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هـــذا الـكـتـاب وطـبـعـه عـلـى نفقتها

المملكة العربية السعودية

Business Decision Making 1 – 1

Secondary Stage – Pathways System
Second Year

1444-2022 Edition

وزارة التعليم
Ministry of Education
2022 - 1444

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Introduction

The progress and development of countries can be measured by their ability to invest in education and by the extent to which their educational system responds to the requirements and changes of the age. It is the responsibility of the Ministry of Education to sustain the development of its educational systems. In response to the concept of Saudi Arabia's Vision 2030 policy, the Ministry has taken the initiative in adopting the Secondary Education Pathways system with the aim of bringing about effective and comprehensive reform at the secondary stage.

The Secondary Education Pathways system provides a distinguished and modern educational model for secondary education in Saudi Arabia, which efficiently contributes to:

- Strengthening the values associated with belonging to our homeland, the Kingdom of Saudi Arabia, and of loyalty to its wise leaders, may Allah protect them, based on pure belief founded on tolerant Islamic teachings.
- Strengthening the values of citizenship by focusing on them in the school curriculum and in class activities, in line with the demands of sustainable development and the development plans of Saudi Arabia, which emphasize the consolidation of the duality of values and identity, founded on the teachings of Islam and moderation.
- Offering qualifications to students that are in line with future specializations in universities and colleges or the required professions, and ensuring that educational outputs are consistent with the requirements of the labor market.
- Enabling students to pursue education along their preferred track at an early stage, according to their inclinations and abilities.
- Enabling students to enrol in specific scientific and administrative disciplines related to the labor market and future jobs.
- Integrating students into an enjoyable and stimulating learning environment within the school, based on a constructive philosophy and applied practices within an active learning environment.
- Guiding students on an integrated educational journey from the primary stage to the end of secondary stage, and facilitating the process of their transition to the post-general education stage.
- Providing students with the technical and personal skills which will help them to deal with life and to respond to the requirements of the stage they are at.
- Expanding opportunities for graduate secondary school students through various options in addition to universities, such as by obtaining professional certificates, joining applied colleges, and obtaining job diplomas.

The Pathways system consists of nine semesters taught over three years, including a common first year in which students receive lessons in various scientific and human fields, followed by two specialized years during which students follow a general pathway as well as four specialized pathways consistent with their inclinations and abilities. These are: the Legal Pathway, the Business Administration Pathway, the Computer Science and Engineering Pathway, and the Health and Life Pathway. This makes this system the best option for students in terms of:

- The existence of new study materials that comply with the requirements of the so-called Fourth Industrial Revolution and its associated development plans, as well as the Saudi Vision 2030 policy which aims to develop higher-order thinking, problem solving, and research skills.
- Elective field programs which are consistent with the needs of the labor market and the students' own preferences. This enables students to enrol in a specific elective field according to a specific job skills matrix.
- An "inclination" scale that ensures the attainment of students' efficiency levels and effectiveness, and helps them to determine their own tendencies, predispositions, and strengths—all of which enhances their chances of success in the future.
- Volunteer work designed specifically for students in line with the philosophy of activities in schools, which is also one of the graduation requirements. This helps to promote humane values, build up society, and ensures its development and cohesion.
- A transfer procedure that enables students to move from one pathway to another according to specific mechanisms.
- Proficiency classes in which skills are developed and achievement levels improved, by providing intensive and remedial lessons.

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- Options for combining education with e-learning and blended learning/teaching, which are built into the Pathways system for reasons of flexibility, convenience, interaction, and effectiveness.
- A graduation project that helps students to integrate theoretical experiences with applied practices.
- Professional and skill-based certificates that are awarded to students after completing specific tasks and certain tests in partnership with specialized bodies.

The Business Administration Pathway is one of the paths developed at the secondary level. It contributes to achieving best practices by investing in human capital and providing students with the knowledge, experience, and skills that will allow them to keep pace with the Fourth Industrial Revolution and the challenges of the 21st century. This pathway also seeks to provide students with the necessary skills to deal with the administrative and financial challenges of the digital economy era in order to ensure a stable economic future. This is driven and supported by: 1) the contents of the Saudi Vision 2030 policy, 2) the two associated programs for developing human capabilities and the quality of life, and 3) the labor market's need for qualified personnel to work in future jobs. The pathway is also intended to promote the values of hard work, discipline, determination, perseverance, positivity, flexibility, national values, enhanced national identity, support for a culture of innovation and entrepreneurship, support for the value of volunteer work—all to prepare students for the labor market and to expand educational opportunities for them. It may also contribute to preparing students to continue their studies at university level, or to obtain professional certificates in one of the related disciplines.

"Business Decision Making" is one of the main subjects in the Business Administration Pathway. It helps students to:

- Become familiar with and grasp the most important basic concepts of decision making.
- Understand business problems, find appropriate solutions, and then use these to fully comprehend the reality and make good decisions for the future.
- Appreciate the importance of identifying problems and finding the most important methods for resolving them.
- Develop an awareness of the alternative solutions available and how to choose the optimal alternative using intuitive or methodological and critical-thinking methods.
- Similarly, develop an awareness of how these methods can be beneficial in solving life and practical problems, and making decisions at the personal, societal, and professional levels.

The subject emphasizes the importance of using quantitative methods in decision making and includes practical and technical exercises to practice what the students have learnt, in order to assist them in solving realistic problems that develop their cognitive skills, under the guidance and supervision of the teacher.

This book "Business Decision Making" is characterized by promoting creative thinking and innovation using technical tools that support the modern decision-making methodology. The book emphasizes important aspects represented by:

- The close connection between the content and real-life situations and problems.
- Presenting the content in diverse, attractive, and interesting ways.
- Highlighting the role of the student in the teaching and learning processes.
- Paying attention to the coherence of its content, which forms an integrated whole.
- Encouraging interest in employing technology in different situations.
- Encouraging Interest in employing a variety of methods in evaluating the students, taking into account the individual differences between them.

In order to keep pace with global developments in this field, the book "Business Decision Making" provides the teacher with an integrated set of diverse educational materials that take into account the individual differences between students. Furthermore, it gives references to educational software and websites, all of which provide students with the opportunity to employ modern technologies and practice-based communication that serve to further confirm the book's role in the teaching and learning process.

Finally, we ask Allah the Almighty to grant that this book may contribute to preparing and qualifying our sons and daughters as students for the world of work and business, and that it may act as an incentive to invest their energies wisely, to build their future, and to contribute to the development of their country.

It is Allah who grants success!

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Foreword

On a cold January morning in 1986, the Space Shuttle Challenger was launched from the Atlantic coast of the United States on its tenth mission. The flight was broadcast live throughout the world, and millions watched as the rockets ignited and carried the shuttle up into the sky. 73 seconds into the flight, one of the solid rocket booster engines exploded, destroying the shuttle and causing the death of its seven crew members. It was one of the most tragic disasters in the history of the American space program. The explosion was blamed on the failure of two O-ring seals in the booster rocket, but the real cause of the disaster was later found to be a case of bad decision making.

The freezing temperatures that day reduced the elasticity of the rubber O-rings which caused them to fail and leak fuel. Engineers were concerned about the effects that the cold weather would have on the integrity of these systems, voiced their reservations, and recommended that the launch be delayed until a day when the temperatures were warmer. However, managers and NASA officials ignored these warnings and made the decision to proceed with the launch. By giving in to what was most certainly enormous pressure to carry on with the mission, their poor decision had catastrophic results.

Life is all about making decisions. From the moment you wake up in the morning until you fall asleep that night, you are constantly making choices and decisions. How many decisions do we make? The number of daily decisions could exceed 100. Whether these are part of your personal or professional life, you are defined by your decisions. If you want your life to follow a particular path, be sure to make decisions carefully, and make the right choices.

Many of the decisions we make each day are routine, and we barely give them a thought. You probably don't spend much time each day thinking about which route you'll take to go to school. You have a routine and the decision becomes automatic. The more challenging decisions are the ones we don't make regularly. This is especially true when the decision is important and has broader implications. Some of the important decisions that many students face include:

- Shall I go on to study at college?
- Which field should I study?
- What profession would I like to go into?
- Where do I want to live and work after finishing school?

Each of these choices will have a major impact on our life's direction. Imagine the outcome if we made important decisions like these randomly or without careful thought?

Important decisions are also a large part of professional life. Consider these examples:

- A manager deciding which job applicant to hire
- A banker deciding whether or not to approve a business loan
- A doctor making decisions about how best to treat a critically-ill patient

In each of these situations, making a thoughtful and informed decision will improve the likelihood of a positive outcome (for example, hiring a good employee, making a productive loan, helping a patient to recover). If these decisions aren't made carefully, we can imagine the negative outcomes that might follow.

Being able to effectively make decisions in the workplace can make you a better employee, manager, and leader. Good decisions have many positive benefits for you and the organization you will work for. Everyone makes numerous decisions

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every day, so knowing why decision making is important, and always improving your decision-making skills, will enhance your performance and work productivity.

On the job, decision-making skills can distinguish you from others and contribute to your professional growth and career development. Depending on your position in the organization, your decisions and choices may also impact other employees and affect their performance as well. The better you are at making decisions, the more success you will experience in your position. Demonstrating your decision-making skills at work can be beneficial when seeking promotions and managerial positions.

Complex decisions aren't only made by individuals. Schools, businesses, public agencies, and even nations must make operational and strategic decisions as they seek to move forward. These are often challenging as the decisions typically affect many people, each of whom may have a different idea about how best to act. Consider the example of Saudi Vision 2030. This was launched with the support of the Custodian of the Two Holy Mosques, may God protect him, and it is the vision of His Royal Highness Crown Prince Mohammad Bin Salman, for the future of this great country. Since the development of Saudi Vision 2030 in 2016, the Kingdom has witnessed changes and development on different levels in the Saudi community. This vision is a wise example of the power and importance of making complex decisions.

Saudi Arabia's economy is heavily reliant on oil exports and has been since the discovery of oil in 1938. Oil is thought to make up 30–50% of Saudi GDP. (GDP, gross domestic product, is a measure of a country's economic output.) Its leaders recognize that the country would benefit from change, but how best to accomplish this? Many important and difficult decisions were made about different aspects of Saudi life, culture, and society. These decisions culminated in the Saudi Vision 2030 plan, a strategic framework designed to:

- Reduce dependence on oil
- Diversify the country's economy
- Develop public-service sectors including: Healthcare, Education, Infrastructure, Recreation/Entertainment, and Tourism

Saudi Vision 2030 is translated into strategic goals to empower effective execution through programs that aim to implement the vision through three main pillars:

1 A resilient society
2 A prosperous economy
3 An ambitious country

Saudi Vision 2030 is based on the following competitive benefits for Saudi Arabia:

- To become the heart of the Arab-Islamic world
- To become a powerful global investor
- To become a hub connecting Africa, Asia, and Europe

Saudi Vision 2030 represents the combined efforts of many people under the leadership of Crown Prince Mohammed bin Salman. Since its introduction in 2016, the country has seen changes and developments throughout society. Saudi Vision 2030 is an example of the power and significance of complex decision making.

Making good decisions is easier when we understand and follow sound decision-making practices. In this book, you will learn about this important process and how to approach problems logically and rationally. You will learn powerful decision-making strategies that you will use throughout your personal and professional life.

This book is written in a way that makes learning simple and enjoyable. Important concepts are broken up into short lessons. Each of these can be quickly read and understood. The lessons are colorfully illustrated to help reinforce each concept. In addition, your teacher may assign learning activities to give you an opportunity to practice these new skills. The structure and features of each lesson are detailed in the Preface of this book.

Good decision making is an important personal and professional skill; one that you'll develop and improve throughout your life.

Preface

Welcome to *Business Decision Making*. This book has a unique design: each skill is presented on two facing pages, with Essential Elements on the left and illustrations and examples pictured on the right. The layout makes it easy to learn a skill without having to read a lot of text and flip pages to see an illustration. The design also makes this a great reference after the course is over! See the illustration on the right to learn more about the pedagogical and design elements of a typical lesson.

Focused on the Essentials

Each lesson presents only the most important information about the featured skill. The left page of the lesson presents about five key Essential Elements, which are the most important guidelines that a student needs to know about the skill. Absorbing and retaining a limited number of key ideas makes it more likely that students will retain and apply the skill in a real-life situation.

Hands-On Activities

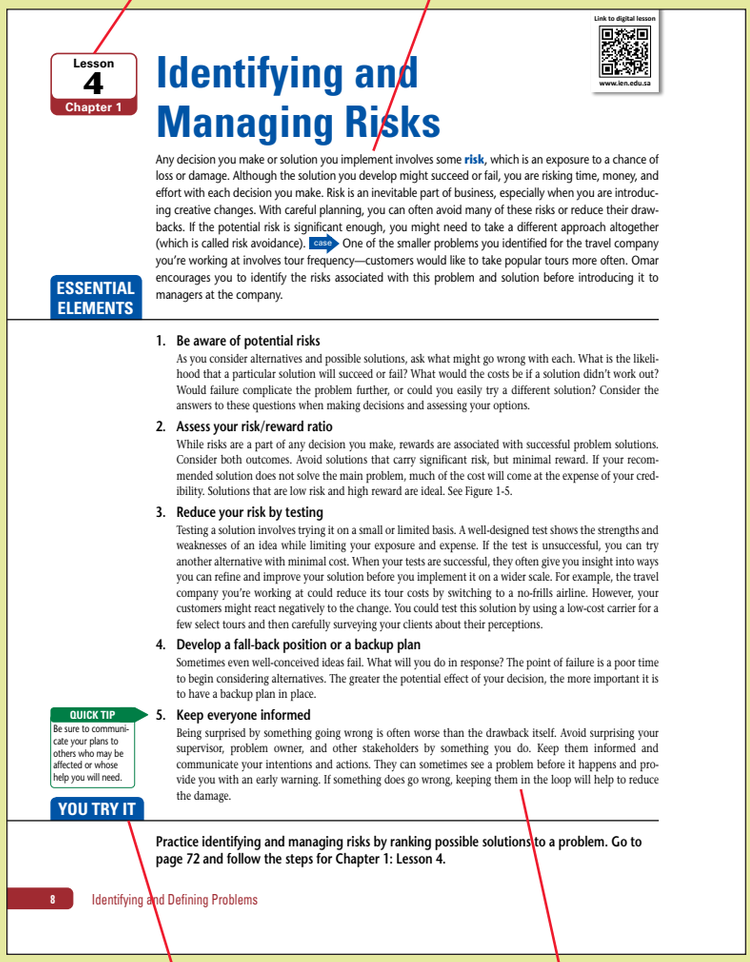
Every Essential Elements lesson contains a You Try It exercise, where students demonstrate their understanding of the lesson skill by completing a task that relates to it. The steps in the You Try It exercises are often general, requiring that students use critical thinking to complete the task.

Real-World Advice and Examples

To help put lesson skills in context, many lessons contain yellow shaded boxes that present real-world stories pulled from today's workplace. Some lessons also contain Do's and Don'ts tables, featuring key guidelines on what to do and not do in certain workplace situations relating to the lesson skill. The Technology @ Work lesson at the end of every chapter covers the Internet and other technologies relating to the chapter.

Each lesson focuses on a single learning objective.

Short introduction reviews key lesson points and presents a real-world case study to engage students.



Lesson 4
Chapter 1

Link to digital lesson
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Identifying and Managing Risks

Any decision you make or solution you implement involves some **risk**, which is an exposure to a chance of loss or damage. Although the solution you develop might succeed or fail, you are risking time, money, and effort with each decision you make. Risk is an inevitable part of business, especially when you are introducing creative changes. With careful planning, you can often avoid many of these risks or reduce their drawbacks. If the potential risk is significant enough, you might need to take a different approach altogether (which is called risk avoidance). CASE One of the smaller problems you identified for the travel company you're working at involves tour frequency—customers would like to take popular tours more often. Omar encourages you to identify the risks associated with this problem and solution before introducing it to managers at the company.

ESSENTIAL ELEMENTS

1. **Be aware of potential risks**
   As you consider alternatives and possible solutions, ask what might go wrong with each. What is the likelihood that a particular solution will succeed or fail? What would the costs be if a solution didn't work out? Would failure complicate the problem further, or could you easily try a different solution? Consider the answers to these questions when making decisions and assessing your options.
2. **Assess your risk/reward ratio**
   While risks are a part of any decision you make, rewards are associated with successful problem solutions. Consider both outcomes. Avoid solutions that carry significant risk, but minimal reward. If your recommended solution does not solve the main problem, much of the cost will come at the expense of your credibility. Solutions that are low risk and high reward are ideal. See Figure 1-5.
3. **Reduce your risk by testing**
   Testing a solution involves trying it on a small or limited basis. A well-designed test shows the strengths and weaknesses of an idea while limiting your exposure and expense. If the test is unsuccessful, you can try another alternative with minimal cost. When your tests are successful, they often give you insight into ways you can refine and improve your solution before you implement it on a wider scale. For example, the travel company you're working at could reduce its tour costs by switching to a no-frills airline. However, your customers might react negatively to the change. You could test this solution by using a low-cost carrier for a few select tours and then carefully surveying your clients about their perceptions.
4. **Develop a fall-back position or a backup plan**
   Sometimes even well-conceived ideas fail. What will you do in response? The point of failure is a poor time to begin considering alternatives. The greater the potential effect of your decision, the more important it is to have a backup plan in place.

QUICK TIP
Be sure to communicate your plans to others who may be affected or whose help you will need.

5. **Keep everyone informed**
   Being surprised by something going wrong is often worse than the drawback itself. Avoid surprising your supervisor, problem owner, and other stakeholders by something you do. Keep them informed and communicate your intentions and actions. They can sometimes see a problem before it happens and provide you with an early warning. If something does go wrong, keeping them in the loop will help to reduce the damage.

YOU TRY IT

Practice identifying and managing risks by ranking possible solutions to a problem. Go to page 72 and follow the steps for Chapter 1: Lesson 4.

8 Identifying and Defining Problems

You Try It activities let students perform tasks to demonstrate their understanding of the lesson objective.

Essential Elements present key points that students need to know to perform the lesson skill successfully.

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Lessons and Exercises

This book is divided into five chapters, with each chapter containing a series of lessons, or learning objectives. The lessons use a fictional adventure travel company as the case study. The assignments in the Extra Practice section at the end of each chapter increase in difficulty. Data files and case studies provide a variety of interesting and relevant business applications. Assignments include:

- **Real Life Independent Challenges** are practical exercises where students can apply the skills they learned in an activity that will help their own lives. For instance, they might create a resume, write a letter to a potential employer, or role play for a job interview for their dream position.
- **Team Challenges** are practical projects that require working together in a team to solve a problem.
- **Be the Critic Exercises** are activities that require students to evaluate a flawed example and provide ideas for improving it.
- **Critical Thinking Questions** in Chapter 5 pose topics for discussion that require analysis and evaluation. Many also challenge students to consider and react to realistic critical thinking and application of the skills taught in Chapter 5.

Do's & Don'ts tables present key tips for what to do and not do.

Certain lessons feature illustrations of examples discussed in the lesson, and act as prompts for discussion and further thought.

