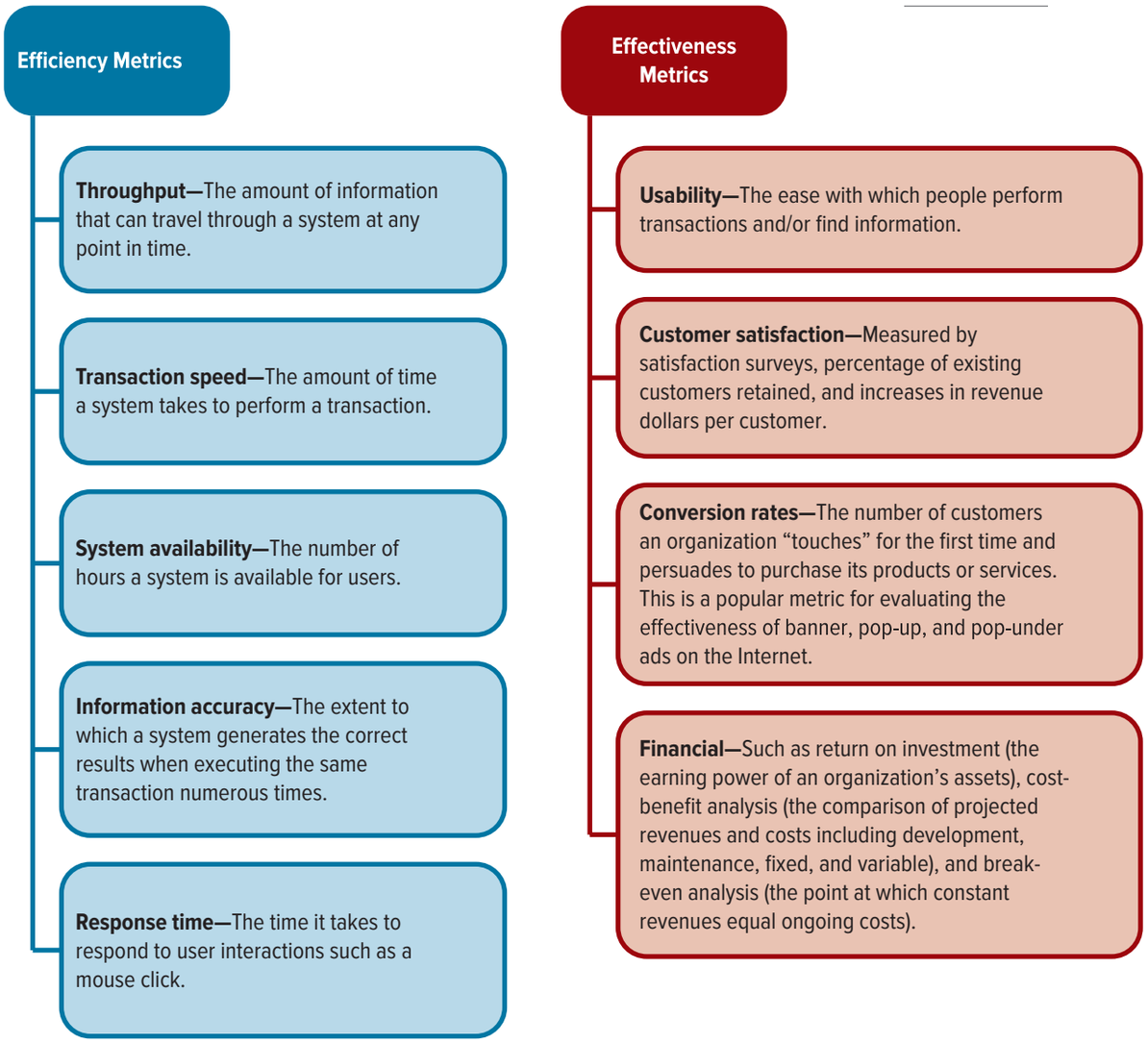
sales email could land a million-dollar deal while 300 others might not generate any revenue. Non-revenue-generating departments such as human resources and legal require email but will not be using it to generate profits. For this reason, many managers turn to higher-level metrics, such as efficiency and effectiveness, to measure MIS projects. ***Best practices*** are the most successful solutions or problem-solving methods that have been developed by a specific organization or industry. Measuring MIS projects helps determine the best practices for an industry.