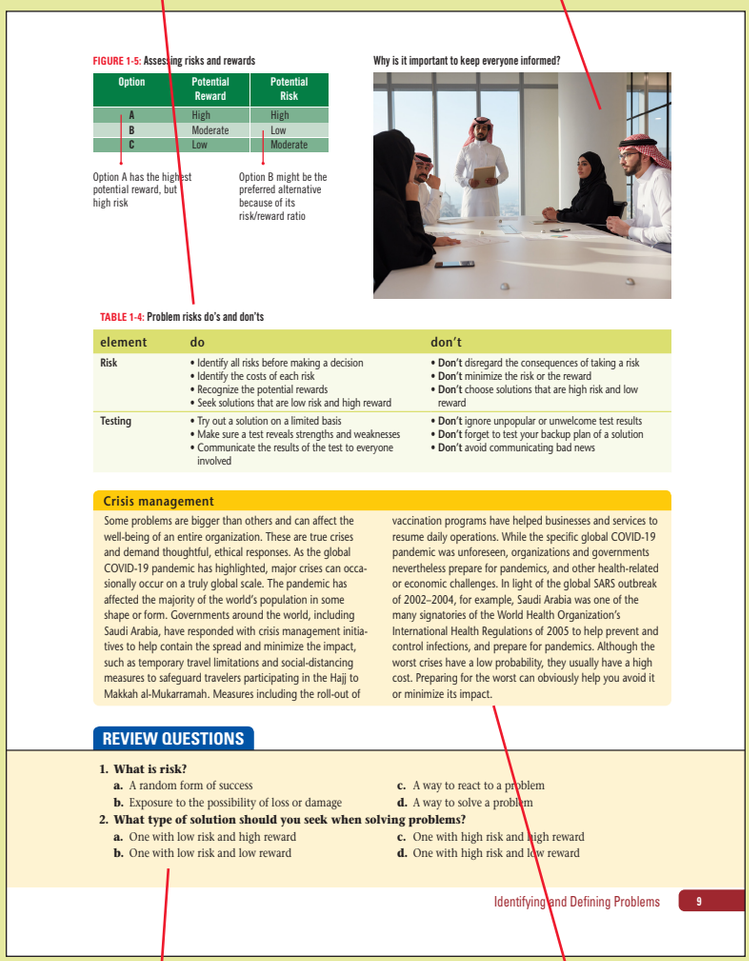

FIGURE 1-5: Assessing risks and rewards

Option	Potential Reward	Potential Risk
A	High	High
B	Moderate	Low
C	Low	Moderate

Option A has the highest potential reward, but high risk

Option B might be the preferred alternative because of its risk/reward ratio

Why is it important to keep everyone informed?

TABLE 1-4: Problem risks do's and don'ts

element	do	don't
Risk	• Identify all risks before making a decision • Identify the costs of each risk • Recognize the potential rewards • Seek solutions that are low risk and high reward	• **Don't** disregard the consequences of taking a risk • **Don't** minimize the risk or the reward • **Don't** choose solutions that are high risk and low reward
Testing	• Try out a solution on a limited basis • Make sure a test reveals strengths and weaknesses • Communicate the results of the test to everyone involved	• **Don't** ignore unpopular or unwelcome test results • **Don't** forget to test your backup plan of a solution • **Don't** avoid communicating bad news

Crisis management

Some problems are bigger than others and can affect the well-being of an entire organization. These are true crises and demand thoughtful, ethical responses. As the global COVID-19 pandemic has highlighted, major crises can occasionally occur on a truly global scale. The pandemic has affected the majority of the world's population in some shape or form. Governments around the world, including Saudi Arabia, have responded with crisis management initiatives to help contain the spread and minimize the impact, such as temporary travel limitations and social-distancing measures to safeguard travelers participating in the Hajj to Makkah al-Mukarramah. Measures including the roll-out of vaccination programs have helped businesses and services to resume daily operations. While the specific global COVID-19 pandemic was unforeseen, organizations and governments nevertheless prepare for pandemics, and other health-related or economic challenges. In light of the global SARS outbreak of 2002–2004, for example, Saudi Arabia was one of the many signatories of the World Health Organization's International Health Regulations of 2005 to help prevent and control infections, and prepare for pandemics. Although the worst crises have a low probability, they usually have a high cost. Preparing for the worst can obviously help you avoid it or minimize its impact.

REVIEW QUESTIONS

1. **What is risk?**
   - **a.** A random form of success
   - **b.** Exposure to the possibility of loss or damage
   - **c.** A way to react to a problem
   - **d.** A way to solve a problem
2. **What type of solution should you seek when solving problems?**
   - **a.** One with low risk and high reward
   - **b.** One with low risk and low reward
   - **c.** One with high risk and high reward
   - **d.** One with high risk and low reward

Identifying and Defining Problems 9

Review Questions provide multiple-choice questions that test students' understanding of the lesson material.

News to Use boxes provide real-world stories related to the lesson topic.

What decisions have you made today?

What decisions will you have to make about going to university or college?

What decisions will you have to make about deciding on a career?

Chapter
1

Identifying and Defining Problems

Whether you are working in a large or small company, or preparing to start a career, you are likely to spend time making decisions and solving problems. Although problems can cause frustration and substantial difficulties, creative thinkers and successful professionals learn to view them as opportunities for improving a business, service, or task because they compel you to recognize and confirm your goals. This chapter outlines the process of solving problems, discusses how to analyze problems and their causes, and identifies common problem-solving pitfalls. case You are working at an adventure travel company as an assistant to Omar, the vice president of finance. Tour sales at the company have not increased in many months, even during the height of the summer travel season. Omar is in charge of a new project called 12 by 12 that is looking for a solution to this problem. The goals of the project are to increase sales by 12%. As an assistant, you are helping him identify problems customers have with the company's tours and with traveling overall. Omar asks you to learn more about creative thinking and problem solving to contribute productively to the 12 by 12 project.

LEARNING OBJECTIVES

Once you have completed this chapter, you should be able to:

1. Understand problem solving
2. Analyze problems
3. Develop effective problem statements
4. Identify and manage risks

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Lesson 1
Chapter 1

Understanding Problem Solving

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To be an effective business decision maker, every professional should be a problem solver. You can learn and develop the skill of solving problems over time to help support successful decision making. People who can identify, define, and solve problems are valued members of an organization. Developing this ability will contribute to the success of your career as you seek positions with greater responsibility. Table 1-1 compares the do's and don'ts of effective problem solving. case To prepare for an upcoming 12 by 12 project meeting to discuss goals and assign tasks, Omar asks you to develop a list of problem-solving guidelines to guide decision making.

DETAILS

Consider these guidelines as you begin solving problems to guide decision making:

- ### Identify yourself as a problem solver

  One day, you are likely to enter employment. Whether you are a member of staff or management, much of what you do every day is solve problems and make decisions. In fact, the role of problem solver is one that distinguishes the professional from the line worker. People who are new to the workforce often solve problems by reacting to them. However, you are more effective if you use an organized approach to problem solving.

QUICK TIP
Variations on problems include dilemmas, paradoxes, and difficulties, such as trouble performing tasks.

- ### Recognize problems

  Learn to recognize problems so that you see them developing and can act quickly to solve them. A dictionary defines a problem as an unsettled question or the source of distress or difficulty. In an organization, a **problem** is an obstacle that stands in the way of achieving a desired goal. In short, a problem is the difference between the current state and where you want to be. For example, if you expect to sell 100 tours each month, but are only selling 50, then you have a problem. See Figure 1-1.

QUICK TIP
No single or simple set of steps solves every type of problem. Most solutions involve creative thinking and logical exploration.

- ### Select an intuitive approach for solving problems

  People usually solve problems in one of two ways: intuitively or systematically. **Intuition** is your knowledge of something without having to discover or learn it, and it is typically your first reaction to a problem or question. When you solve a problem intuitively, you react immediately and instinctively, without following a particular procedure. This reactive approach is well suited to situations where you need to make a quick decision or solve a routine problem. In those cases, you can often use your common sense to decide on a solution. For example, if the problem is that customers often have to wait to receive brochures for the popular Al Wahbah crater tour, you can solve the problem by printing additional brochures.

- ### Select a systematic approach for solving problems

  When you are **systematic**, you solve a problem in a methodical and organized manner. Systematic problem solving takes a reasoned, rational approach and is appropriate for larger, more complicated problems or situations that involve a lot of risk. One systematic problem-solving method is to adapt a solution from a prior problem and apply it to your current situation. For example, one way to begin solving the problem of declining sales at the travel company you're working at is to examine advertising campaigns that increased sales in the past. Figure 1-2 lists the basic problem-solving steps.

- ### Make decisions

  A major part of problem solving involves making effective decisions. **Decisions** are choices you make when faced with a set of options or alternatives. You can also think of decisions as tiny problems you need to solve, and then apply problem-solving techniques to guide your choices. As you improve your problem-solving skills, you will naturally develop your decision-making ability as well.

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FIGURE 1-1: Defining a problem

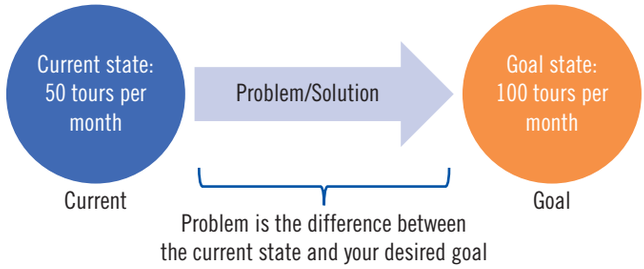

FIGURE 1-2: Basic problem-solving steps

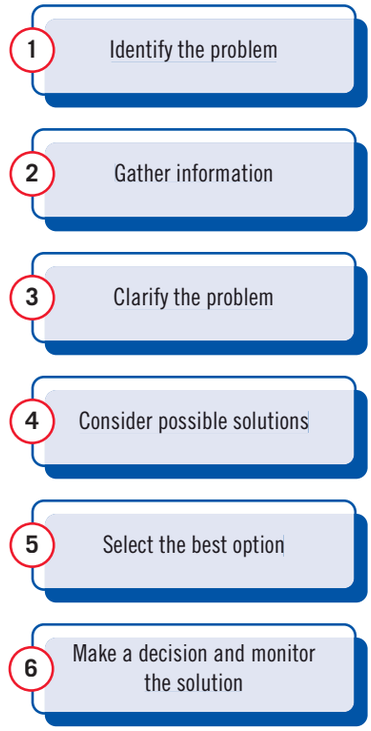

TABLE 1-1: Problem solving do's and don'ts

guideline	do	don't
Identify yourself as a problem solver	• Feel confident you can solve the problem	• **Don't** give up easily if one idea does not work
Recognize problems	• Consider problems as opportunities to find innovative solutions • Define and then redefine the problem	• **Don't** ignore problems until they are too big to solve easily • **Don't** stick to your original conception of the problem if you are having trouble finding a solution
Select an approach	• Use your intuition for simple problems • Follow a systematic process for complex problems • Review and reconsider the problem, your goals, and possible solutions • Consider the problem from different perspectives	• **Don't** create a detailed procedure that is difficult to complete or duplicate • **Don't** jump to conclusions
Make decisions	• Consider all the alternatives before selecting one • Trust your intuition, but make sure the facts support your decision	• **Don't** make rash decisions • **Don't** second guess yourself if you feel you made the right choice

REVIEW QUESTIONS

1. **What is a problem for an organization?**
   - **a.** Choice made when faced with a set of alternatives
   - **b.** Difference between professional and line worker
   - **c.** Set of objectives or goals
   - **d.** Difference between current state and goal state
2. **Which of the following should you not do when solving problems?**
   - **a.** Define the problem
   - **b.** Accept the first solution
   - **c.** Gather information
   - **d.** Make a decision

Lesson 2
Chapter 1

Analyzing Problems

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Many companies around the world rely on their employees to identify problems and solve them. That is why people who can effectively solve problems are valuable members of an organization. Much of the effort in problem solving involves understanding what the underlying issues really are. Look for the root causes, related information, ideas, risks, costs, and benefits associated with problems. Defining the real problem is the first major milestone on the way to a solution. It frequently takes as much time to identify and understand the problem as it does to solve it. Table 1-2 summarizes the do's and don'ts for analyzing problems. case Omar asks you to determine whether the decline in sales is part of a trend for the entire travel industry or if it is unique to the company.

ESSENTIAL ELEMENTS

1. Look for deficiencies

A problem is only a problem when you are aware of it. Most organizations have a constant stream of difficulties, though they frequently overlook or ignore many because of time or other constraints. The first step in the problem-solving process is to identify shortcomings, deficiencies, or dissatisfactions. Be observant, ask questions, and develop sensitivity for subtle problems.

2. Interview and gather data

Talk to people who are involved with the problem, work in the area, or may be affected by your solution. Learn all that you can about the problem and possible solutions. The best insights often come from the least obvious people and sources. Gather enough information to develop a representative sample. Figure 1-3 outlines ways to gather information.

QUICK TIP
As you observe and discover information, you might have to redefine the problem.

3. Observe as much as you can

You often learn the most about a problem through observation. You can observe a problem directly by watching an interaction, for example, or experiencing the problem yourself. You can also rely on the direct observations of others to describe current or past difficulties. When you use observed data, be sure to document details such as the date, time, and other factual information about the observation and the problem.

4. Ask what, not who

When gathering information, focus on objective facts. Ask "what?" not "who?". Investigating problems can make people apprehensive, and they might withdraw as a consequence. Assure everyone that you are seeking their help and that you value and respect their ideas, opinions, and suggestions.

5. Have a reality check

When you identify a suspected problem, ask yourself if it makes sense in light of the data you've collected. Trust your instinct and wait to start solving the problem until you are comfortable with your conclusion. If you are not satisfied, take more time to redefine the problem. Ask other people for opinions and advice.

YOU TRY IT

Practice analyzing problems by listing the steps you would take to analyze a problem. Go to page 71 and follow the steps for Chapter 1: Lesson 2.

FIGURE 1-3: Gathering information

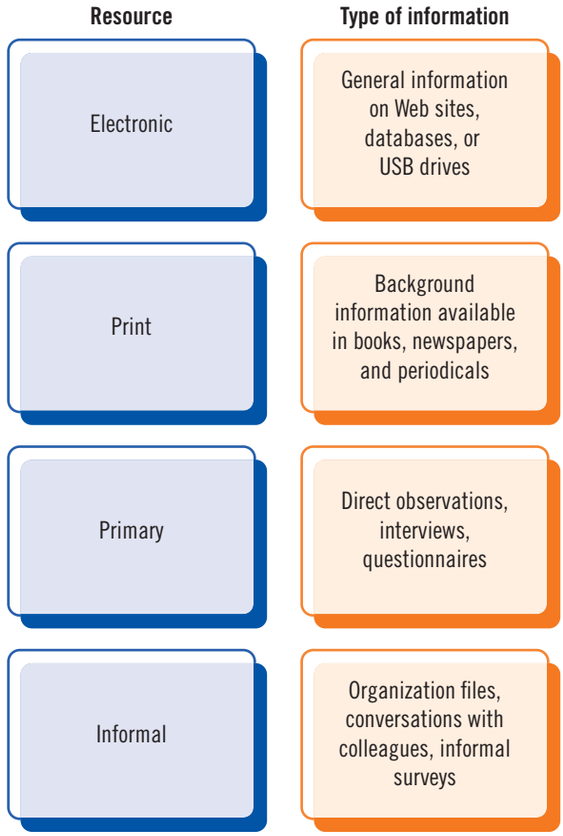

TABLE 1-2: Analyzing problems do's and don'ts

guideline	do	don't
Identification	• Look for possible deficiencies, shortcomings, and other types of problems • Ask questions of people involved to find out why goals are not met • Gather data from other sources	• **Don't** overlook or ignore possible problems • **Don't** limit yourself to a single type of information
Observation	• Observe where and how the problem occurs, if possible • Ask "what," not "who" • Assure people that you respect their ideas, opinions, and suggestions	• **Don't** intimidate people involved with the problem; ask for their cooperation • **Don't** threaten others so that they undermine the solution
Confirmation	• Review the data you gathered to confirm that you've correctly identified a problem	• **Don't** start solving the problem unless you are confident you identified it thoroughly

REVIEW QUESTIONS

1. **The first step in problem solving is to:**
   - **a.** make a decision
   - **b.** describe the problem-solving traps
   - **c.** identify shortcomings
   - **d.** communicate your progress
2. **Which of the following is a primary resource of information about a problem?**
   - **a.** Observation
   - **b.** Web site
   - **c.** Magazine article
   - **d.** Organization files

Lesson 3
Chapter 1

Developing Effective Problem Statements

Link to digital lesson
www.ien.edu.sa

As you solve problems, communicate clearly and succinctly about what you are doing and the progress you are making. Start by providing a statement of the problem. A **problem statement** is a clear, concise description of the problem and the effect you expect from the solution. Its purpose is to describe a single problem objectively, not to find a cause, assign blame, or define the solution. Include the problem statement in your proposals, progress reports, and discussions with stakeholders. Table 1-3 outlines the do's and don'ts of developing a problem statement. case After gathering data about the problem of the company's declining tour sales, you are ready to summarize your understanding of the problem in a problem statement you include in a progress report for Omar.

ESSENTIAL ELEMENTS

1. **Describe the ideal situation**
   Frame the problem for your audience by starting with a brief description of the ideal situation. A problem represents a deviation from the norm. By describing the desired state, you help others understand the current situation. Use terms and comparisons that your audience considers important.
2. **Briefly summarize the problem**
   Contrast the ideal situation with the current state. Identify the condition that is preventing the goal, outcome, or state from being achieved.

QUICK TIP
Describe objective symptoms of the problem that others can observe.

3. **Identify symptoms of the problem**
   Let your audience know where the problem is manifesting itself. Describe the symptoms of the problem that others can see or detect so they understand the problem you are working on.

QUICK TIP
Use numbers and other specific, concrete details to describe the problem.

4. **Describe the size and scope of the problem**
   Stakeholders and other interested people will try to assess how significant the problem is. Help them to do this by providing information about the size and scope of the matter.
5. **Identify the consequences**
   Use specific detail to describe how the problem affects your audience and the organization. Identify any direct and indirect costs associated with the problem. Emphasize the benefits of your work by outlining the consequences of a solution.
6. **Explain any other research or investigation that you may pursue**
   Your problem statement is likely to be a work in progress. If you are still collecting data, interviewing affected parties, or developing alternative solutions, let your audience know. Your understanding of the problem may change as new information becomes available. See Figure 1-4.

YOU TRY IT

Practice developing effective problem statements by writing a problem statement. Go to page 71 and follow the steps for Chapter 1: Lesson 3.

FIGURE 1-4: Parts of a problem statement

Ideal situation:
Based on previous years, tour sales overall should be steady, with an increase in trips to adventure travel destinations.

Problem summary:
Customers report that worries about the global economy and international airline services are preventing them from traveling.

Symptom:
Tour sales in all areas have decreased by 8%, with no increase in adventure travel.

Size and scope:
Even our most popular Saudi Arabian tours show no increase in enrollment, despite heavy promotion.

Consequences:
Plans to add tours, develop our Web site, and expand staff are now on hold until we can solve this problem.

Research:
50% of tour companies reported significant loss of revenue last year.

How would you describe the size and scope of the problem?

TABLE 1-3: Problem statement do's and don'ts

guideline	do	don't
Purpose	• Describe a single problem • Use objective measures	• **Don't** address more than one problem • **Don't** identify causes • **Don't** assign blame • **Don't** describe the solution
Audience	• Provide the problem statement to the person who is supervising or approving your problem-solving activities • Involve others who are helping to solve the problem	• **Don't** give the problem statement to everyone in the organization
Content	• Identify the ideal situation from the point of view of your audience • Describe the condition that prevents the ideal situation • Identify symptoms • Describe the size and scope of the problem objectively • Identify consequences	• **Don't** list every condition or symptom; focus on the most important ones • **Don't** offer opinions about possible consequences

REVIEW QUESTIONS

1. **The purpose of a problem statement is to:**
   - **a.** determine the cause
   - **b.** assign responsibility
   - **c.** define the solution
   - **d.** describe a single problem objectively
2. **A statement such as "Plans to add tours, develop our Web site, and expand staff are now on hold until we can solve this problem," is an example of:**
   - **a.** defining the ideal situation
   - **b.** identifying the consequences
   - **c.** describing the symptoms of the problem
   - **d.** describing the size and scope of the problem

Lesson 4
Chapter 1

Link to digital lesson
www.ien.edu.sa

Identifying and Managing Risks

Any decision you make or solution you implement involves some **risk**, which is an exposure to a chance of loss or damage. Although the solution you develop might succeed or fail, you are risking time, money, and effort with each decision you make. Risk is an inevitable part of business, especially when you are introducing creative changes. With careful planning, you can often avoid many of these risks or reduce their drawbacks. If the potential risk is significant enough, you might need to take a different approach altogether (which is called risk avoidance). case One of the smaller problems you identified for the travel company you're working at involves tour frequency—customers would like to take popular tours more often. Omar encourages you to identify the risks associated with this problem and solution before introducing it to managers at the company.