EFFICIENCY AND EFFECTIVENESS METRICS

Efficiency MIS metrics measure the performance of MIS itself, such as throughput, transaction speed, and system availability. ***Effectiveness MIS metrics*** measure the impact MIS has on business processes and activities, including customer satisfaction and customer conversion rates. Efficiency focuses on the extent to which a firm is using its resources in an optimal way, while effectiveness focuses on how well a firm is achieving its goals and objectives. Peter Drucker offers a helpful distinction between efficiency and effectiveness: Doing things right addresses efficiency—getting the most from each resource. Doing the right things addresses effectiveness—setting the right goals and objectives and ensuring they are accomplished. Figure 4.4 describes a few of the common types of efficiency and effectiveness MIS metrics. KPIs that measure MIS

FIGURE 4.4

Common Types of Efficiency and Effectiveness Metrics.



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projects include both efficiency and effectiveness metrics. Of course, these metrics are not as concrete as market share or ROI, but they do offer valuable insight into project performance.[4]

Large increases in productivity typically result from increases in effectiveness, which focus on CSFs. Efficiency MIS metrics are far easier to measure, however, so most managers tend to focus on them, often incorrectly, to measure the success of MIS projects. Consider measuring the success of automated teller machines (ATMs). Thinking in terms of MIS efficiency metrics, a manager would measure the number of daily transactions, the average amount per transaction, and the average speed per transaction to determine the success of the ATM. Although these offer solid metrics on how well the system is performing, they miss many of the intangible or value-added benefits associated with ATM effectiveness. Effectiveness MIS metrics might measure how many new customers joined the bank due to its ATM locations or the ATMs' ease of use. They can also measure increases in customer satisfaction due to reduced ATM fees or additional ATM services such as the sale of stamps and movie tickets, significant time savers and value-added features for customers. Being a great manager means taking the added viewpoint offered by effectiveness MIS metrics to analyze all benefits associated with an MIS project.

THE INTERRELATIONSHIP BETWEEN EFFICIENCY AND EFFECTIVENESS MIS METRICS

Efficiency and effectiveness are definitely related. However, success in one area does not necessarily imply success in the other. Efficiency MIS metrics focus on the technology itself. While these efficiency MIS metrics are important to monitor, they do not always guarantee effectiveness. Effectiveness MIS metrics are determined according to an organization's goals, strategies, and objectives. Here, it becomes important to consider a company's CSFs, such as a broad cost leadership strategy (Walmart, for example), as well as KPIs such as increasing new customers by 10 percent or reducing new-product development cycle times to six months.

Figure 4.5 depicts the interrelationships between efficiency and effectiveness. Ideally, a firm wants to operate in the upper right-hand corner of the graph, realizing both significant increases in efficiency and effectiveness. However, operating in the upper left-hand corner (minimal effectiveness with increased efficiency) or the lower right-hand corner (significant effectiveness with minimal efficiency) may be in line with an organization's particular strategies. In general, operating in the lower left-hand corner (minimal efficiency and minimal effectiveness) is not ideal for the operation of any organization.

Regardless of what process is measured, how it is measured, and whether it is performed for the sake of efficiency or effectiveness, managers must set ***benchmarks***, or baseline values the system seeks to attain. ***Benchmarking*** is a process of continuously measuring system results, comparing those results to optimal system performance (benchmark values), and identifying steps and procedures to improve system performance. Benchmarks help assess how an MIS project performs over time. For instance, if a system held a benchmark for a response time of 15 seconds, the manager would want to ensure response time continued to decrease until it reached that point. If response time suddenly increased to 1 minute, the manager would

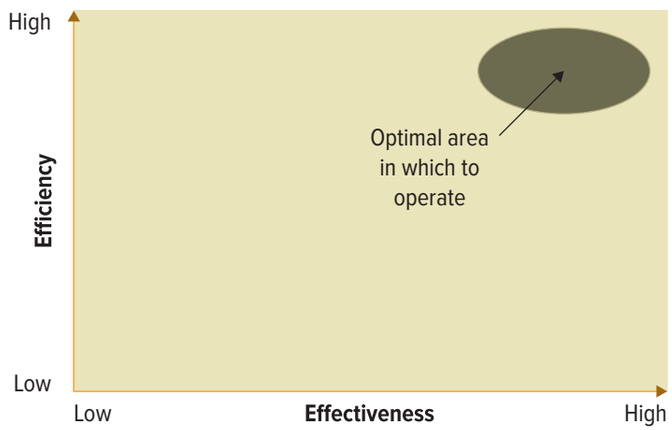

FIGURE 4.5
The Interrelationships between Efficiency and Effectiveness.

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know the system was not functioning correctly and could start looking into potential problems. Continuously measuring MIS projects against benchmarks provides feedback so managers can control the system.

Metrics for Strategic Initiatives

LO 4.3 Explain why a business would use metrics to measure the success of strategic initiatives.

What is a metric? A metric is nothing more than a standard measure to assess performance in a particular area. Metrics are at the heart of a good, customer-focused management system and any program directed at continuous improvement. A focus on customers and performance standards shows up in the form of metrics that assess the ability to meet customers' needs and business objectives.

Business leaders want to monitor key metrics in real time to actively track the health of their business. Most business professionals are familiar with financial metrics. Different financial ratios are used to evaluate a company's performance. Companies can gain additional insight into their performance by comparing financial ratios against other companies in their industry. A few of the more common financial ratios include:

- Internal rate of return (IRR)—the rate at which the net present value of an investment equals zero.
- Return on investment (ROI)—indicates the earning power of a project and is measured by dividing the benefits of a project by the investment.
- Payback method—number of years to recoup the cost of an initiative based on projected annual net cash flow.
- Break-even analysis—determines the volume of business required to make a profit at the current prices charged for the products or services. For example, if a promotional mailing costs $1,000 and each item generates $50 in revenue, the company must generate 20 sales to break even and cover the cost of the mailing. The break-even point is the point at which revenues equal costs. The point is located by performing a break-even analysis. All sales over the break-even point produce profits; any drop in sales below that point will produce losses (see Figure 4.6).

Most managers are familiar with financial metrics but unfamiliar with information system metrics. Most companies measure the traffic on a website as the primary determinant of the website's success. However, heavy website traffic does not necessarily indicate large sales. Many organizations with lots of website traffic have minimal sales. A company can use web traffic analysis or web analytics to determine the revenue generated, the number of new customers acquired, any reductions in customer service calls, and so on. Figure 4.7 displays a few metrics managers should be familiar with to help measure website success along with an organization's strategic initiatives. A web-centric metric is a measure of the success of web and ebusiness initiatives. Of the hundreds of web-centric metrics available, some are general to almost any web or ebusiness initiative and others are dependent on the particular initiative.[5]

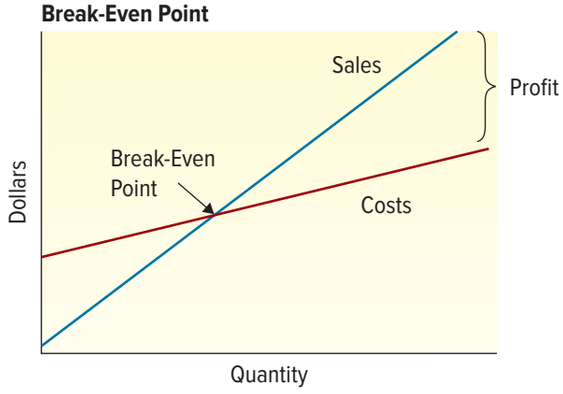

FIGURE 4.6
Break-Even Analysis.

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FIGURE 4.7

Website Metrics.