ESSENTIAL ELEMENTS

1. Be aware of potential risks

As you consider alternatives and possible solutions, ask what might go wrong with each. What is the likelihood that a particular solution will succeed or fail? What would the costs be if a solution didn't work out? Would failure complicate the problem further, or could you easily try a different solution? Consider the answers to these questions when making decisions and assessing your options.

2. Assess your risk/reward ratio

While risks are a part of any decision you make, rewards are associated with successful problem solutions. Consider both outcomes. Avoid solutions that carry significant risk, but minimal reward. If your recommended solution does not solve the main problem, much of the cost will come at the expense of your credibility. Solutions that are low risk and high reward are ideal. See Figure 1-5.

3. Reduce your risk by testing

Testing a solution involves trying it on a small or limited basis. A well-designed test shows the strengths and weaknesses of an idea while limiting your exposure and expense. If the test is unsuccessful, you can try another alternative with minimal cost. When your tests are successful, they often give you insight into ways you can refine and improve your solution before you implement it on a wider scale. For example, the travel company you're working at could reduce its tour costs by switching to a no-frills airline. However, your customers might react negatively to the change. You could test this solution by using a low-cost carrier for a few select tours and then carefully surveying your clients about their perceptions.

4. Develop a fall-back position or a backup plan

Sometimes even well-conceived ideas fail. What will you do in response? The point of failure is a poor time to begin considering alternatives. The greater the potential effect of your decision, the more important it is to have a backup plan in place.

QUICK TIP
Be sure to communicate your plans to others who may be affected or whose help you will need.

5. Keep everyone informed

Being surprised by something going wrong is often worse than the drawback itself. Avoid surprising your supervisor, problem owner, and other stakeholders by something you do. Keep them informed and communicate your intentions and actions. They can sometimes see a problem before it happens and provide you with an early warning. If something does go wrong, keeping them in the loop will help to reduce the damage.

YOU TRY IT

Practice identifying and managing risks by ranking possible solutions to a problem. Go to page 72 and follow the steps for Chapter 1: Lesson 4.

FIGURE 1-5: Assessing risks and rewards

Option	Potential Reward	Potential Risk
A	High	High
B	Moderate	Low
C	Low	Moderate

Option A has the highest potential reward, but high risk

Option B might be the preferred alternative because of its risk/reward ratio

Why is it important to keep everyone informed?

TABLE 1-4: Problem risks do's and don'ts

element	do	don't
Risk	• Identify all risks before making a decision • Identify the costs of each risk • Recognize the potential rewards • Seek solutions that are low risk and high reward	• **Don't** disregard the consequences of taking a risk • **Don't** minimize the risk or the reward • **Don't** choose solutions that are high risk and low reward
Testing	• Try out a solution on a limited basis • Make sure a test reveals strengths and weaknesses • Communicate the results of the test to everyone involved	• **Don't** ignore unpopular or unwelcome test results • **Don't** forget to test your backup plan of a solution • **Don't** avoid communicating bad news

Crisis management

Some problems are bigger than others and can affect the well-being of an entire organization. These are true crises and demand thoughtful, ethical responses. As the global COVID-19 pandemic has highlighted, major crises can occasionally occur on a truly global scale. The pandemic has affected the majority of the world's population in some shape or form. Governments around the world, including Saudi Arabia, have responded with crisis management initiatives to help contain the spread and minimize the impact, such as temporary travel limitations and social-distancing measures to safeguard travelers participating in the Hajj to Makkah al-Mukarramah. Measures including the roll-out of vaccination programs have helped businesses and services to resume daily operations. While the specific global COVID-19 pandemic was unforeseen, organizations and governments nevertheless prepare for pandemics, and other health-related or economic challenges. In light of the global SARS outbreak of 2002–2004, for example, Saudi Arabia was one of the many signatories of the World Health Organization's International Health Regulations of 2005 to help prevent and control infections, and prepare for pandemics. Although the worst crises have a low probability, they usually have a high cost. Preparing for the worst can obviously help you avoid it or minimize its impact.

REVIEW QUESTIONS

1. **What is risk?**
   - **a.** A random form of success
   - **b.** Exposure to the possibility of loss or damage
   - **c.** A way to react to a problem
   - **d.** A way to solve a problem
2. **What type of solution should you seek when solving problems?**
   - **a.** One with low risk and high reward
   - **b.** One with low risk and low reward
   - **c.** One with high risk and high reward
   - **d.** One with high risk and low reward

Technology @ Work: Crowdsourcing

Crowdsourcing is a term to characterize a way of using groups to solve problems. The groups are usually online communities called a crowd. An organization broadcasts a problem to the crowd as an open call for solutions. The crowd submits solutions, and then the organization selects and owns the best solution. It sometimes rewards members of the crowd. The Royal Commission for Riyadh City is consulting consumers' opinions through crowdsourcing to help transform the city and improve its services. The National Competitiveness Center's Public Consultation Platform enables individuals and businesses to share insights on proposed economic and development projects (https://istitlaa.ncc.gov.sa/ar/Pages/default.aspx). Through crowdsourcing, a company can investigate problems at low cost and might produce innovative solutions from a wider range of people than it employs. The risks to the company are that it might waste time looking for a solution from the crowd, who is not committed to helping the company solve the problem. case Because the problem at the travel company you're working for is common to the travel industry, Omar is considering working with other travel companies to solve the problem and asks you to learn more about crowdsourcing.

ESSENTIAL ELEMENTS

QUICK TIP
Open-science problem solving is a form of crowdsourcing.

1. Strength in numbers

The value of crowdsourcing comes from the thousands or millions of people participating. Successful Web sites such as the National Business Innovation Portal Fikra (www.fikra.sa) use crowdsourcing, by drawing upon over 60 government and private agencies to offer services that promote and support the development of small and medium enterprises.

2. Collaboration matters

Crowdsourcing can provide valuable feedback for companies about their products. More than feedback, however, customers often want to collaborate. For example, a furniture company might invite its customers to submit designs for chairs, helping to develop the crowd into a loyal and enthusiastic customer base.

3. Different, not necessarily better

Crowdsourcing is not designed for every business. A crowd's decisions can determine the direction of a company or product. Crowdsourcing works well for businesses such as video Web sites, which are popular and draw enough numbers to provide a representative sample. Other products or businesses that have less appeal, such as household cleaners, are unlikely to attract enough of a crowd to solve problems.

YOU TRY IT

Learn more about crowdsourcing. Go to page 72 and follow the steps for Chapter 1: Technology @ Work.

REVIEW QUESTIONS

1. Crowdsourcing is a way to:

a. employ staff
b. reduce risk and increase rewards
c. use many overseas workers to perform tasks
d. use groups to solve problems

2. The most successful crowdsourcing examples involve:

a. volunteer efforts where the results are provided for the common good
b. persuading customers to purchase services
c. products that have specific, limited appeal
d. high company profits with low crowd compensation

Extra Practice

Real Life Independent Challenge

You can apply the problem-solving techniques you learned in this chapter to challenges, difficulties, and other problems in other parts of your life.

Start by selecting a problem you want to solve. Next, using the template below, construct a problem statement, following the steps in Lesson 3 and the example model provided in Figure 1-4.

Ideal situation:	**Problem summary:**
Symptom:	**Size and scope:**
Consequences:	**Research:**

Team Challenge

You have just been hired by Qassim Builders, a company in Buraydah, Al-Qassim Province, specializing in sustainable building. In line with Saudi Vision 2030, the goals of your company are to design and build structures that use energy, resources, and materials efficiently. For your first project, you are assigned to a newly formed team that will communicate with clients and solve their problems. However, your new team itself is having problems: the team has only met once and one person dominated the discussion. Everyone else was silent or quietly responded to text messages. Your manager learned about the ineffective meeting and suggested that you start by creating a team charter, which spells out the rules for conduct for the team and its members. The following Web site can be used for free for this purpose: https://mural.co (team charter template: https://mural.co/templates/team-charter)

a. Meet as a group to begin creating a team charter. Identify the goals of the Qassim Builders team. Discuss how often the team should meet, and what happens if a team member skips meetings or doesn't do their share of the work.
b. Identify the strengths of each member of the team. Discuss how to resolve conflicts and other team problems.
c. On your own, summarize the conclusions of your team. Be sure to include suggestions for resolving conflicts and handling team problems.
d. Meet again as a team and compile a single charter for your team.

Be the Critic

You are working for Asif Insurance, an insurance agency in Riyadh. Asif Insurance often contributes to local nonprofit organizations, and provides major support to one organization each year. You are a member of a committee that is selecting this year's organization. Figure 1-6 describes the meeting. Analyze the problem-solving discussion, noting its weaknesses, and send a list of the weaknesses to your instructor.

FIGURE 1-6

Yousef (committee chair):
Let's support the food pantry.

Khalil:
That sounds like a good idea.

Farah:
I like any idea that helps people in need.

Tahir:
I have to leave in 10 minutes.

Jamal:
What about something else, such as the electronics recycling program?

Yousef:
Electronics recycling doesn't seem as helpful as the food pantry.

Khalil:
I agree.

Tahir:
So we've settled on the food pantry?

Chapter 2

Solving the Problem

After you identify a problem and explore its causes and related issues, it is time to develop a solution. The activities associated with solving a problem are different from the steps you have followed to this point. When you define a problem, you should be open-minded and flexible as you explore, research, and communicate with others. Developing and implementing a solution demands greater focus and deliberation. Planning tasks and managing your time become your most distinguishing skills. This chapter introduces you to solving problems methodically and then managing the solution to verify you made the right decision. case As an assistant to Omar, the vice president of finance at the adventure travel company you both work for, you have been working on a project called 12 by 12 that aims to increase sales by 12%. After identifying problems customers have with the company's tours and with traveling overall, Omar is ready to assemble all the data you and others have collected, discuss alternatives, and make decisions about the future of the company. He asks you to work with him to solve the problem of declining tour sales.

LEARNING OBJECTIVES

Once you have completed this chapter, you should be able to:

1. Gather and analyze data
2. Develop alternatives
3. Evaluate options
4. Implement the solution
5. Monitor and manage the solution
6. Verify the solution

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Lesson 1
Chapter 2

Gathering and Analyzing Data

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Before you solve a business problem, gather relevant data and then analyze it to find trends, indicators, and other useful information. Successful business decisions are based on sound information. Use the data you collect to prepare possible solutions and alternatives. To systematically gather and analyze the data related to your problem, start by identifying your goal and looking for information related to it. If you want to increase sales, for example, you should gather recent sales data. Then use tools to view that data in different ways, such as by product, region, or quarter, as shown in Figure 2-1. Keep one eye on your desired outcome to be sure the information you collect is helping you to reach your goals. Table 2-1 outlines the types of data you can collect. case Before you meet with Omar to discuss solutions, he advises you to review the fundamentals of gathering and analyzing data.

DETAILS

Consider the following guidelines as you gather data:

- **Define your data needs**

  What information do you need to reach an informed decision? A thoughtful answer to this question helps guide your research. Make a list of important data and where you can find it. Consider the costs of acquiring this information (such as money and time), and plan to pursue the data that provides the best return on your efforts.

- **Do not overestimate what you know about the problem**

  The information you gather might contradict your assumptions. Be scientific and objective in your research. Let the data stand on its own and keep an open mind about interpreting it. Apply intellectual humility, and assume your research will reveal more than you already know about the problem.

QUICK TIP
Documenting your data and sources of information also supports your decision in case something goes wrong with your solution.

- **Document the data and its sources**

  As you talk with people, review documents, and make observations, take time to record basic information such as title, author, and location. Your records will be useful when you need to retrace your steps. As other people become involved, they might also need to review your work.

- **Examine existing information first**

  Acquiring information costs you and others time and effort. Before you start to collect new information through observations or studies, look for sources of existing information. Talk to others who already observed the problem and can quickly provide you with details. Company documents and records can reveal information with a quick search and review. Start to gather new data after you examine the available material.

- **Rely on people as your most important resource**

  Much of the information you need might be available only from other people in your organization. They often have insights or experience that is not available anywhere else. Even if they do not know about the problem directly or do not think they could contribute to the solution, identify and approach people who might be able to share data with you.

QUICK TIP
Use software tools such as spreadsheets, databases, and diagramming programs for flowcharts to help you see how one set of data relates to another.

- **Consider interrelationships**

  Most of the data you collect is interrelated because it is connected to the same problem. Examine all of the information together to see how it is connected. Does one factor or process show up repeatedly? Do you see a trend or pattern? What do the relationships tell you about the nature of the problem?

FIGURE 2-1: Viewing data in different ways

Specialty Travel

Tour	Qtr 1		Qtr 2	
Farasan Islands	SAR	23,600	SAR	5,900
Jabal Qarah caves	SAR	51,540	SAR	-
Al Wahbah crater	SAR	26,970	SAR	-
Qaisariyah Souq	SAR	31,425	SAR	6,285
Al-Masmak	SAR	18,360	SAR	-
Al-'Ula	SAR	39,950	SAR	-
Diriyah	SAR	26,340	SAR	-
Wonders of Saudi Arabia	SAR	218,185	SAR	-

Spreadsheet of sales data

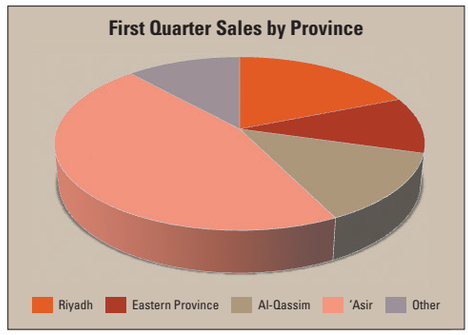

Chart showing sales by Province

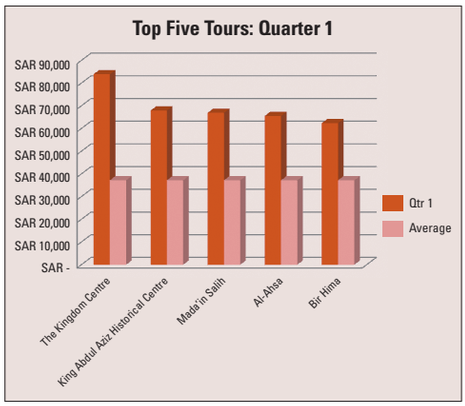

Chart comparing top five tours in Quarter 1

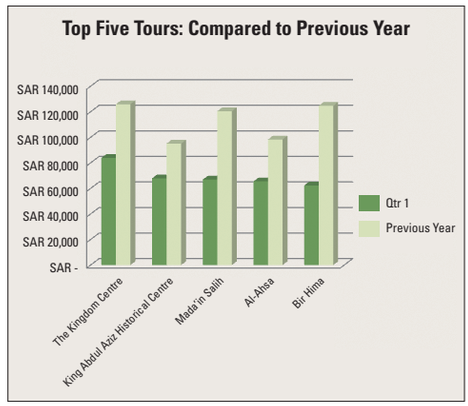

Chart comparing top five tours to previous year

TABLE 2-1: Types of data to collect

type of data	resource	applies to
Financial	Organization records, trade associations, and business databases	Financial problems, such as increasing revenue, decreasing expenses, and setting prices
Task or process	Employee reports and logs	Inefficient processes, such as late orders, missed deadlines, and low production
Product or service	Customer surveys and comments	Decreasing sales, high inventory, and customer dissatisfaction
General advice	Experts, experienced colleagues and managers, outsiders, and secondary sources, such as books and Web sites	Comprehensive problems, such as business mission and focus, and social or interpersonal problems

REVIEW QUESTIONS

1. **Before you start collecting new information through observations or experiments, you should:**
   - **a.** analyze the alternatives
   - **b.** look for sources of existing information
   - **c.** make quick decisions
   - **d.** subscribe to new sources of information
2. **What kind of data should you collect to solve a problem of customer dissatisfaction with a product or service?**
   - **a.** Employee reports and logs
   - **b.** Secondary sources, such as books and Web sites
   - **c.** Customer surveys and comments
   - **d.** Organization records, trade associations, and business databases

Lesson 2
Chapter 2

Developing Alternatives

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After you research a problem and collect data, start to consider alternatives and solutions. This creative phase of the problem-solving process requires imagination and intuition. Identify as many alternatives and ideas as you can—your eventual solution is only as good as the set of options that you generate. Continue working with other people, especially those who are close to the problem, because they often suggest solutions that might not occur to you. Table 2-2 outlines the do's and don'ts for developing alternatives. case Now that the 12 by 12 project team has gathered data about sales at the company you're working at and throughout the travel industry, Omar is ready to meet with you and other members of the team to explore alternative solutions.

ESSENTIAL ELEMENTS

QUICK TIP
Innovative ideas often come when you don't expect them, so carry a pad of paper, notebook, or journal with you and record ideas as you think of them.

1. Think creatively

The desire to solve a problem often anchors people to their initial ideas, though this limits the possibilities they consider and detracts from the quality of the final solution. Instead, use your creativity to explore as many ideas as you can. Think of creativity as an exercise in breaking your assumptions. Your goal is to identify new approaches and uncommon ideas.

2. Brainstorm ideas

Brainstorming is a powerful creativity tool you can use to generate ideas and alternatives. Start by defining your problem—write it on a pad of paper, flip chart, whiteboard, or electronic document. List possible solutions as they occur to you, whether they are obvious, impractical, or far-fetched. The goal is quantity, not quality. Work quickly to suppress the tendency to edit and critique. When you run out of ideas, review your list to refine, combine, and edit alternatives. For example, one suggestion for increasing sales at the travel company you're working at is to offer a wider range of adventure tours showcasing stunning natural and historic wonders of Saudi Arabia. The 12 by 12 project team brainstormed to identify the alternatives shown in Figure 2-2.

QUICK TIP
Remember that you are asking for opinions, not inviting people to assume control of your project.

3. Ask others for advice

Even if you are responsible for solving the problem, you do not have to work alone. Instead, take advantage of the **collective wisdom** of your colleagues, which is the shared knowledge and experience a group of people can apply to a problem. By involving others, you can take advantage of their diverse opinions, experiences, and perspectives.

QUICK TIP
Mapping your ideas visually helps you see relationships, understand and remember your ideas, and avoid the limitations of a traditional outline or list.

4. Develop a mind map

Mind maps are diagrams that represent your ideas and stimulate your creativity. Start a mind map by writing the problem in the center of a physical or digital sheet of paper. As you think of ideas, draw them as branches that project from the problem description. See Figure 2-3. Do this quickly, without pausing to reflect on the ideas, as you do when brainstorming. Add words or concepts that you associate with each idea. Continue to add branches radiating out from the central idea.

YOU TRY IT

Practice developing alternatives by generating a list of alternatives. Go to page 73 and follow the steps for Chapter 2: Lesson 2.