Website Metrics
■ **Abandoned registrations:** Number of visitors who start the process of completing a registration page and then abandon the activity.
■ **Abandoned shopping carts:** Number of visitors who create a shopping cart and start shopping and then abandon the activity before paying for the merchandise.
■ **Click-through:** Count of the number of people who visit a site, click on an ad, and are taken to the site of the advertiser.
■ **Conversion rate:** Percentage of potential customers who visit a site and actually buy something.
■ **Cost-per-thousand (CPM):** Sales dollars generated per dollar of advertising. This is commonly used to make the case for spending money to appear on a search engine.
■ **Page exposures:** Average number of page exposures to an individual visitor.
■ **Total hits:** Number of visits to a website, many of which may be by the same visitor.
■ **Unique visitors:** Number of unique visitors to a site in a given time. This is commonly used by Nielsen/Net ratings to rank the most popular websites.

Supply chain management metrics can help an organization understand how it's operating over a given time period. Supply chain measurements can cover many areas including procurement, production, distribution, warehousing, inventory, transportation, and customer service. However, a good performance in one part of the supply chain is not sufficient. A supply chain is only as strong as its weakest link. The solution is to measure all key areas of the supply chain. Figure 4.8 displays common supply chain management metrics.[6]

Wondering what CRM metrics to track and monitor using reporting and real-time performance dashboards? Best practice is no more than seven (plus or minus two) metrics out of the hundreds possible should be used at any given management level. Figure 4.9 displays common CRM metrics tracked by organizations.[7]

Business process reengineering and enterprise resource planning are large, organization-wide initiatives. Measuring these types of strategic initiatives is extremely difficult. One of the best methods is the balanced scorecard. This approach to strategic management was developed in the early 1990s by Dr. Robert Kaplan of the Harvard Business School and Dr. David Norton. Addressing some of the weaknesses and vagueness of previous measurement techniques, the balanced scorecard approach provides a clear prescription as to what companies should measure in order to balance the financial perspective.

The ***balanced scorecard*** is a management system, in addition to a measurement system, that enables organizations to clarify their vision and strategy and translate them into action.

FIGURE 4.8

Supply Chain Management Metrics.

Supply Chain Management Metrics
■ **Back order:** An unfilled customer order. A back order is demand (immediate or past due) against an item whose current stock level is insufficient to satisfy demand.
■ **Customer order promised cycle time:** The anticipated or agreed upon cycle time of a purchase order. It is a gap between the purchase order creation date and the requested delivery date.
■ **Customer order actual cycle time:** The average time it takes to actually fill a customer's purchase order. This measure can be viewed on an order or an order line level.
■ **Inventory replenishment cycle time:** Measure of the manufacturing cycle time plus the time included to deploy the product to the appropriate distribution center.
■ **Inventory turns (inventory turnover):** The number of times that a company's inventory cycles or turns over per year. It is one of the most commonly used supply chain metrics.

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Sales Metrics	Service Metrics	Marketing Metrics
■ Number of prospective customers	■ Cases closed same day	■ Number of marketing campaigns
■ Number of new customers	■ Number of cases handled by agent	■ New customer retention rates
■ Number of retained customers	■ Number of service calls	■ Number of responses by marketing campaign
■ Number of open leads	■ Average number of service requests by type	■ Number of purchases by marketing campaign
■ Number of sales calls	■ Average time to resolution	■ Revenue generated by marketing campaign
■ Number of sales calls per lead	■ Average number of service calls per day	■ Cost per interaction by marketing campaign
■ Amount of new revenue	■ Percentage compliance with service-level agreement	■ Number of new customers acquired by marketing campaign
■ Amount of recurring revenue	■ Percentage of service renewals	■ Customer retention rate
■ Number of proposals given	■ Customer satisfaction level	■ Number of new leads by product

FIGURE 4.9
CRM Metrics.