FIGURE 2-2: Brainstorming

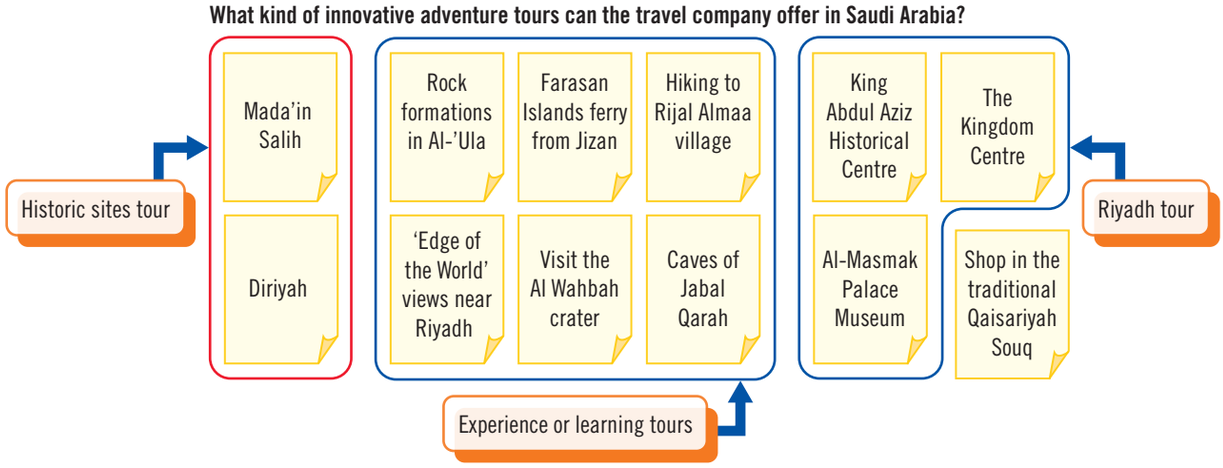

FIGURE 2-3: Mind map

TABLE 2-2: Developing alternatives do's and don'ts

guidelines	do	don't
Think creatively	• Generate as many ideas as possible • Break your assumptions to uncover original ideas • Brainstorm new approaches and uncommon ideas • Develop a mind map to see how problems, solutions, and alternatives are connected	• **Don't** get too attached to your own ideas • **Don't** settle for the standard approach • **Don't** rely on your preconceived assumptions • **Don't** evaluate the ideas you generate yet
Ask others	• Take advantage of the collective wisdom of your colleagues • Consider the opinions and advice of experts and nonexperts	• **Don't** think you must solve the problem yourself • **Don't** work on the problem alone
Document ideas	• Keep track of your ideas and those offered by others • Refer to the ideas you documented later	• **Don't** risk forgetting a great idea by failing to write it down • **Don't** limit the number or type of ideas you document

REVIEW QUESTIONS

1. **Why should you use your creativity when developing alternatives?**
   - **a.** To identify as many ideas as possible
   - **b.** To enjoy the experience
   - **c.** To stay anchored to your initial ideas
   - **d.** To delay a decision
2. **Which of the following is a useful creativity tool for generating ideas?**
   - **a.** Mind map
   - **b.** Mindstorm
   - **c.** Brain wave
   - **d.** Mashup

Lesson 3
Chapter 2

Evaluating Options

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As you search for solutions, analyze the trade-offs among competing needs and options. Instead of trying to find the one best solution, your goal should be to develop a good solution by evaluating, modifying, and improving on your ideas. After generating as many alternatives as you can, evaluate each one carefully. Using objective criteria helps you avoid making decisions based on emotion or snap judgments. Table 2-3 summarizes the do's and don'ts for evaluating options. case The 12 by 12 project team generated many ideas for solving the problem of declining sales at the travel company you're working at, and you recorded them on an electronic whiteboard. Now the team is meeting again to evaluate the options.

ESSENTIAL ELEMENTS

1. Choose an evaluation method

To select a solution from the alternatives you developed, adopt an appropriate way to evaluate them. Is the decision small enough that you can choose intuitively? If not, consider the pros and cons of each alternative and how you can objectively measure them.

QUICK TIP
Decisions based on a single criterion are often unsatisfactory.

2. Select the criteria

Evaluation criteria are the variables that drive your decisions. What do you need to know about each alternative to make an informed choice? Popular criteria include cost, time, feasibility, usefulness, and appropriateness for the organization. Use more than one of these when evaluating alternatives.

3. Weigh your criteria

If your problem is complex, consider all of its dimensions as you evaluate alternatives. However, not all criteria are equally important. To take the differences into account, assign weights to each option. For example, you might be evaluating locations for a customer appreciation event for the travel company you're working at. Two criteria are overall cost and the availability of an event planner at the hotel. Because cost is more significant, you could assign 80% of the decision to cost and 20% to the event planner. The weights you assign to each criterion determine how much influence each has on the final outcome.

QUICK TIP
Have a reality check. Don't assume that the rating is the absolute answer.

4. Rate the alternatives

You can rate the alternatives by ranking each one based on your criteria and the weight you assigned. See Figure 2-4. Another method is to compare each alternative to the others and determine which is superior. You can use an analytical hierarchy matrix to rate alternatives based on these comparisons. See Figure 2-5. When making important decisions, use more than one rating technique. The outcomes might not be identical, but they should be very similar. If not, reevaluate your work.

QUICK TIP
Ask trusted colleagues for their opinions; they might see something you overlooked.

5. Make a decision

Choose the best alternative and use it to develop a solution to the problem. Do not be concerned if the selected alternative is not *perfect*. Complex problems rarely have ideal solutions. Make sure you feel comfortable with the alternative you choose.

YOU TRY IT

Practice evaluating options by selecting an option and then explaining why you selected it.
Go to pages 73–74 and follow the steps for Chapter 2: Lesson 3.

FIGURE 2-4: Ranking and weighting alternatives

Evaluating Alternatives

Each alternative = 25%	Easy to do		Popular with customers		Compared to competition		Amount of revenue		
	Points	Score	Points	Score	Points	Score	Points	Score	Total Score
Raise tour prices	5	125	1	25	4	100	5	125	375
Drop unprofitable tours	3	75	5	125	5	125	4	100	425
Offer popular tours more often	3	75	5	125	5	125	5	125	450
Cut tour features	1	25	1	25	2	50	5	125	225

Assign points on a scale, such as 1–5

Multiply points by percentage for each alternative (5 × 25 = 125)

Highest total is the best alternative

Total the scores

FIGURE 2-5: Analytical hierarchy matrix

Options for Increasing Sales

	A	B	C	D	Row Sum	Rank
A. Raise tour prices		0	0	1	1	3rd
B. Drop unprofitable tours	1		0	1	2	2nd
C. Offer popular tours more often	1	1		1	3	1st
D. Cut tour features	0	0	0		0	4th

Add the sum of the ratings in the row

Is option A (raise tour prices) preferable to option B (drop unprofitable tours)? If yes, rate this 1. If no, rate it 0.

Is option A preferable to option C (offer popular tours more often)? If yes, rate this 1. If no, rate it 0.

Is option A preferable to option D (cut tour features)? If yes, rate this 1. If no, rate it 0.

Rank the row sums

TABLE 2-3: Evaluating options do's and don'ts

guidelines	do	don't
Examine criteria	• Identify the criteria for your decision, such as cost, time, and usefulness • Choose more than one criteria • Assign weights to each criterion	• **Don't** settle on only one criterion • **Don't** assign the same weight to the criteria
Rate alternatives	• Rank alternatives based on the criteria and assigned weights • Compare each alternative to the others • Reevaluate if you have different outcomes using different techniques	• **Don't** use a single evaluation method for complex problems
Make a decision	• Choose the best alternative and use it to develop a solution to the problem • Select a good alternative instead of waiting for the ideal solution	• **Don't** be concerned if the selected alternative is not perfect • **Don't** make a decision you are not comfortable with

REVIEW QUESTIONS

1. **Cost, time, and usefulness are examples of:**
   - **a.** primary resources
   - **b.** common problems
   - **c.** adaptive techniques
   - **d.** evaluation criteria
2. **Which of the following should you *not* do before making a decision?**
   - **a.** Weigh the criteria
   - **b.** Wait for the ideal solution
   - **c.** Rate the alternatives
   - **d.** Select an evaluation method

Lesson 4
Chapter 2

Implementing the Solution

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Moving from planning to implementation is a significant milestone when you are solving a problem. This is when you begin to make decisions, take actions, and put your plans into practice. Keep everyone informed of your intentions as you move ahead by communicating clearly and frequently. Take action and remember that in most cases, it is better to act decisively with a good solution than it is to plan endlessly looking for the perfect one. Table 2-4 offers do's and don'ts for putting solutions into practice. case Based on the results of the 12 by 12 team's work, Omar has decided to offer popular tours more often in an effort to increase sales for the company.

ESSENTIAL ELEMENTS

1. Get approval from the problem owner

Before you implement a solution, consult with the problem owners and make sure they support your idea. Discuss the process you followed, explain the options you considered, and make your case for the solution you chose. If a problem owner is uncomfortable with the solution you recommend, work together to identify an acceptable option.

QUICK TIP
Make sure that your plan leads you to this desired end state.

2. Develop a plan

Outline the steps to apply your chosen alternative. List the resources you need, including people, money, facilities, and influence. Estimate how much time the solution will take, and develop a schedule. Define the expected outcome, and consider what the situation should look like when the problem is solved. Work with other people in your team, if necessary, to identify all parts of the plan.

3. Notify stakeholders

How you communicate your decisions significantly affects how others accept your proposed solution. Internal staff and managers need to understand how each decision relates to their jobs and missions. As you begin to implement your solution, let people know what you are doing so they can take action. Your communication should include the elements shown in Figure 2-6.

4. Anticipate opposition

Decisions that cause change can upset or threaten others in the organization. To avoid this, build support for your solution before you put it into practice. Preview your plan to reassure people who resist change. Clearly explain the nature of the problem, and show why your solution is the most responsible way to deal with it.

5. Take action

Until the solution takes effect, your decision is little more than a good intention. After making decisions and securing approvals, start to take specific actions. Projects suffer from inertia, so it usually requires extra effort to keep your plan moving. However, once you start, it becomes easier to manage.

YOU TRY IT

Practice implementing solutions by identifying why a solution was not successful. Go to page 74 and follow the steps for Chapter 2: Lesson 4.

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What factors should be considered when developing a plan?

FIGURE 2-6: Communicate with stakeholders

Topics to discuss with stakeholders:

What the decision is
How the solution will be put into place
How it will be monitored and evaluated
How changes will be decided on and made

TABLE 2-4: Implementing the solution do's and don'ts

guidelines	do	don't
Communicate with others	• Involve the problem owner in the decision • Describe the steps you followed to make a decision • Communicate clearly and frequently • Notify staff and managers	• **Don't** go forward with the solution if the problem owner is uncomfortable • **Don't** withhold information in the hopes of having everyone agree
Develop a plan	• Outline the steps to take to put the solution into place • Identify the resources you need • Draft a realistic schedule • Reconsider your goals	• **Don't** underestimate the amount of time you need to complete each step of the plan • **Don't** move forward if your plan doesn't meet your goals
Anticipate opposition	• Build support for your solution • Continue to communicate about your plans and progress	• **Don't** ignore the opposition • **Don't** block out opposing points of view, but don't abandon the solution either
Take action	• Start following your plan soon after making a decision	• **Don't** let inaction end your efforts to solve the problem

Unintended consequences: when solving one problem spurs new ones

Thanks to initiatives introduced by the Saudi government, small businesses are booming in Saudi Arabia, with many entrepreneurs choosing to set up new ventures. All business owners and managers need to be good problem-solvers. This is not always easy, because in solving one problem it is possible to create another! The law of unintended consequences maintains that any purposeful activity can produce some unintended consequences. A classic example is of a road bypass built to relieve traffic congestion that results in two busy streets instead of one. Anyone with an e-mail account has been frustrated by spam—junk e-mail sent out in bulk to clog your inbox with advertisements for often phony or fraudulent products. The Saudi Commerce Ministry has recently warned consumers to be vigilant against online scams, putting measures in place to protect shoppers and for reporting violations. When authorities in the United States attempted to crack down on spam in 2008, however, it had an unintended consequence. A group of servers in California (U.S.), considered to be the source of 40% of the world's spam, were disconnected from the Internet, leading to a sudden decrease in nuisance emails. Shortly after, however, researchers discovered a significant increase in activity of 'botnets'—software robots that secretly gather e-mail addresses for spamming! As you consider solutions, keep in mind that at least one of them is likely to produce an unintended side effect.

REVIEW QUESTIONS

1. **An effective plan for implementing a solution includes a(n):**
   - **a.** analytical hierarchy matrix
   - **b.** collective wisdom indicator
   - **c.** schedule
   - **d.** mind map
2. **Communication about your proposed solution should include:**
   - **a.** a notice that you have a limited amount of time
   - **b.** a code of ethics
   - **c.** a worst-case scenario
   - **d.** details about how the solution will be put in place

Lesson 5
Chapter 2

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Monitoring and Managing the Solution

Complicated problems are seldom solved by making a simple decision. Most solutions involve related choices, tasks, and the participation of others. Monitor and manage these activities to ensure a successful outcome. Managers, coworkers, and other stakeholders expect you to deal professionally and competently with interruptions, delays, and unexpected events. Planning for and identifying trouble quickly helps you minimize the disruption and problems it causes. Table 2-5 summarizes the do's and don'ts of managing solutions. case Under Omar's management, the 12 by 12 project team has started to rework schedules and develop promotional materials to offer the travel company's most popular tours more often. Omar asks you to help monitor this solution.

ESSENTIAL ELEMENTS

1. Identify key variables

Solutions to problems are abstract ideas, not tangible objects you can pick up, hold, and inspect, which makes them difficult to monitor. Instead, identify the key variables or observable indicators that show whether your solution is succeeding or failing. These are often symptoms of the problem itself, such as tour enrollment, and are factors that should improve. Decide which variables are appropriate for your solution and monitor them. For example, you might track weekly tour enrollment in the travel company's most popular tours.

QUICK TIP
Typically, the necessary amount of management and control decreases over time.

2. Select an appropriate level of monitoring

The level of monitoring, follow-up, and control varies for each problem. See Figure 2-7. Complicated solutions require close contact, while simpler problems need less attention. Budget time for monitoring by asking yourself if the solution requires a full-time commitment, daily activity, or only occasional monitoring.

3. Involve others with the process

Engage others to help with your solution. Ask stakeholders and others to monitor changes and watch for problems. Let people know what you changed and the outcomes you expect so they can observe the right indicators. Also advise them about what action to take if something seems out of place. Follow up with these observers to keep them aware and interested.

QUICK TIP
Stay connected with the issues because much can change in a short time.

4. Be persistent

Spend some time every day monitoring, managing, and working on the problem. In most cases, it is better to spend an hour or two every day managing your project than devoting a full day once a week. Consistency and persistence will contribute to a successful conclusion.

5. Make corrections promptly

Unforeseen complications or issues can cause your solution to go off track. If you detect a problem, it is usually best to make adjustments promptly. Problems tend to grow bigger with time and harder to tame. If you need to change your plans, be sure to communicate them clearly to everyone involved. Then monitor indicators very closely to ensure that the correction is working.

YOU TRY IT

Practice monitoring and managing the solution by describing how you would monitor a problem and solution. Go to page 75 and follow the steps for Chapter 2: Lesson 5.

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FIGURE 2-7: Levels of monitoring

Why is it important to involve others with your solution?

TABLE 2-5: Managing solution do's and don'ts

guidelines	do	don't
Identify variables	• Identify signs that your plan is working • Track objective measures of the solution's success • Watch for symptoms of the original problem	• **Don't** assume your plan is solving the problem; make sure it is by measuring the results
Select a level of monitoring	• Monitor complicated solutions closely • Monitor simple problems occasionally • Spend at least some time every day monitoring, managing, and working on the problem • Continue to put your solution into place as you planned	• **Don't** forget to budget for monitoring time in your work schedule • **Don't** monitor the solution only one day a week
Involve others	• Ask stakeholders and others to help you monitor changes • Let people know what you changed and the outcomes you expect	• **Don't** let yourself be the only one monitoring the solution • **Don't** forget to let others know what to do if they detect a problem
Correct problems	• Make adjustments as soon as possible • Communicate the changes to everyone involved	• **Don't** overlook signs that the solution is not working or the problem is returning

REVIEW QUESTIONS

1. **Which of the following is not a variable you might track when monitoring a solution?**
   - **a.** Expert advice
   - **b.** Daily sales data
   - **c.** Production logs
   - **d.** Customer surveys
2. **What should you do if your solution is not causing expected improvements?**
   - **a.** Wait for the problem to solve itself
   - **b.** Adjust the solution promptly
   - **c.** Abandon the solution
   - **d.** Stop monitoring efforts

Lesson 6
Chapter 2

Verifying the Solution

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Expect surprises when you implement a solution. Part of being an effective professional is staying involved with a project until it is completed and making necessary corrections along the way. Ask yourself and others how well the solution is working, how realistic your objectives are, and what is not working as expected. When you identify a deficiency, take the responsibility for making a correction. Table 2-6 outlines the do's and don'ts of verifying the solution. case You have been tracking tour enrollments for the most popular tours at the travel company you're working at. Omar asks you to develop a presentation that describes the progress of the project and its success. See Figure 2-8.

ESSENTIAL ELEMENTS

1. Define success

Define a successful solution using objective measures, if possible. For example, the travel company you're working at wants to increase sales by 12%. In other cases, success means that major symptoms disappear. Discuss your definition of success with the problem owner and other stakeholders, and use the definition when you verify your work.

2. Test your solution

Though a solution seems to be working superficially, it might break down under stress. Test your solution to make sure it is successful. Determine a **worst-case scenario** and try to simulate it. However, avoid introducing hazards or additional problems. Does increasing sales by 12% really solve the travel company's income problems? Or do the extra expenses offset the gains? Play what-if to make sure your solution is robust.

3. Avoid the problem in the future

Consider how well your solution holds up over time. What short- and long-term effects do your decisions have on the organization? What else can you do to improve the longevity of your solutions? Who can monitor and maintain the solution in the future? Document the problem so that the organization does not make the same mistakes again.

QUICK TIP
Identify how you would conduct the same project if you had to redo it.

4. Learn from the process

When you solve a problem, you and the organization should learn from the experience. Identify what you did correctly and what you might have done differently. You can apply many of the lessons you learn in other situations. Your company should also benefit from your efforts. Take the time to document your results and make them available to others to reference in the future.

QUICK TIP
Take credit for your success and share it with others who helped you.

5. Take credit for your success

Your abilities to solve problems and make decisions are among your most valuable professional skills. When you successfully complete a project, let others know what you and your team accomplished. The problem owner, stakeholders, or your direct supervisor might not be aware of all that you have done. Communicate your success with them professionally through a written report, oral presentation, or combination of the two.

YOU TRY IT

Practice verifying the solution by testing a solution with a worst-case scenario. Go to page 75 and follow the steps for Chapter 2: Lesson 6.

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FIGURE 2-8: Communicating progress

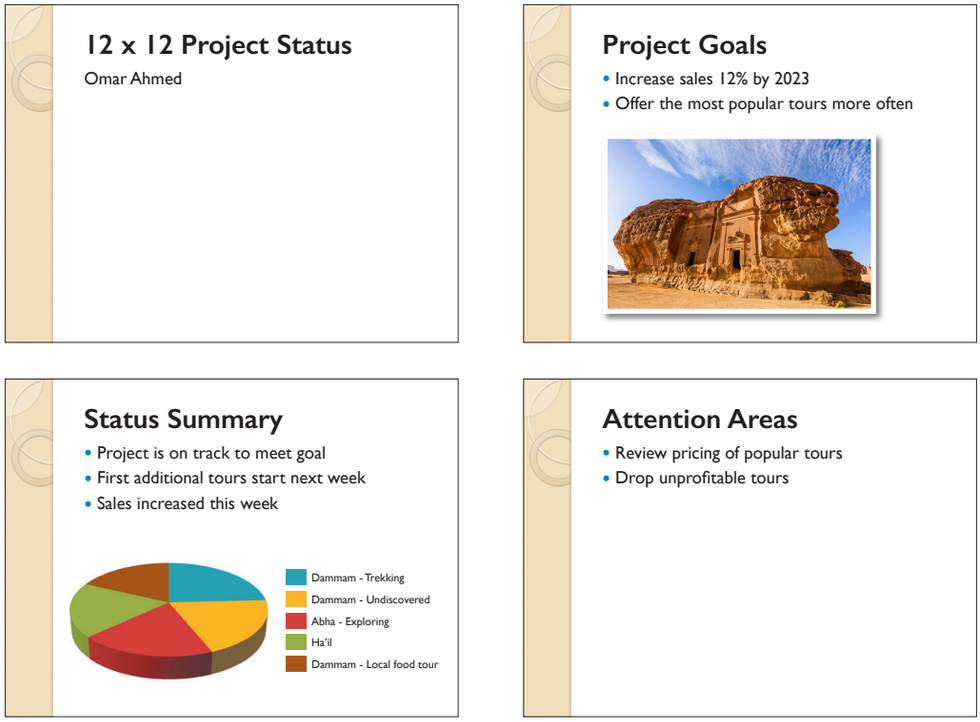

TABLE 2-6: Verifying solutions do's and don'ts

guidelines	do	don't
Define success	• Compare the current state to the goal state • Measure the changes that determine your success • Define success with the stakeholders and problem owner	• **Don't** forget to define success for the problems you solve • **Don't** consider the problem solved because major symptoms disappear
Test solution	• Test the solution by considering the worst-case scenario • Stress the system and see if you still have the desired results	• **Don't** look at superficial parts of the solution only • **Don't** create a dangerous or problematic test
Avoid problems	• Consider how long your decisions will affect the organization • Train someone else to monitor the solution as necessary	• **Don't** overlook long-term effects • **Don't** hold yourself back by making yourself the only person who knows how to manage the problem and solution
Learn from success	• Make sure you and the organization learn from the success • Document your results	• **Don't** fail to take credit for your contributions to the success

REVIEW QUESTIONS

1. **When testing a solution, you should:**
   - **a.** create the most stressful test possible, even if it is dangerous
   - **b.** stick to the superficial part of the solution
   - **c.** consider the worst-case scenario
   - **d.** make the results confidential
2. **Why might you give a presentation after verifying a solution?**
   - **a.** To communicate your progress
   - **b.** To entertain your colleagues
   - **c.** To provide an opportunity for brainstorming
   - **d.** To defer a decision

Technology @ Work: Mashups

A **mashup** is a Web application that combines features or information from more than one source. A popular example is the integration of open-source mapping software (such as Google Maps) with company-specific data, to create an interactive map to promote the company's services. For example, the map might show branch locations of a particular bank or Panda grocery store in the region. Clicking on a locator might provide the address or opening hours of that branch. Businesses like Al-Rajhi Bank are using mashups to develop views of information that aid in decision making. Business mashups typically combine data from internal and public sources, and publish the results within the company for employees to use. case Omar wonders if the company could develop an in-house mashup that uses mapping Web sites and local data about weather, events, and travel information. He asks you to learn the basics of mashups and their benefits to business.