It provides feedback around both the internal business processes and external outcomes in order to continuously improve strategic performance and results. When fully deployed, the balanced scorecard transforms strategic planning from an academic exercise into the nerve center of an enterprise. Kaplan and Norton describe the innovation of the balanced scorecard as follows:

> The balanced scorecard retains traditional financial measures. But financial measures tell the story of past events, an adequate story for industrial age companies for which investments in long-term capabilities and customer relationships were not critical for success. These financial measures are inadequate, however, for guiding and evaluating the journey that information age companies must make to create future value through investment in customers, suppliers, employees, processes, technology, and innovation.[8]
>
> Source: The Balanced Scorecard, www.balancedscorecard.org, accessed February 2015.

The balanced scorecard views the organization from four perspectives, and users should develop metrics, collect data, and analyze their business relative to each of these perspectives:

- The learning and growth perspective.
- The internal business process perspective.
- The customer perspective.
- The financial perspective (see Figure 4.10).

Recall that companies cannot manage what they cannot measure. Therefore, metrics must be developed based on the priorities of the strategic plan, which provides the key business drivers and criteria for metrics that managers most desire to watch. One warning regarding metrics: do not go crazy. The trick is to find a few key metrics to track that provide significant insight. Remember to tie metrics to other financial and business objectives in the firm. The key is to get good insight without becoming a slave to metrics. The rule of thumb is to develop seven key metrics, plus or minus two.

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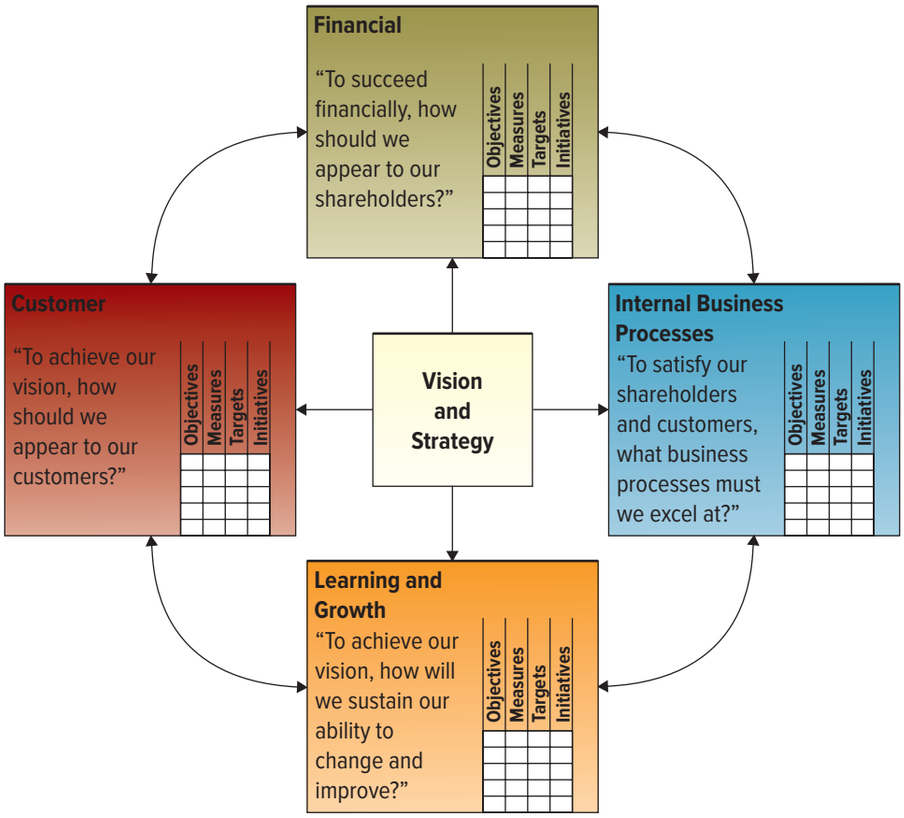
FIGURE 4.10

The Four Primary Perspectives of the Balanced Scorecard.



OPENING CASE STUDY QUESTIONS

1. You have landed your dream job working for Steve Evert. Unfortunately, Steve does not understand the difference between difference between efficiency MIS metrics and effectiveness MIS metrics. Provide Steve with an overview of the importance of metrics and the difference between efficiency MIS metrics and effectiveness MIS metrics.