ESSENTIAL ELEMENTS

1. Use the best of the Web

Mashups are created from parts of Web applications and services and result in innovative resources. Because they present information in new ways, they can help you to make quick decisions that depend on factors such as weather and traffic. For example, if your company does business overseas, it could create a mashup between a translation service such as Google Translate and local business news so you can find up-to-date market information in your native language.

QUICK TIP

Like automobile dashboards, business dashboards display current information about an organization's performance or other indicators. See, for example, https://covid19.moh.gov.sa/.

2. Find mashups by type

The two main types of mashups are consumer and business, and the two types overlap. Consumer mashups include mapping, photo and video, search, shopping, and news. News mashups use sources such as the *Arab News* and syndication technologies such as Really Simple Syndication (RSS) to provide personalized news summaries on your desktop. Government departments such as the Ministry of Health use RSS feeds to share important information and announcements about their services.

Business mashups generally help employees process information or decision makers view information in new ways. For example, online retailers can combine customer orders with credit card approval and protection systems from banks to offer secure online payment for orders. Managers can view mashups called **dashboards**, windows that graphically summarize information about how a business is operating.

YOU TRY IT

Learn more about mashups. Go to page 75 and follow the steps for Chapter 2: Technology @ Work.

REVIEW QUESTIONS

1. What is a mashup?

a. A matrix for making decisions
b. A way to use groups to solve problems
c. A way to make decisions based on intuition
d. A Web application that combines features or information from more than one source

2. A business might create a mashup to:

a. develop views of information that aid in decision making
b. learn how to manage by exception
c. test solutions using worst-case scenarios
d. schedule Web conferences

Extra Practice

Real Life Independent Challenge

You can apply the decision-making techniques you learned in this chapter to the decisions you need to make in other parts of your life, such as what job to accept, whether to buy or rent a house or apartment, and whether to continue your formal education. Select a decision you need to make, and then identify possible solutions.

a. Select a decision you need to make. Choose one that demands careful consideration and analysis.
b. Use one of the tools presented in this lesson to generate possible alternatives. For example, brainstorm a list of alternatives or create a mind map.
c. Use a tool such as a decision table to rate the alternatives.
d. Use a different tool to rate the alternatives, and then compare the results.
e. Now that you've applied logic to your decision, do you intuitively agree with the results?

Team Challenge

You are working for Qassim Builders, a company in Buraydah, Al-Qassim Province, specializing in sustainable building. In line with the Saudi Vision 2030, the goal of your company is to design and build structures that use energy, resources, and materials efficiently, protect the health of occupants, improve the productivity of employees, and reduce waste, pollution, and environmental degradation. Your manager, Nora, asks you and your team to consider whether Qassim Builders should accept a new project. The project involves building an information center in Buraydah. The building will be "off the grid," meaning that the building will be self-sufficient and will not rely on public utilities for power or water. Nora suggests you follow the steps below to make your recommendations:

a. Individually, learn what is involved in green building and creating off-the-grid structures. Outline a plan of up to six steps for building the information center.
b. Meet as a group to discuss what would happen if the project fails miserably. Compile a list of the reasons for the failure.
c. Sort the list into categories, such as technology obstacles, community opposition, and lack of knowledge.
d. Revise your plan to correct its flaws and to avoid the potential problems.
e. Submit the plan to your instructor as requested.

Be the Critic

You are working for Salman Software, a company that designs useful desktop gadgets for computer users. Your boss, Abdullah Salman, is planning a major overhaul of the company Web site. Abdullah is trying to decide whether to hire an outside Web design firm to create the Web site or do it in house using company programmers. To help make the decision, Abdullah listed the pros and cons of his two alternatives, as shown in Figure 2-9. In the end, Abdullah made a gut decision and now plans to revise the Web site in house. Analyze Abdullah's decision, noting its weaknesses, and send a list of the weaknesses to your instructor.

FIGURE 2-9

Hire an Outside Web Design Agency?	
Pros	**Cons**
Quality of work	High cost
Expertise	Don't know our products
Work more quickly	Not as flexible
Have graphical resources	Loss of control

Chapter 3

Thinking Critically

Suppose as part of the Saudi Vision 2030 initiative to develop Al Widyan as the world's largest shopping and entertainment destination, you were building a new shopping mall complex. You would determine how many stores, staff, and customers would need to be accommodated, where precisely to locate the site, and assess transport links. You might consider a few styles of buildings. You would draw designs and build at least one model to make sure the layout was suitable for all needs. Finally, after creating schedules and enlisting help from experts, you would dig the first foundations. All of these activities involve analyzing, evaluating, and making objective decisions to make sure the result is sound and successful. The same is true for critical thinking. In this chapter, you explore what it means to think critically and how to become a critical thinker. case At the travel company, you have been working with Omar, the vice president of finance, to solve the problem of declining sales. Your project team is now tracking the progress of the solution: increasing the enrollment of the company's most popular tours. These tours include trips to Dammam, Abha, and Ha'il. So far, the enrollment for the Abha and Ha'il tours have improved steadily. In fact, the Al-Qishlah Palace tour in Ha'il is now one of the top five all-time best sellers. However, sales for the active tours in Dammam remain flat, despite the region's popularity. Omar asks you to help him determine the reasons for the flat sales.

LEARNING OBJECTIVES

Once you have completed this chapter, you should be able to:

1. Understand critical thinking
2. Overcome obstacles to critical thinking
3. Become a critical thinker

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Lesson 1
Chapter 3

Understanding Critical Thinking

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One characteristic that differentiates humans from other animal species is the ability to think, reason, and make informed judgments about observations and facts. Thought and thinking are natural, sometimes automatic mental processes that include reasoning, remembering, imagining, and reflecting, for example. **Critical thinking** generally requires more analysis, evaluation, discipline, and rigor. The goal of critical thinking is often to improve choices and reduce the risk of adopting or acting on a flawed assumption. case Omar says that investigating the reasons for the flat sales of Dammam tours requires critical thinking. He advises you to learn more about critical thinking to help him solve the sales problem.

DETAILS

Ask yourself the following questions as you prepare to improve your critical thinking:

- ### What is critical thinking?

  Critical thinking is the thoughtful, deliberate process of deciding whether you should accept, reject, or reserve judgment about a particular idea. It is also a measure of your confidence in the idea itself. Use critical thinking whenever you make a decision, solve a problem, take an action, or decide what to believe. Although the word *critical* can mean to find fault or to criticize, critical thinking is not a negative activity. Rather, it is a process where you ask questions, challenge assumptions, examine claims, and identify alternatives or answers. See Figure 3-1.

- ### What is a claim?

  A **claim** is a statement that someone says or writes about a topic. The claim can be true or false. Many statements are not claims. For example, when you greet someone or ask a question, the statements are generally not either true or false. In contrast, you can measure the amount of truth in a claim. For example, if a colleague claims that the company tours to Dammam are the most popular, you can refer to tour sales to determine if that claim is true. When you are presented with a claim, you decide whether to accept, reject, or investigate it.

- ### What is an issue?

  When you are solving problems or engaged in other activities that demand critical thinking, you are examining and thinking about an issue. In general terms, an **issue** is any controversial subject that you discuss, dispute, or review. An issue is different from a simple topic of conversation because it raises questions or concerns. For example, the Dammam tours at the travel company are an issue—their sales should be increasing, but they are not, which raises concerns about the tours.

- ### What is an argument?

  In common usage, *argument* means a heated discussion between people. In the context of critical thinking, an **argument** is a set of one or more claims that support a particular conclusion. The claims are sometimes called *premises*. When you try to persuade someone to adopt your point of view, you typically make an argument and offer evidence that helps prove your claim as true. You should also evaluate other peoples' claims carefully and decide whether you accept their arguments.

- ### What is the difference between facts and opinions?

  Thinking critically demands that you distinguish between fact and opinion. Typically, a **fact** is a claim that is considered to be true. An **opinion** is a claim that someone believes is true. Opinions may or may not be factual, even though people often assert their opinions as facts. Figure 3-2 compares facts and opinions. If you can collect data about and analyze a claim, it is said to be a **factual matter**. This term suggests that you are not certain the claim is a fact, but could prove or disprove if necessary.

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FIGURE 3-1: Steps in critical thinking

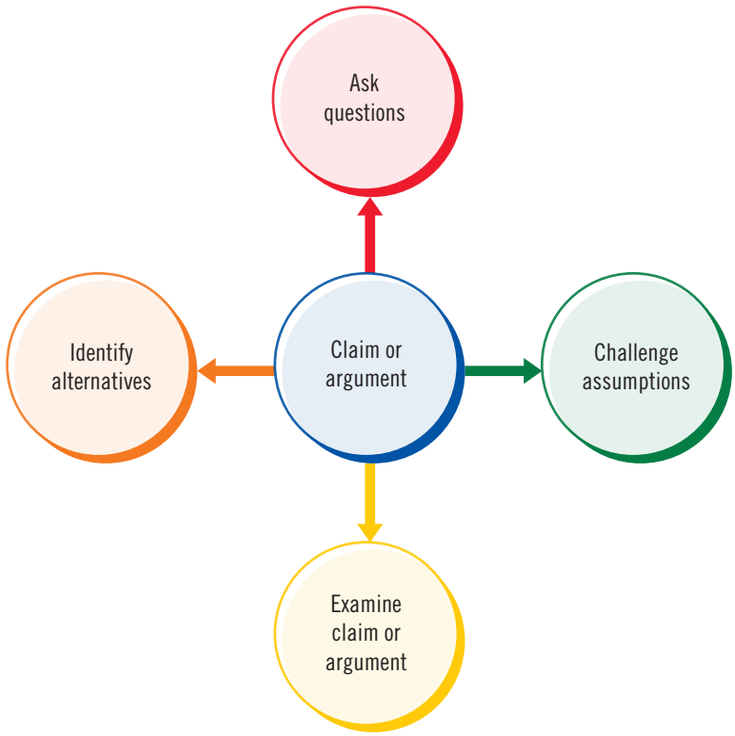
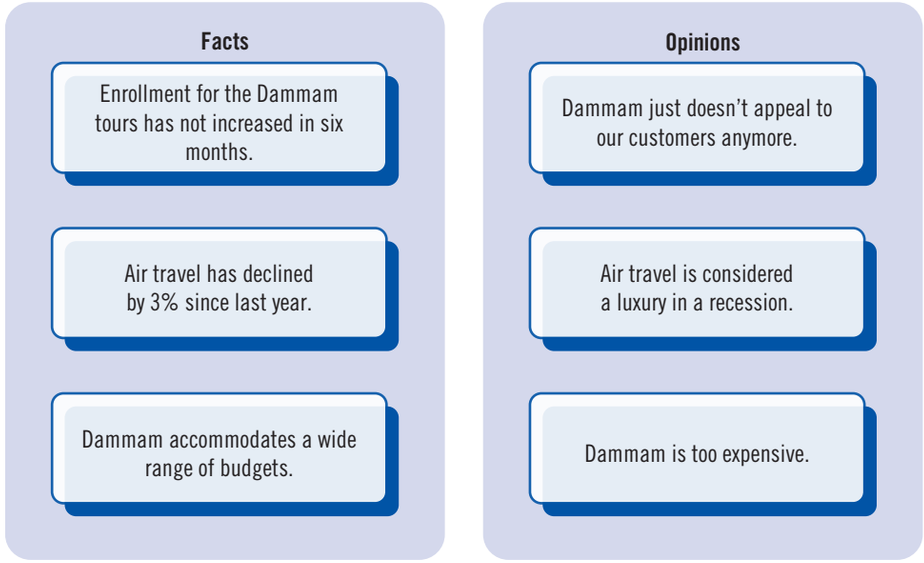


FIGURE 3-2: Facts and opinions



REVIEW QUESTIONS

1. **A(n) _____ is a written or spoken statement that someone makes about a particular topic that is either true or false.**
   - **a.** opinion
   - **b.** hasty generalization
   - **c.** claim
   - **d.** fallacy
2. **What is an argument?**
   - **a.** Claims that support a particular conclusion
   - **b.** An act based on a flawed assumption
   - **c.** Any subject of controversy
   - **d.** The limit of your own knowledge

Lesson 2
Chapter 3

Overcoming Obstacles to Critical Thinking

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You develop critical thinking as a skill over time through practice and repeated application. Learn to recognize typical obstacles to critical thinking so you can anticipate and work through them. Table 3-1 lists the do's and don'ts for overcoming obstacles to critical thinking. case Omar is not convinced that the travel company you're both working at needs to promote the Dammam tours more aggressively. When he checked the advertising expenses, he found the Dammam tours are already being promoted heavily. He asks you to help him find the root of the problem, which will require additional critical thinking. You prepare to overcome typical obstacles so you can help Omar find a solution.

ESSENTIAL ELEMENTS

QUICK TIP
Being flexible, adaptable, and open minded when working with others helps you avoid egocentric thinking.

1. Avoid egocentric thinking

Being egocentric means seeing the world from your own point of view, assuming you are the norm or center. This thinking limits your ability to appreciate other points of view or see past your limitations.

2. Be aware of your social conditioning

Social conditioning encourages you to accept the beliefs, traditions, and values of your social group. Social conditioning helps you feel part of the greater whole, but it can also prevent you from considering unpopular alternatives. Challenge yourself to move beyond your social conditioning and consider other ways of thinking and interpreting.

3. Identify outliers

Past experiences with other people, places, and situations that are extremely good or bad are **outliers**. They can bias your expectations in the future. For example, if your first experience flying in a commercial jet involved stormy weather, turbulence, and rough landings, you might not want to fly again. However, that flight was an outlier, so you should not expect future flights to be similar.

QUICK TIP
If you notice yourself accepting a common idea without much consideration, you have likely normalized it in your mind.

4. Avoid normalization

People who assume that their ideas are normal because they have been exposed to them repeatedly are normalizing the ideas. Critical thinking looks past the tendency to normalize and requires you to question your own thoughts and beliefs. Critical thinking, like creative thinking, demands that you see problems with a fresh perspective. In fact, keeping critical thinking separate from creative thinking can be an obstacle to solving problems. See Figure 3-3.

5. Respect your emotions

Respect your emotions, but consider their logic and appropriateness for the decisions that you are trying to make. Avoid emotional thinking, which makes it difficult to distinguish between emotions and thoughts.

YOU TRY IT

Practice overcoming obstacles to critical thinking by reacting to a scenario. Go to page 76 and follow the steps for Chapter 3: Lesson 2.

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FIGURE 3-3: Creative and critical thinking

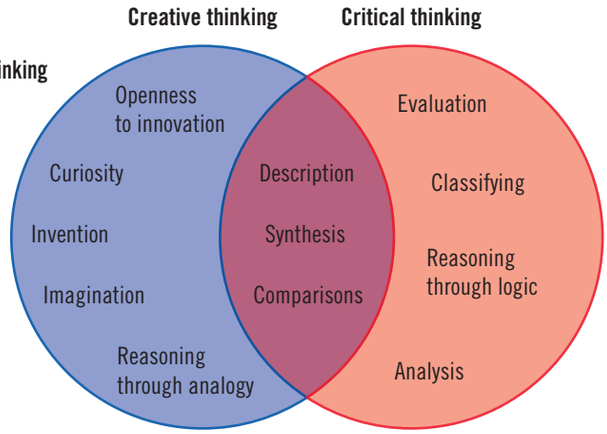

TABLE 3-1: Overcoming obstacles do's and don'ts

guidelines	do	don't
Avoid egocentric thinking	• Be aware of your own point of view	• **Don't** assume your point of view is the norm or exclusively right
Recognize social conditioning	• Challenge yourself to move beyond your social conditioning and consider alternative ways of thinking and interpreting	• **Don't** let social conditioning prevent you from considering unpopular alternatives
Understand outliers	• Understand that past extreme experiences can bias future behavior	• **Don't** let past experience necessarily determine your reactions to similar experiences in the future
Avoid normalization	• Look past the tendency to normalize ideas • Question and challenge thoughts and beliefs when appropriate	• **Don't** keep critical thinking separate from creative thinking
Respect emotions	• Respect your emotional reactions to arguments	• **Don't** give emotion more weight than logic and reason

Critical thinking and feeling

Pioneering research at King Abdullah University of Science and Technology (KAUST) is using 3D visualization to help provide a better understanding of how brains function. Interest in the field of neuroscience has soared in Saudi Arabia in recent years, with facilities including KAUST's Visualization Core Lab leading the way in new research and scientific publications. These research projects are part of a wider international effort to understand the human mind. Rational thoughts and emotional feelings are usually considered as separate mental processes, perhaps even occurring in opposite sides of the brain.

In early brain studies, scientists said that the rational mind is like a computer, and computers do not have feelings. Recently, however, researchers have discovered that we cannot understand how we think without understanding how we feel. Neuroscientists studying people with brain injuries that prevent them from perceiving their emotions have found that they cannot make effective decisions. Researchers, using sophisticated imaging techniques to monitor brain activities, find that decisions involve emotional reactions as well as logical thought.

REVIEW QUESTIONS

1. **Which of the following is *not* an obstacle to critical thinking?**
   - **a.** Normalization
   - **b.** Creative thinking
   - **c.** Social conditioning
   - **d.** Being egocentric
2. **What is an outlier?**
   - **a.** An extreme experience in the past
   - **b.** Someone far outside the norm
   - **c.** An emotional reaction to a logical problem
   - **d.** A goal in critical thinking

Lesson 3
Chapter 3

Becoming a Critical Thinker

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Developing your thinking and problem-solving skills is a gradual process that requires conscious effort on your part. Changing your thinking habits and practices is a long-range project and something you should commit to throughout your life. Table 3-2 identifies the do's and don'ts for becoming a critical thinker. Figure 3-4 illustrates the habits of critical thinkers. case After analyzing your premises and data, you conclude that the new tour assistant for Dammam tours needs training to improve her time and customer management skills. This should result in greater enrollments on the tours. You meet with Omar to make your argument, confident in your critical-thinking abilities.

ESSENTIAL ELEMENTS

1. Develop intellectual humility

Intellectual humility is defined as recognizing the limits of your knowledge and understanding of a situation. It includes an awareness of your biases and limitations in your thinking. When you are intellectually humble you become more open to other ideas, different viewpoints, and potential solutions to problems. You are also better able to avoid the effects that false beliefs and habits of mind tend to have.

2. Be a critic, not a cynic

Becoming a critical thinker is not the same thing as being a cynic or critical person. A cynic is generally negative, scornful, and distrusting of other people. Cynics are often self-righteous and quick to point out flaws in other people's arguments. It is because of this that cynicism and critical thinking are sometimes confused. A critical thinker is neither negative nor distrustful. Rather, you should be inquisitive, questioning, and open minded in your thinking while also being empathetic and respectful of other people.

3. Challenge your assumptions and beliefs

Sometimes we put our own blinders on and limit our ability to think critically. You can overcome this by not only challenging other peoples' arguments, but your own assumptions, ideas, and beliefs as well. Don't always believe and accept everything you see for the first time. Ask yourself what you want to see or hear and how that influences any incoming information. Hold yourself to the same intellectual standards that you have for other people.

4. Work through complex issues and problems

Critical thinking is certainly hard work; however, it is also an important part of being a professional. There are no simplistic solutions to complex human problems, and you need to be prepared to work through complex issues. Don't become comfortable with the easy answers or give up when you become frustrated.

5. Have confidence in your reasoning ability

Know that you can learn to be a critical thinker and that your reasoning and decision-making abilities can improve with practice. Trust yourself and give yourself permission to think openly and honestly. Know that your ideas and solutions may not always be optimal, but in most cases they will be "good enough" and better than they would otherwise have been.

YOU TRY IT

Practice becoming a critical thinker by identifying the habits of critical thinkers. Go to page 76 and follow the steps for Chapter 3: Lesson 3.

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FIGURE 3-4: Critical-thinking habits

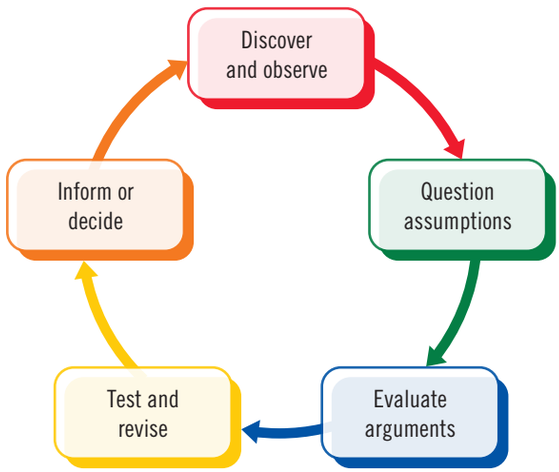


TABLE 3-2: Becoming a critical thinker do's and don'ts

guidelines	do	don't
Develop intellectual humility	• Recognize the limits of your own knowledge and understanding • Be aware of your biases and limitations	• **Don't** grow overconfident about your habits or conclusions
Be critical	• Be inquisitive and open minded while also being empathetic and respectful of other people • Challenge your own assumptions, ideas, and beliefs	• **Don't** be cynical when you should be critical • **Don't** be negative or distrustful
Have confidence in your critical thinking	• Practice critical thinking • Accept solutions that are good enough instead of perfect	• **Don't** be intolerant of uncertainty

Guesstimating is critical thinking

One way to become a critical thinker is to 'guesstimate'—giving approximate answers to mathematical questions such as the amount of space required to gather all the people in the world in one place. In fact, you could fit the entire world's population into an area the size of Riyadh with plenty of room to spare! While, by nature, it is imprecise and involves some degree of speculation, the ability to guesstimate is an invaluable skill for any critical thinker. According to the traditional Arabic proverb, "Ask the experienced, not the learned." Guesstimating can be viewed as a technique that bridges the gap between what one has learned (the known facts) and what one has experienced (one's intuition and ability to make a judgment based on their practical interactions in the real world). Guesstimating should not be relied upon for making big decisions that will have a significant impact on the final outcome of a result, especially when there is sufficient time in the schedule for collecting and interpreting all the relevant information. However, it is particularly useful in situations such as business meetings, when a quick judgment is needed to 'get a sense' of the current state of play in the short-term before the full facts are established.

REVIEW QUESTIONS

1. **Which one of the following is *not* a habit of critical thinkers?**
   - **a.** Intellectual humility
   - **b.** Methodical reasoning
   - **c.** Cynicism
   - **d.** Questioning assumptions
2. **What quality do you have when you understand the limits of your own knowledge?**
   - **a.** Intellectual humility
   - **b.** Scientific reasoning
   - **c.** Valid arguments
   - **d.** Social conditioning

Technology @ Work: Electronic Books

In Saudi Arabia, many readers enjoy the tactile pleasure of flicking through the pages of a traditional paper book. However, there is a growing market for electronic books (e-books) used on hand-held devices, such as a tablet or smartphone, with an app for downloading books. Thousands of titles can be stored on one device, and e-books can increase the distribution of useful information from businesses. case Omar wonders if the travel company you're both working at should enter the business of electronic tour guides that travelers could take with them on trips. He asks you to learn the advantages and disadvantages of e-books.

ESSENTIAL ELEMENTS

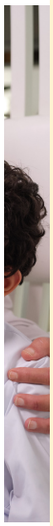
1. **Enhance research and thinking**
   Unlike conventional, printed books, you can search e-books electronically using hyperlinks, similar to the way you use the Web. That could make it easier to do research and find the connections among ideas, evidence, and arguments, which enhances thinking.
2. **Provide a more engaging medium**
   E-books can include multimedia such as sound, video, and more vivid graphics than are usually produced in printed books. Readers can annotate and highlight e-texts without permanently marking the book. They can also adjust font size, lighting, and other settings to create a more comfortable and engaging reading experience.
3. **Require electronic device and software**
   Even if you read e-books on a laptop computer or mobile phone, you need special software to do so, whereas traditional books do not need special equipment or software. Traditional books are also easier to carry and transport than e-book devices, which require a source of power, although many titles can be stored on one device. Furthermore, e-books are susceptible to physical damage.
4. **Change the reading experience**
   Traditional books enhance the tactile and visual experience. Scanning and quickly paging through a book can be a more effective way to learn new information than searching electronically. Unlike glancing at the front or back cover of a book, it is difficult to gain a sense of an e-book by viewing its first page or promotional material.

YOU TRY IT

Learn more about electronic books. Go to page 76 and follow the steps for Chapter 3: Technology @ Work.

REVIEW QUESTIONS

1. **Which of the following is an advantage e-books offer over conventional books?**
   - **a.** Can transport without a power source
   - **b.** Can search electronically using hyperlinks
   - **c.** Can absorb greater physical damage
   - **d.** Can judge an e-book by its cover
2. **Which of the following is an advantage traditional books offer over e-books?**
   - **a.** Include multimedia
   - **b.** Can annotate without making permanent marks
   - **c.** Can adjust font size
   - **d.** Do not need special equipment or software



Extra Practice

Real Life Independent Challenge

You can apply the critical-thinking techniques you learned in this chapter to develop your leadership skills. Develop your self-awareness by completing the following exercise.

a. Create a timeline of your life history. What are the major events in your life?
b. Identify your role models. Are these people in your current or past life? What did you learn from them?
c. Describe your strengths and weaknesses.
d. Describe the way you typically solve problems.
e. Identify at least three of your core values. How do they shape the decisions you make?

Team Challenge

You are working for Qassim Builders, a company in Buraydah, Al-Qassim Province, specializing in sustainable building. In line with the Saudi Vision 2030, the goal of your company is to design and build structures that use energy, resources, and materials efficiently, protecting the health of occupants and improving the productivity of employees while reducing waste, pollution, and environmental degradation. Your top competitor is a company named Tameer Environments, and you are both submitting bids on three lucrative contracts. Your manager, Nora, asks your team to find a way to win the contract. Which of the following motivating actions should your team choose and why? Select your responses individually and then discuss them in your team.

a. Offer your team data from the green building trade association showing how Qassim Builders uses more environmentally friendly methods and products than Tameer Environments.
b. Offer a whitewater rafting adventure tour for any team member who wins a contract.
c. Announce that Qassim Builders is downsizing. The team member who does not contribute to a winning bid will be fired.
d. Hold a team meeting to brainstorm how to win the contracts. What has anyone learned from customers recently? Do they like the buildings and structures from Qassim Builders? What can be improved and how?

Be the Critic

You are working on a Saudi Vision 2030 project to build a new community center in Riyadh, which will provide a state-of-the-art events space and other facilities for the public and local businesses to use. However, one of the members of the board wants to change the location of the proposed building. He has provided his argument for moving the location in the series of statements below.

Considering the critical-thinking processes discussed in this chapter, analyze the argument in each statement, noting its weaknesses, and send a list of the weaknesses to your instructor.

"We should change the location of the community center because it would better to build a new shopping center in this location instead."

"We should change the location of the community center because some people think we don't need one here anyway."

"We should change the location of the community center because I'm selling my own piece of land and I think it would be much better to build it there."

Chapter
4

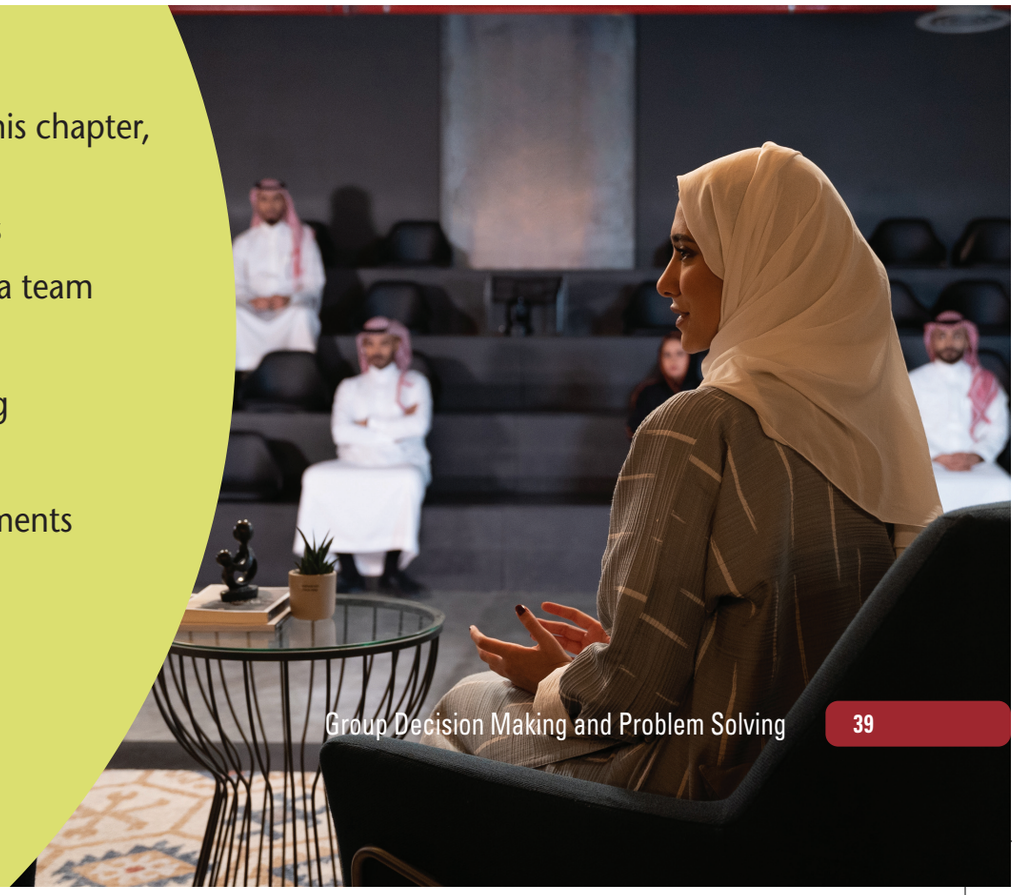
Group Decision Making and Problem Solving

When confronted with a complex problem or one that affects many people, organizations usually form a group to study the problem and make decisions that lead to a solution. Group decision making and participatory management are key facets of the Saudi Vision 2030. Today, many companies use team-based approaches for organizational tasks. Although you solve problems in similar ways whether you are working alone or as a member of a group, your task can be complicated or enhanced by group dynamics. This unit introduces you to the basics of group dynamics and the ways teams can work together effectively to solve problems. case You have been working with Omar, the vice president of finance at a travel company, to solve business problems for the company. Omar suspects that the company's future financial health depends on expanding its services to corporate travelers. He talks to company employees who were members of other problem-solving groups and asks them to join a new team exploring business travel services. Omar asks you to be a member of the new team.

LEARNING OBJECTIVES

Once you have completed this chapter, you should be able to:

1. Explain group dynamics
2. Evolve from a group to a team
3. Use divergent thinking
4. Use convergent thinking
5. Reach closure
6. Build sustainable agreements



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Lesson 1
Chapter 4

Understanding Group Dynamics

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When working on complex tasks, you cannot do them all yourself. Organizations use groups and teams to make decisions, solve problems, and accomplish goals. A **group** is made up of two or more people who interact with each other, share expectations and obligations, and develop a common identity as a group. Real groups, as opposed to random collections of individuals, also have social or professional bonds and common interests, values, or backgrounds. The way that people work and interact with each other is known as **group dynamics**. Other terms used to describe groups include "teams," "clubs," and "committees." case Before the new company group meets for the first time, Omar suggests that you learn about the benefits of successful groups.

DETAILS

Organizations are embracing group projects and teamwork for the following reasons:

- **Diversity**
  A group of people can bring a rich diversity of culture, age groups, and other variables to a common table. This diversity gives a group a more varied perspective and appreciation for different ideas and enhances the types of solutions it can come up with. Figure 4-1 illustrates the types of expertise group members can offer when discussing a topic or solving a problem.
- **Rich experience base**
  Each member of a group brings unique experiences with them. This includes differences in formal and informal education, work experience, responsibilities, and exposure to ideas from outside of the organization. Bringing together a group of people with a rich set of experiences can be very powerful.

QUICK TIP
Organizational memory can include an organization's physical archives, electronic databases, and members' knowledge.

- **Enhanced organizational memory**
  Organizations have a unique history and culture that a group must function in. People who have worked for a company for some time develop an **organizational memory** as they learn about the various processes, personalities, and subtleties of how the organization operates. When a group is formed, it can take advantage of its rich organizational memory. Someone on the team is likely to know who to talk with, what resources are available, or how to get something done. See Figure 4-2.
- **Error detection**
  When you bring people together to work on a common task, you introduce multiple levels of error checking. Mistakes and omissions that may have otherwise gone unnoticed are more likely to be caught by other team members.
- **More creative solutions**
  Each individual in a group will approach a problem differently than everyone else. This leads to a larger number of unique and creative solutions. Functional teams can be an excellent source of ideas.
- **Greater acceptance of decisions and outcomes**
  When someone is involved in a decision-making process, they are more likely to accept and support its outcome. Committees are often formed when broad acceptance of an outcome is necessary. Even those who are not part of the group will be more accepting if someone from their department or work unit is involved in the decision process.

FIGURE 4-1: Using a group's expertise to explore a topic

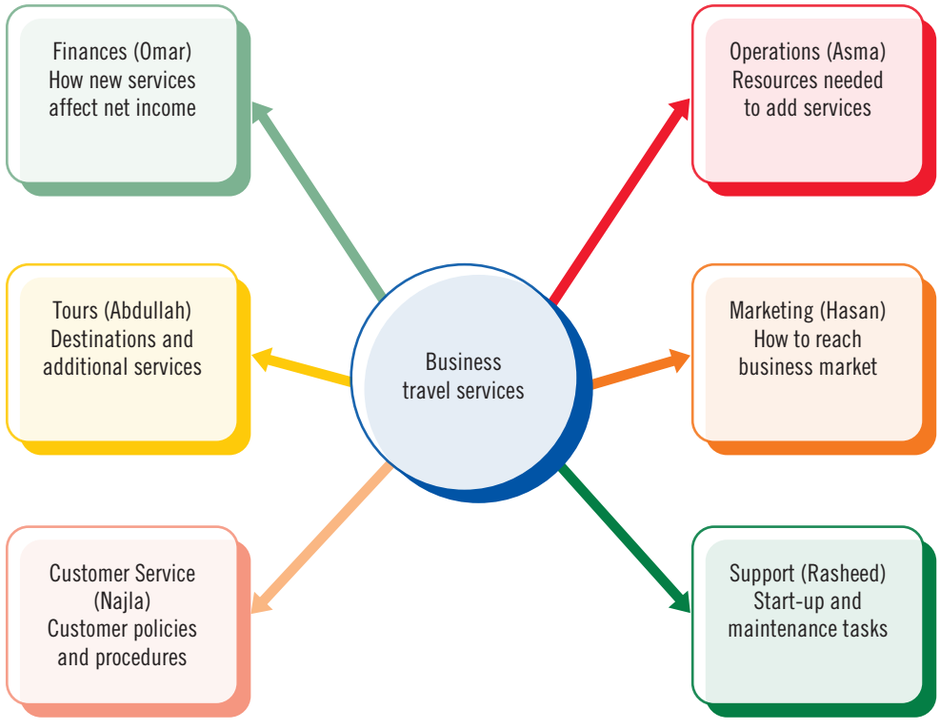

FIGURE 4-2: Organizational memory

Star power or team effectiveness?

Managers of business teams can learn a lot from how successful sports teams are managed. Using a popular management approach, many managers assign tasks to staff members according to their skills, personalities, and experience. This style of leadership, called a differentiated style, is used by coaches who treat their superstars differently from other players. Some coaches might award star players special privileges like more time with the trainer. In contrast, team-focused leadership treats a staff or other group as a whole.

A recent study compared the two styles and reached a surprising conclusion. "Most managers believe that you should treat everybody differently," says researcher Angelo Kinicki. "But our results reveal that...in a team setting, [singling out a star] can actually lead to negative effects." The results of the research show that teams in organizations work the same way. Treating all team members the same way can make them work more effectively in the group.

Source: Staff, "Successful Small Team Leadership: Manage the Group, Not the Individuals," Knowledge@W.P. Carey, May 27, 2009.

REVIEW QUESTIONS

1. **What are group dynamics?**
   - **a.** Changes noted in the action plan
   - **b.** How people work and interact with each other
   - **c.** Ways to organize an idea's costs and benefits
   - **d.** How resources are provided where they are needed
2. **Knowing about the processes, personalities, and subtleties of how a company operates is called:**
   - **a.** organizational memory
   - **b.** logistics
   - **c.** groupthink
   - **d.** consensus

Lesson 2
Chapter 4

Evolving from a Group to a Team

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People often form themselves into groups, but they may or may not work well together. If they do, the group is said to be functioning as a **team**—a group of people who organize themselves to work cooperatively on a common objective. Effective teams are not created automatically. Most groups of people pass through stages of cohesion and understanding before they can do useful work. Understanding how groups develop will help you when working with other people. Table 4-1 lists the do's and don'ts for evolving from a group to a team. case You meet with the new company group so each member can get acquainted before discussing how to improve sales to business travelers.

ESSENTIAL ELEMENTS

1. Expect socializing

During the first meetings, groups of people typically take time to get to know one another. This phase involves introductions, social interaction, and personal sharing through polite conversations. Some group members think that the socialization phase wastes time, but a group needs personal connections to develop into an effective team.

2. Encourage organizing and forming

During the second phase, the group develops a shared understanding of its mission and purpose. People also begin to assume group roles, including asserting their dominance and competing for influence over the group's direction. This power struggle often occurs even if the group has a formal leader or chair. In time, the group comes to an understanding about how it operates and makes decisions, what the expectations for participation are, and how often it meets. Members begin to identify with the group during this phase and develop a sense of belonging.

QUICK TIP
Avoid making important decisions before the group works out a pecking order. Priorities can change as informal leaders emerge.

3. Facilitate information sharing and processing

After group members get acquainted and work out their **pecking order**, as shown in Figure 4-3, they feel comfortable sharing information with each other. This includes disclosing sensitive material, responding openly to one another, and providing feedback. At this point, the group can begin to schedule meetings, work sessions, and other collaborative time. The group also starts to work on its assigned tasks and looks more like a team to an outside observer.

4. Collaborate to solve problems

Assuming a group successfully completes earlier phases, it eventually develops teamwork and **synergy**, which is achieved when two or more people work together to produce something greater than the sum of their individual efforts. During the collaboration phase, group members can complete tasks efficiently, work together on complex problems, and make shared decisions. They respect each other, develop a desire to cooperate, and take pride in the group's accomplishments instead of only their own. Not all groups evolve to the collaboration phase, but those that do are usually very productive and effective.