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Chapter Four Case: Manipulating the Data to Find Your Version of the Truth

How can global warming be real when there is so much snow and cold weather? That's what some people wondered after a couple of massive snowstorms buried Washington, DC, and parts of the East Coast. Politicians across the capital made jokes and built igloos as they disputed the existence of climate change. Some concluded the planet simply could not be warming with all the snow on the ground.

These comments frustrated Joseph Romm, a physicist and climate expert with the Center for American Progress. He spent weeks turning data into information and graphs to educate anyone who would listen as to why this reasoning was incorrect. Climate change is all about analyzing data, turning it into information to detect trends. You cannot observe climate change by looking out the window; you have to review decades of weather data with advanced tools to really understand the trends.

Increasingly, we see politicians, economists, and newscasters taking tough issues and boiling them down to simplistic arguments over what the data mean, each interpreting the data and spinning the data to support their views and agendas. You need to understand the data and turn them into useful information or else you will not understand when someone is telling the truth and when you are being lied to.[9]

Questions

1. Brainstorm two or three types of data economists use to measure the economy.
2. How do they turn the data into information?
3. What issues do they encounter when attempting to measure the economy?
4. As a manager, what do you need to understand when reading or listening to economic and business reports?

Source: Clive Thompson, "Do You Speak Statistics?" Wired, May 2010, p. 36.

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LEARNING OUTCOME REVIEW

4.1. Define the primary MIS roles along with their associated responsibilities.

The chief information officer (CIO) is responsible for (1) overseeing all uses of information technology and (2) ensuring the strategic alignment of MIS with business goals and objectives. The chief data officer (CDO) is responsible for determining the types of information the enterprise will capture, retain, analyze, and share. The chief technology officer (CTO) is responsible for ensuring the throughput, speed, accuracy, availability, and reliability of an organization's information technology. The chief security officer (CSO) is responsible for ensuring the security of MIS systems and developing strategies and MIS safeguards against attacks from hackers and viruses. The chief privacy officer (CPO) is responsible for ensuring the ethical and legal use of information within an organization. The chief knowledge officer (CKO) is responsible for collecting, maintaining, and distributing the organization's knowledge.

4.2. Define critical success factors (CSFs) and key performance indicators (KPIs), and explain how managers use them to measure the success of MIS projects.

Metrics are measurements that evaluate results to determine whether a project is meeting its goals. Two core metrics are critical success factors and key performance indicators. Critical success factors (CSFs) are the crucial steps companies perform to achieve their goals and objectives and implement their strategies. Key performance indicators (KPIs) are the quantifiable metrics a company uses to evaluate progress toward critical success factors. KPIs are far more specific than CSFs.

4.3. Explain why a business would use metrics to measure the success of strategic initiatives.

Business leaders want to monitor key metrics in real time to actively track the health of their business. Most business professionals are familiar with financial metrics. Different financial ratios are used to evaluate a company's performance. Companies can gain additional insight into their performance by comparing financial ratios against other companies in their industry.

REVIEW QUESTIONS

1. What are the responsibilities of a chief information officer?
2. What are the responsibilities of a chief privacy officer?
3. What are the responsibilities of a chief data officer?
4. Why would a company want to have a CIO, CPO, and CSO?
5. What is the difference between MIS efficiency metrics and MIS effectiveness metrics?
6. What is the difference between CSFs and KPIs?
7. How can metrics be used to measure the success of supply chain management systems and CRM systems?
8. What is the purpose of the balanced scorecard?

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MAKING BUSINESS DECISIONS

1. Who Really Won the Winter Olympics?

If you were watching the 2014 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 Sochie Olympic website, the United States ranked fourth. The simple question of who won the 2014 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?

Winter Olympics 2014 Medal Ranking According to NBC News

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

Winter Olympics 2014 Medal Ranking According to Official Sochie Olympic Website

Rank	Country	Gold	Silver	Bronze	Total
1	Russian Fed.	13	11	9	33
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2. Starting Your Own Business

Josh James recently 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?