YOU TRY IT

Practice evolving from a group to a team by analyzing descriptions of group meetings.
Go to page 77 and follow the steps for Chapter 4: Lesson 2.

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FIGURE 4-3: Pecking order and assumed roles

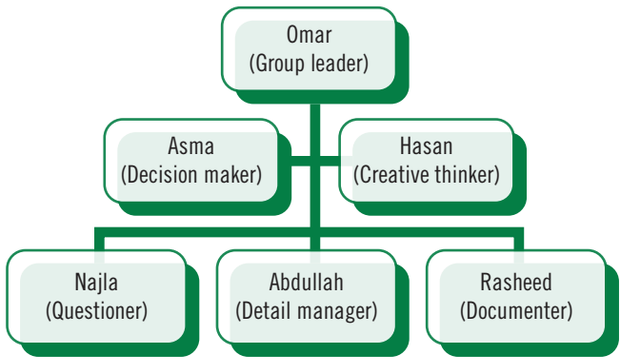

TABLE 4-1: Evolving to a team do's and don'ts

guidelines	do	don't
Phase 1: Socialize	• Allow time for a new group to get acquainted • Develop the personal connections that make teams successful	• **Don't** skip this phase because you think it wastes time
Phase 2: Organize	• Agree on a shared mission and purpose • Reach an understanding about how to run and participate in group meetings • Set a schedule	• **Don't** let a power struggle over the group's leadership get in the way of the group's mission • **Don't** rush this preliminary phase • **Don't** make important decisions during this phase
Phase 3: Share	• Share information with other group members • Respond openly to others in the group • Provide feedback • Schedule work sessions and meetings	• **Don't** disregard the pecking order the group has established
Phase 4: Solve problems	• Collaborate on tasks • Work on solving complex problems • Make shared decisions • Encourage respect and cooperation	• **Don't** be discouraged if your group does not reach this level of teamwork

Consensus decisions and collaboration in Saudi Vision 2030

If your group is discussing a change that directly affects most people in the organization or a solution that requires cooperation and unity, consensus decision making can be invaluable. Collaboration and consensus are two key themes of Saudi Vision 2030, which encourages citizens to play an active role in ensuring collective success, while simultaneously promoting and empowering individuals to nurture "resilient and independent characters". According to Saudi Vision 2030: "The nation we aspire to build will not be realized without a grand collective national effort where everyone contributes..." One specific example of a new collaborative approach is the 'Irtiqaa' program in children's education. This initiative encourages parents to become more actively involved in their children's education, through developments including parent-led school boards and open discussion forums. Equally, innovative educational programs (drawing upon collaboration with both non-profit and private sectors) and teacher training will help to foster this relationship between families and educators. Collaborative initiatives can prove to be very effective when everyone involved stands to benefit from their success.

REVIEW QUESTIONS

1. **In business, a team is:**
   - **a.** two or more people attending a meeting
   - **b.** a group of people who work together cooperatively on a common objective
   - **c.** a group of people that meet regularly
   - **d.** two or more people who share expectations and obligations
2. **What do successful teams allow time for when the group first starts to meet?**
   - **a.** Online scheduling
   - **b.** Convergent thinking
   - **c.** Creating action plans
   - **d.** Socializing

Lesson 3
Chapter 4

Using Divergent Thinking

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Groups can develop creative ideas and solutions to problems because their collective knowledge is greater than that of a single person. However, groups seldom behave creatively on their own. The team leader or other facilitator needs to engage the group in activities that foster creativity and collaboration. **Divergent thinking** describes thought processes or methods used to generate ideas. As the name suggests, divergent thinking techniques generate many ideas that are often not related to one another. Divergent thinking is usually spontaneous, free flowing, and unorganized. Later, the group can organize the ideas and apply them to solving the problem. Table 4-2 describes the do's and don'ts of divergent thinking. case After meeting with Omar and the new corporate travel team, you are ready to generate ideas about how to increase the amount of tours designed for business travelers.

ESSENTIAL ELEMENTS

1. Brainstorming

One of the most popular and well-known techniques for divergent thinking is brainstorming. Groups use brainstorming to generate ideas and solutions to problems. The group considers a question, task, or project, and then generates as many ideas as possible, usually in a short period of time. Every idea is recorded, and no idea is disregarded, criticized, or analyzed. As ideas are suggested, they often stimulate others. The group continues to contribute ideas until everyone has exhausted their creativity.

2. Group mind mapping

Mind mapping uses simple graphics to generate, visualize, and organize creative ideas. A group member lists a main idea or problem at the center of a page, white board, or flip chart. Each participant is invited to share reactions and ideas. These are drawn as radial lines or spokes. When someone's idea builds, or piggybacks, on another, it is drawn as a branch in a tree structure. The visual nature of a mind map helps some people to think about a problem more creatively and may yield different results than traditional brainstorming. The map itself is a useful record of the group's contributions. See Figure 4-4.

3. Free writing

Free writing is a form of brainstorming where group members focus on a subject and then write about it nonstop for a short period of time. Participants write any idea that occurs to them without pausing to consider the value of the idea or to proofread or edit their writing. This exercise is designed to encourage creativity and explore alternatives. When done as a group, free writing can be followed by a brainstorming or mind mapping session to collect ideas for the group.

QUICK TIP
Allow people to submit their entries anonymously to encourage free thought.

4. Journaling

People often think of creative ideas spontaneously and can easily forget them if they do not act on them or record them. Distribute journals to members of a group and ask each to write down thoughts and ideas. A journal can be an inexpensive spiral notebook or specialty blank book. Team members can keep the journal at their desks to note ideas when they occur to them. They can share the ideas with the group at a later meeting or submit them directly to a team leader. The quantity of ideas generated through journal writing is not as great as some other techniques, but the quality and range of the ideas are often superior.

YOU TRY IT

Practice using divergent thinking by generating solutions to a problem. Go to page 77 and follow the steps for Chapter 4: Lesson 3.

FIGURE 4-4: Group mind map

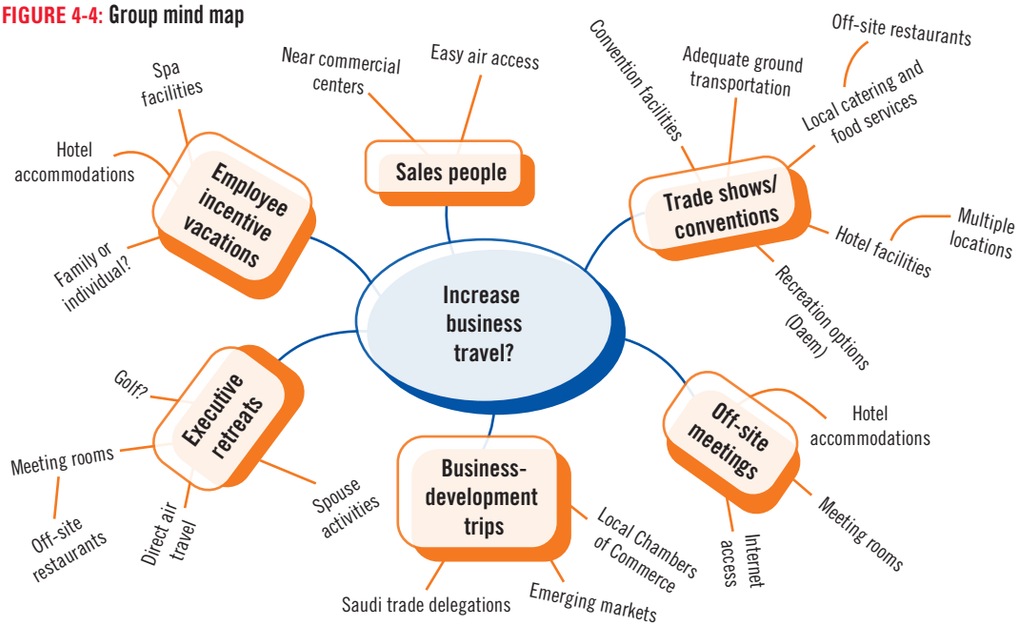

TABLE 4-2: Divergent thinking do's and don'ts

guidelines	do	don't
Brainstorming	• Generate ideas and solutions as a group • Record ideas	• **Don't** disregard, analyze, or reject an idea during brainstorming
Mind map	• Visualize and organize creative ideas as a group • Draw ideas as a tree or spoke-wheel diagram • Retain the mind map as a record of the group's ideas and decisions	• **Don't** get bogged down in the mechanics of drawing a mind map • **Don't** evaluate ideas until you are finished
Free writing	• Use to stimulate individual creativity • Write thoughts about a subject nonstop for a short time • Follow up with a group brainstorming or mind mapping session	• **Don't** pause to edit, proofread, or review as you are writing
Journal writing	• Use to record spontaneous thoughts and ideas • Share journal contents with the group	• **Don't** expect to generate as many ideas with a journal as with brainstorming or mind maps

Mind mapping software

You can use digital tools to boost your divergent thinking. Bubbl.us (*www.bubbl.us*) is a free Web application that lets you conduct brainstorming sessions online. You write your thoughts in graphical bubbles and connect those to other bubbles without the distraction of drawing and formatting. Bubbl.us helps you brainstorm quickly instead of getting bogged down in the mechanics of creating and linking bubbles. MindMeister (*www.mindmeister.com*) is a simple, free tool that lets you quickly create mind maps just by pressing the directional arrow keys on your keyboard. XMind (*www.xmind.net*) is also free, but lets you create fishbone, organizational, tree, and logic charts in addition to mind maps.

REVIEW QUESTIONS

1. **Divergent thinking describes thought processes or methods used to:**
   - **a.** design credible arguments
   - **b.** generate ideas
   - **c.** select the best alternative
   - **d.** overcome resistance to change
2. **Which of the following is *not* an exercise in divergent thinking?**
   - **a.** Brainstorming
   - **b.** Free writing
   - **c.** Outlining
   - **d.** Mind mapping

Lesson 4
Chapter 4

Using Convergent Thinking

Link to digital lesson
www.ien.edu.sa

In the early stages of solving a problem, you use divergent thinking to develop as many creative ideas and potential solutions as possible. At some point, however, the group needs to review and evaluate the ideas in an organized, understandable, and structured format. **Convergent thinking** techniques narrow the options to a manageable set. The decisions and solutions that the group eventually makes will be based on these organized ideas. Table 4-3 lists the do's and don'ts for convergent thinking. case Now that the corporate travel team met to generate ideas, Omar plans a meeting to organize and evaluate the ideas. He asks you to learn about techniques for structuring group ideas and solutions.

ESSENTIAL ELEMENTS

1. Review your ideas

If your group's divergent thinking has gone well, you should have a sizable set of ideas, options, and possibilities to consider. One of the first tasks for the group is to carefully review these ideas and cull, or remove, the impractical ones. A popular culling approach is the **three-pile method**. Review each option and have the group vote to put the idea into either a Yes, No, or Maybe pile (or category). A simple plurality of votes is needed for each. The No pile is eliminated from further consideration. The Maybe pile is held in reserve and may be revisited if necessary.

QUICK TIP
Identify pros and cons in an informal discussion, or more formally with someone recording the feedback for all to see.

2. Identify the pros and cons

Have the group consider each option or idea one at a time and identify the associated pros and cons. The objective is to have the group consider each option in an objective manner. Ask the group if there is a **fatal flaw** inherent in any of the ideas. A fatal flaw is some aspect of an idea that would make it unacceptable.

3. Perform a cost-benefit analysis

Each idea that is proposed will have some benefit to the group or organization. It will also have some associated costs. Good ideas typically have benefits that outweigh their costs. Costs and benefits may take different forms such as monetary return, cost savings, improved efficiency, reduced problems, and others, and comparing one to another may be tricky. A **decision balance sheet** is a formal way of organizing an idea's costs and benefits. See Figure 4-5.

QUICK TIP
An impact analysis alone should not drive the final decision, but can help to better differentiate between alternatives.

4. Create an impact analysis

It is easy to consider ideas, options, and potential solutions by themselves and not consider other related factors. Use an **impact analysis** to broaden your view. Have the group list the consequences of each idea. Who or what would each option affect? Would the consequences be minimal or manageable? Which idea would cause the least amount of loss or harm? See Figure 4-6.

5. Use reverse brainstorming

Brainstorming is usually thought of as a divergent thinking technique. However, when used in reverse it can be a helpful convergent tool. Present each idea or option to the group and ask everyone to identify possible weaknesses or problems. The goal is not to come up with new ideas, but to generate criticisms instead. This exercise forces people to take a hard look at each option and helps minimize problems associated with groupthink. The group can reexamine the ideas to generate possible solutions for each of the weaknesses identified.

YOU TRY IT

Practice using convergent thinking by generating solutions to a problem. Go to page 78 and follow the steps for Chapter 4: Lesson 4.

FIGURE 4-5: Decision balance sheet

Should the travel company expand to provide tours and services for the business traveler?

	Gains	Losses
The company	Add to customer base	Detract from current customers
	Develop new sources of revenue	Increase expenses
	Build on current tours	Manage conflicts
	Create stability	Manage change
	Increase sales to both sets of customers	Dilute current services
Customers	Can select from a full range of services	Might be confused about company focus
	Can combine business and personal travel	Might not be willing to pay higher prices for business services

FIGURE 4-6: Impact analysis

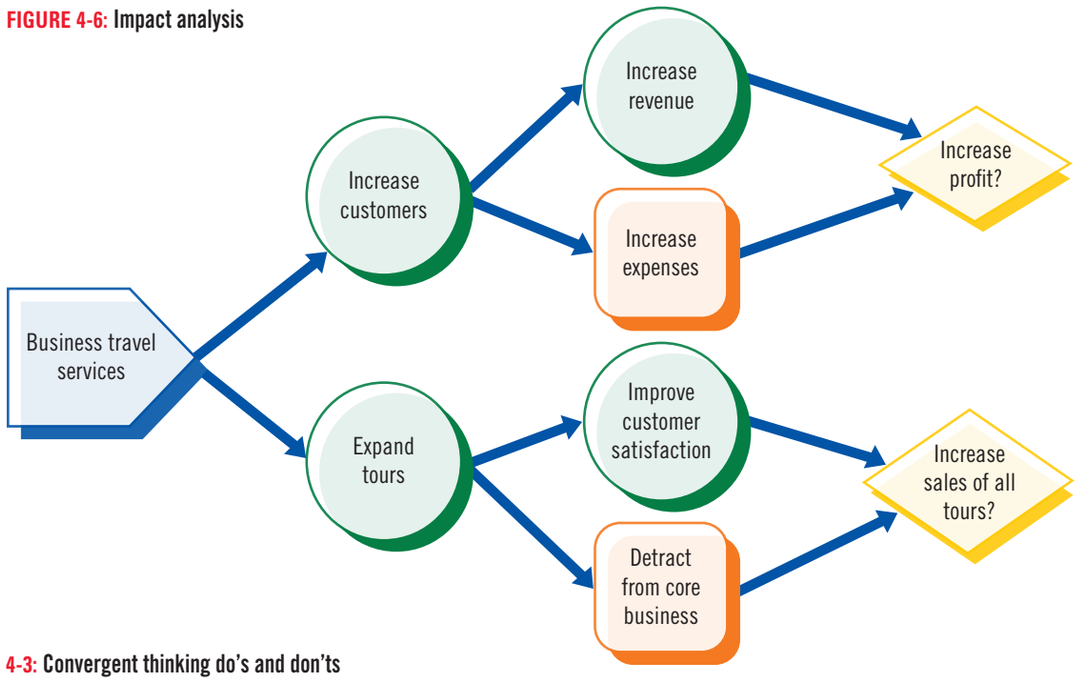

TABLE 4-3: Convergent thinking do's and don'ts

guidelines	do	don't
Review ideas	• Review ideas and eliminate some • Reduce number of ideas to a manageable amount • Use three-pile method to vote on each idea	• **Don't** reject ideas arbitrarily; use criteria the group agrees on
Analyze ideas	• List the pros and cons of each idea • Perform a cost-benefit analysis • Create a decision balance sheet • Create an impact analysis • List the consequences of each idea • Use reverse brainstorming to identify weaknesses and avoid groupthink	• **Don't** overlook the fatal flaw in an idea • **Don't** focus on one type of cost or benefit—consider different forms • **Don't** consider ideas, options, and potential solutions on their own—consider related factors • **Don't** introduce new ideas

REVIEW QUESTIONS

1. The goal of convergent thinking is to:

a. narrow possible options to a manageable set
b. avoid groupthink
c. identify tasks, resources, and expenses
d. reach a group consensus

2. Which of the following tools helps to perform a cost-benefit analysis?

a. Three-pile analysis
b. SWOT analysis
c. Online communication channel
d. Decision balance sheet

Lesson 5
Chapter 4

Reaching Closure

Link to digital lesson
www.ien.edu.sa

Some groups and teams are designed to be ongoing concerns that continue to work together and move from one issue or project to another. Other groups address a particular concern and are disbanded when that problem is solved. In both cases, it is common for the group to artificially prolong a process and not reach closure as efficiently as it could. A team leader needs to provide direction and help the group to develop closure and make necessary decisions. Table 4-4 lists common approaches for groups to make final decisions.

ESSENTIAL ELEMENTS

case The corporate travel team has met a few times and generated detailed suggestions for providing tours to the business traveler. For the next meeting, you and the other members plan to decide whether to pursue the new business and if so, what approach to take.

1. Use a command style

In some settings, a group may examine an issue and develop ideas for it, but the final decisions are left up to a single person. In most cases, this decision maker is a manager, executive, or other administrator. The command approach is the most efficient way to reach closure as there is only one decision maker. However, it is often unpopular with the other participants. People who feel as though their opinions and ideas have little consideration are less committed to the outcome and may harbor negative feelings about the process.

2. Use a consultative approach

The consultative approach is similar to a command style in that a leader still makes the final decisions. However, the process is more democratic because the leader actively seeks input and advice from the group before making the decision. Because there is more communication between the leader and the group, ideally the solution reflects contributions from everyone.

QUICK TIP
Consensus doesn't mean allowing someone to set the agenda with an unreasonable demand.

3. Use consensus decision making

Consensus decision making seeks a solution that most of the group can agree to while trying to resolve any concerns or objections that the minority has. Consensus-based approaches require more time for closure, but tend to have a higher level of commitment from the participants. This is achieved by seeking solutions that the majority can agree to while also taking steps to modify or remove objectionable features of any decisions. See Figure 4-7.

QUICK TIP
Strengthen a plurality vote by using several rounds. Eliminate options with the least support and vote again.

4. Select appropriate voting methods

In all but the most authoritative groups, members signal their intent and preferences for different options through some form of voting. A group can select one of several voting methods according to what is most appropriate for the problem or project. See Table 4-4.

YOU TRY IT

Practice reaching closure by reviewing a decision and choosing how to reach closure. Go to page 78 and follow the steps for Chapter 4: Lesson 5.