- Why is it so easy today for students to create start-ups while still in college and how can this course help prepare you to start your own business?
- Explain three CSFs and KPIs you would use to measure the success of your business.
- Choose two CRM and SCM metrics you could use to measure your business and explain how they can help you achieve success.

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3. The Competitive Landscape for Students

According to the Economic Policy Institute, over the past decade the United States has lost an estimated 2.4 million factory jobs to China. Factories in South Korea, Taiwan, and China are producing toys, toothpaste, running shoes, computers, appliances, and cars. For a long time, U.S. firms did not recognize these products as competition; they regarded Asia's high-tech products as second-rate knockoffs and believed Asian countries maintained a factory culture—they could imitate but not innovate.

In hindsight, it is obvious that once these countries did begin designing and creating high-end products, they would have obvious competitive advantages, with high-value research and development coupled with low-cost manufacturing of unbeatable goods and services. Asia is now on the rise in all industries from wind turbines to high-speed bullet trains. According to *Bloomberg Businessweek*'s ranking of the most innovative companies, 15 of the top 50 are Asian, up from just 5 in the previous year. In fact, for the first time, the majority of the top 25 are based outside the United States.

How do you, as a business student, view these statistics? What type of global business climate will you be competing in when you graduate? If you wanted to gather competitive intelligence about the job market, where would you look and what types of data would you want to analyze? What can you do to create personal competitive advantages to differentiate yourself when searching for a job?

4. Roles and Responsibilities

You are the chief executive officer for a start-up telecommunications company. The company currently has 50 employees and plans to ramp up to 3,000 by the end of the year.

Your first task is to determine how you are going to model your organization. You decide to address the MIS department's organizational structure first. You need to consider if you want to have a CIO, CPO, CSO, CTO, CDO, and CKO, and if so, what their reporting structure will look like and why. You also need to determine the different roles and responsibilities for each executive position. Once you have compiled this information, put together a presentation describing your MIS department's organizational structure.

5. One Laptop per Child

Nicholas Negroponte is the founder of the MIT Media Lab and has spent his career pushing the edge of the information revolution as an inventor, thinker, and angel investor. His latest project, One Laptop per Child, plans to build $100 laptops that he hopes to put in the hands of the millions of children in developing countries around the globe. The XO (the "$100 laptop") is a wireless, Internet-enabled, pedal-powered computer costing roughly $100. What types of competitive advantages could children gain from Negroponte's $100 laptop? What types of issues could result from the $100 laptop? Explain each of the efficiency metrics and effectiveness metrics that are required for each laptop to be considered successful.

6. Is it Effective or Is It Efficient?

Making business decisions is a key skill for all managers. Review the following list and, in a group, determine whether the question is focusing on efficiency, effectiveness, or both.

7. Measuring Efficiency and Effectiveness

In a group, create a plan to measure the efficiency and effectiveness of this course and identify recommendations on how you could improve the course to make it more efficient and more effective. You must determine ways to benchmark current efficiency and effectiveness and ways to continuously monitor and measure against the benchmarks to determine if the course is becoming

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more or less efficient and effective (class quizzes and exams are the most obvious benchmarks). Be sure your plan addresses the following:

- Design of the classroom.
- Room temperature.
- Lighting and electronic capabilities of the classroom.
- Technology available in the classroom.
- Length of the class.
- Email and instant messaging.
- Students' attendance.
- Students' preparation.
- Students' arrival time.
- Quizzes and exams (frequency, length, grades).

Business Decision	Efficiency	Effectiveness
What is the best route for dropping off products?		
Should we change suppliers?		
Should we reduce costs by buying lower-quality materials?		
Should we sell products to a younger market?		
Did we make our sales targets?		
What was the turnover rate of employees?		
What is the average customer spending?		
How many new customers purchased products?		
Did the amount of daily transactions increase?		
Is there a better way to restructure a store to increase sales?		

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