FIGURE 4-7: Reaching closure through consensus

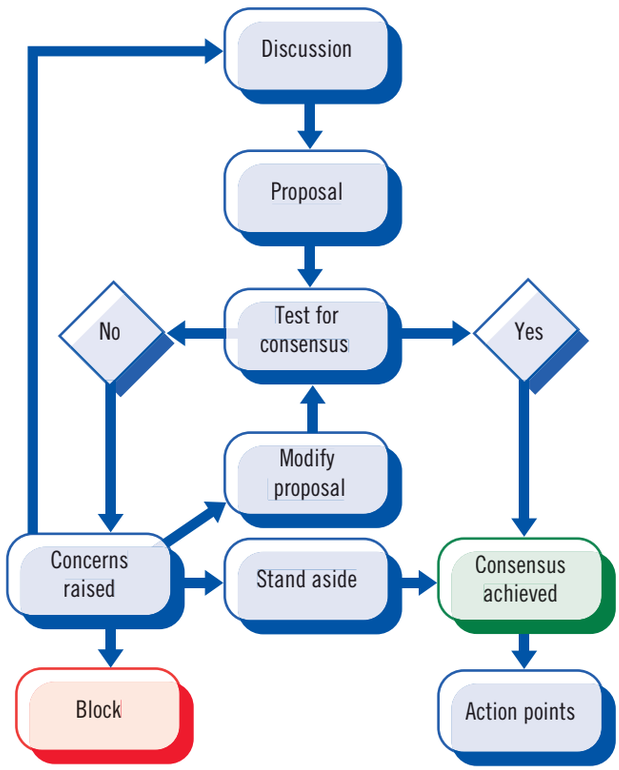

TABLE 4-4: Group decision methods

method	description	purpose
Range voting	• Members assign scores to multiple options rather than voting for a single choice • Scores indicate level of preference • Option with the highest overall average is selected	• Allows people to better express their preferences • Appropriate when group members support several options
Majority rule	• Common decision technique • Selects an alternative based on which one has more than half of the votes	• Efficient technique when choosing between two alternatives • Less efficient with more than two options; another approach might be more practical
Plurality	• The largest block in the group decides the issue • A plurality can be a percentage less than 50%	• This technique is useful when a choice is made from multiple alternatives • Because a decision can be made by a relatively small percentage of a group, people may be less accepting of the outcome

REVIEW QUESTIONS

1. A team leader who actively seeks advice from the group before making a decision is using:

a. a consultative approach
b. a command style
c. consensus decision making
d. an active advice approach

2. When is majority rule an efficient decision-making technique?

a. When using a command style
b. When group members support several options
c. When choosing between two alternatives
d. With small groups

Lesson 6
Chapter 4

Building Sustainable Agreements

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The final step a problem-solving group performs is developing an implementation plan, also called an **action plan**, to guide changes, product or service introductions, and complex projects. The action plan summarizes the activities the group and other members of the organization agree to perform to make sure the project succeeds. See Figure 4-8. Recognize that the action plan represents change, and people and organizations tend to resist change. Involve members of the team and others in the organization to build an agreement that can be sustained as the problem is solved. Table 4-5 describes the do's and don'ts for building agreements. case A few days after meeting to discuss the travel company's new business travel services with the Riyadh office and partners around the world, you and the rest of the corporate travel team in Tabuk meet again to create an action plan.

ESSENTIAL ELEMENTS

QUICK TIP
If the group's solution might be threatening to a decision maker, invite that person to a team meeting to encourage their support.

1. Overcome fear

An action plan represents change, which can threaten someone's job, status, position, budget, or power. Resistance to change increases as a solution becomes more creative and less like habitual activities. Members of your group should discuss their concerns about the plan and understand its benefits before agreeing to it. The group can also work together to identify fears and objections others in the organization might have.

2. Communicate openly

Groups tend to communicate among themselves, forgetting to share their ideas with a larger audience. This is especially true of teams that have worked together in the same location for some time. As your group starts to develop its action plan, take extra steps to share your ideas and progress with stakeholders and decision makers. Use a variety of open meetings, forums, memos, newsletters, and presentations to communicate across the organization.

3. Manage the pace

People are more accepting of change when they have sufficient time to adjust to it. Your group should share ideas and conclusions gradually, allowing time between each new step the group introduces. Welcome discussions about the action plan and its steps, but avoid overwhelming people with major new initiatives all at once.

QUICK TIP
Look at the company calendar and ask people what activities are scheduled for the organization.

4. Avoid inappropriate times

Be aware of the periods when your organization is typically busy, and avoid starting the steps in the action plan at that time. For example, trying to launch a new project a day before the weekend, when employees are focusing on completing their existing tasks, may not be advisable. However, that same initiative introduced at another time might have a warm reception.

YOU TRY IT

Practice building sustainable agreements by creating an action plan for a project. Go to page 79 and follow the steps for Chapter 4: Lesson 6.

FIGURE 4-8: Sample action plan

Action Plan: Expand business travel market				
Objectives: To contact 2000 potential business customers and sign 40 of those customers to a tour in one year **Budget:** SAR 1500 start-up budget plus SAR 1000/month				
Action	**Cost**	**Time**	**Schedule**	**Assigned to**
• Add or expand five tours for business travelers	SAR 1000	24 hours	June 20–July 20	Asma Hasan Abdullah
• Join Saudi Arabian Voyagers Association (Meetings and networking)	SAR 250/yr	4 hrs/month	June, September	Hasan
• Create new brochure	SAR 600	15 hrs	June 20–30	Asma Rasheed
• Select and hire a telemarketing firm	SAR 300/month	5 hrs/month	June 1–July 1	Hasan
• Advertising (Direct mail and Web)	SAR 550 plus SAR 120/month	9 hrs plus 3 hrs/month	June 16–August 15	Asma Omar Hasan
• Develop sales presentation	SAR 360	20 hrs	June 20–30	Abdullah Omar
• Train customer service staff	SAR 150	20 hrs	June 16–30	Najla Ebtesam
Start-up expenses	**SAR 2910**	**88 hrs**		
Monthly expenses	**SAR 420**	**12 hrs**		

TABLE 4-5: Building agreements do's and don'ts

guidelines	do	don't
Overcome fear	• Recognize that team members and others in the organization might resist change • Discuss the benefits of the change	• **Don't** change tasks, project goals, or parts of the team without discussing them first • **Don't** discourage members of your group from discussing their concerns about the project • **Don't** avoid identifying fears and objections
Communicate openly	• Share team ideas with a larger audience, such as a department or company • Communicate frequently with decision makers • Hold open meetings and forums, and provide memos, newsletters, and presentations to keep in touch with others outside the team	• **Don't** assume a single communication or tool is sufficient • **Don't** overwhelm the larger audience with too much or too frequent news • **Don't** introduce a new solution during a period that is usually busy for your organization

REVIEW QUESTIONS

1. **What is the purpose of an action plan?**
   - **a.** To identify the consequences of each idea
   - **b.** To review ideas and reduce them to a manageable number
   - **c.** To document meeting activities
   - **d.** To summarize the activities the group agrees to perform
2. **Which of the following is *not* a way to build a sustainable agreement?**
   - **a.** Introduce all changes at the same time
   - **b.** Overcome fears
   - **c.** Communicate openly
   - **d.** Manage the pace

Technology @ Work: Online Scheduling Tools

Finding time for team meetings or scheduling appointments with another professional can result in dozens of exchanged e-mail messages that are hard to track. A growing range of online scheduling tools, which includes Doodle and Google Calendar, can simplify this time-consuming task. In typical online scheduling tools, the meeting organizer uses an online calendar to select times for the meeting. The organizer uses e-mail to notify everyone who needs or wants to attend the meeting. Participants respond by selecting times that are most convenient for them. The organizer can select the time, usually the one that works for most people, or the tool can recommend a time. Using Doodle, you can conduct polls to schedule events. Google Calendar lets you organize your schedule and share it with others. **case** Omar wants to offer services such as destination planning and trip coordination to corporate customers. He asks you to learn about online scheduling tools to find out if they would support these services and appeal to the company's business customers.

ESSENTIAL ELEMENTS

QUICK TIP
If you are setting up many dates and times in Doodle, you can copy and paste the times from one date to the next.

1. Schedule events

If you are organizing a meeting or hosting an event, you can use Doodle or Google Calendar to enter the event on an online calendar. With Doodle, you select more than one day or time convenient for you and other participants. With Google Calendar, you enter the event on a personal calendar.

2. Invite others to review the schedule

After you schedule an event, invite others to attend. Doodle sends participants a link to a poll that lists the dates and times you selected. With Google Calendar, you send e-mail invitations to participants.

3. Reserve the best time

Based on the responses from participants, reserve the best time for the event. Doodle takes care of this in an innovative way: as each person responds to the poll by voting for scheduled time, Doodle tabulates the votes and reports the results. You can then reserve a time for the event considering those results. With Google Calendar, the people you invite can RSVP using e-mail or the calendar itself. Let everyone know the event has been scheduled by sharing your calendar online.

QUICK TIP
In Google Calendar, you can set up a calendar for a conference room so you can reserve a meeting space.

4. Send reminders

To notify participants about an upcoming event, you send them an e-mail or text message. You can set Google Calendar to automatically remind others about upcoming events or let them know if event details have changed. If you sign up for a free Google account, you can receive a daily agenda listing your schedule.

YOU TRY IT

Learn more about online scheduling tools. Go to page 79 and follow the steps for Chapter 4: Technology @ Work.

REVIEW QUESTIONS

1. **In most online scheduling tools, the meeting organizer uses an online calendar to:**
   - **a.** vote for meeting locations
   - **b.** select times for a meeting
   - **c.** schedule range voting
   - **d.** distribute documents electronically
2. **After participants respond to a meeting invitation, how does Doodle help you select the best time?**
   - **a.** It reserves a conference room
   - **b.** It publishes a group calendar online
   - **c.** It sends electronic RSVPs
   - **d.** It tabulates responses and reports the results

Extra Practice

Real Life Independent Challenge

You can apply the group decision-making techniques you learned in this chapter to develop your group participation and decision-making skills. Most jobs require a variety of skills in these categories. Develop these skills by completing the following exercise.

a. Identify your life and study skills. List the types of activities you have performed in the past six months in life or school. For example, have you worked on a team? Written reports? Attended group workshops? Then list the skills required to complete these activities.
b. Identify your experiences in life outside of school. List these experiences and the skills required to perform them.
c. Review the lists you created and identify interpersonal and group skills, such as motivating others, learning to negotiate or network, or organizing a meeting.
d. Which skills do you want to continue to develop and be central parts of your future jobs?

Team Challenge

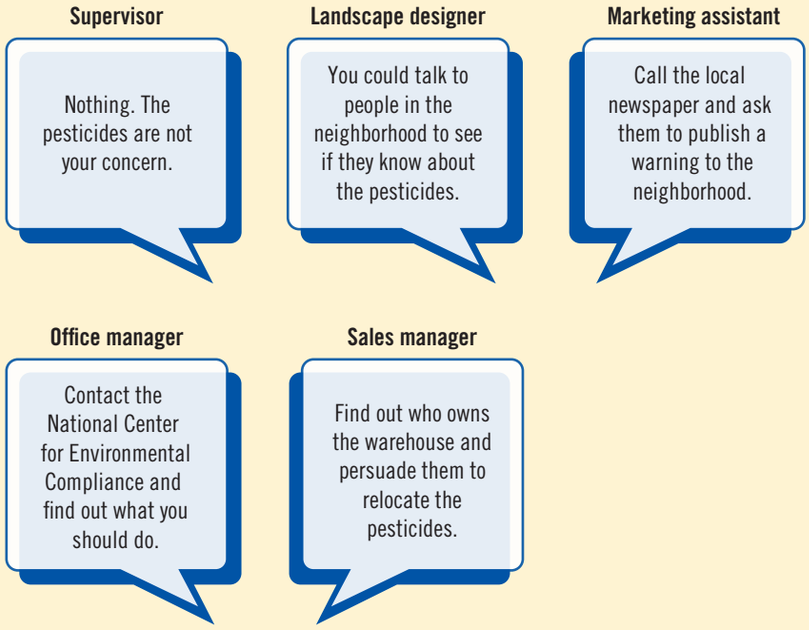
You are working for Qassim Builders, a company in Buraydah, Al-Qassim Province, specializing in sustainable building. You are part of a project team that is supervising the design and construction of a visitor's center in Buraydah. In line with the Saudi Vision 2030, the goal is to build the visitor's center so that it is self-sufficient. That means it should use no outside resources, if possible, including energy, water, and waste systems. Your manager, Nora, suggests that you meet with your team to plan this project.

a. Meet as a team and brainstorm the general categories of resources you need to build the visitor's center so that it is self-sufficient. Consider everything typically found in a public building.
b. Review the resource categories and create a master list.
c. For each category, brainstorm ways to provide the resource without depending on outside systems. For example, if you have a food category, you could create a garden and greenhouse to provide fruits and vegetables without depending on outside suppliers.
d. Review the ideas your team generated, and then use convergent thinking techniques to edit the list. Your goal is to identify all the resources a visitor's center needs using systems that are fairly easy to set up and maintain and are not too expensive.
e. Submit the list to your instructor as requested.

Be the Critic

You are working part-time for a landscaping company planting trees and shrubs in a new neighborhood full of recently built homes. A large warehouse is located near a wadi at the edge of the neighborhood. When you enter the warehouse, you discover it houses old pesticides, some of which are now outlawed. Concerned that the pesticides could pose a danger to the new neighborhood, you introduced the topic of the pesticides at a staff meeting and asked what you should do. Figure 4-9 shows how people answered your question. Analyze the solutions offered, noting their weaknesses, and send a list of the weaknesses to your instructor.

FIGURE 4-9



Chapter 5

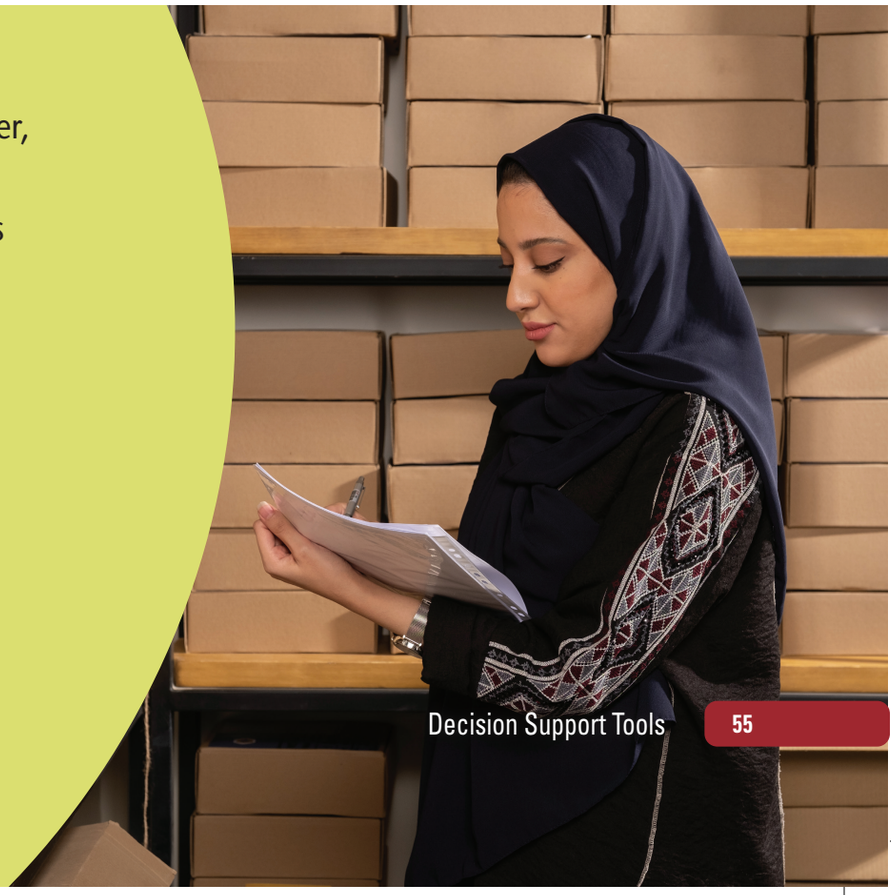
Decision Support Tools

One of the earliest uses of computer technology was to support people making complex decisions. The term decision support system (DSS) describes any information system that aids in decision making, such as spreadsheets that compare weekly sales data or software that summarizes data on a so-called dashboard to highlight positive and negative trends. Today, decision makers use spreadsheets, communication tools, and graphics software to analyze data and options. This chapter introduces the basic concepts of decision support tools and shows how you can use software to make objective decisions. case You have been working with Omar, the vice president of finance at a travel company, to help expand the company's services to corporate travelers. The new project is a success so far, though it has introduced some unexpected questions and decisions. Omar asks you to help him organize information and learn to use decision support tools so that he and others can make effective decisions.

LEARNING OBJECTIVES

Once you have completed this chapter, you should be able to:

1. Explain decision support systems
2. Model decisions quantitatively
3. Describe data objectively
4. Weigh factors
5. Create decision trees
6. Use graphics to display data



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Lesson 1
Chapter 5

Understanding Decision Support Systems

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A **decision support system (DSS)** is interactive software designed to help you compile useful information from raw data, documents, and business knowledge. You then use this information to identify and solve problems and make decisions. A DSS is ideal for analyzing complex problems that involve sets of data and demand a systematic decision-making approach. case Before you start assisting Omar, he asks you to learn about decision support systems and their benefits.

DETAILS

Decision support systems offer the following benefits for decision makers:

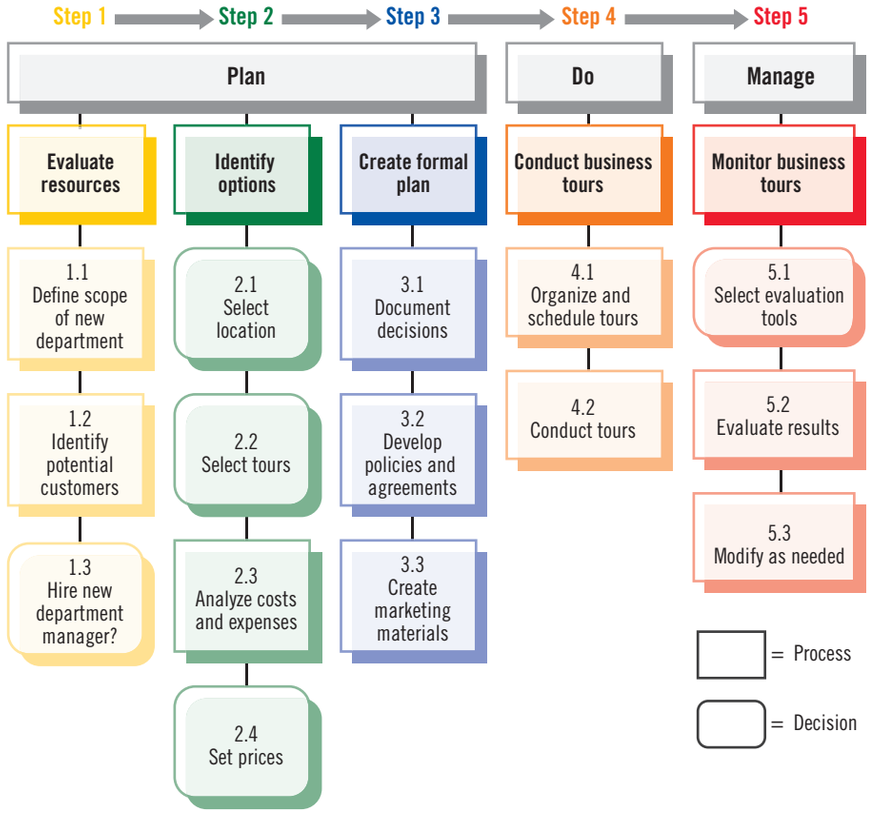
- **Add objectivity to making decisions**
  Decision support software requires you to clearly define the issues, identify relevant information, determine how factors are related, and analyze the results. When you are making a decision, a DSS helps you evaluate all parts of the decision objectively. For example, the travel company you're working at can use a graphic such as the one shown in Figure 5-1 to determine which tour to offer first to corporate customers.
- **Improve efficiency for complex decisions**
  Complex decisions typically involve gathering lots of detailed information and then ranking or assigning weights to each factor. A computer can store information and make complex calculations much more efficiently than people can. You use decision support software to maintain, process, and report on the detailed information involved in complex decisions. For example, the travel company you're working at is considering opening a branch office in Jeddah or Khobar to serve corporate customers. It can use decision support software to compare expenses such as rent, travel, and employees and weigh factors such as proximity to clients, staff preference, and local attractions.
- **Encourage exploration and discovery**
  Decision support systems help you visualize data, illustrate problems, and graphically represent options and solutions. You can easily adjust variables and model scenarios. For example, the travel company's employees can use a spreadsheet to compare the income and expenses they have now with those they expect to have with a separate business travel department.

QUICK TIP
When you solve a problem intuitively, you react immediately and instinctively, without following a particular procedure.

- **Provide support for particular decisions**
  As a member of an organization, you must always be prepared to support the decisions you make. Intuitive decisions can be difficult to defend. When you approach a decision objectively and analyze it, you can demonstrate that you handled the matter professionally. For example, a decision support system can help to compare the cost and volume of trips to find the best price.
- **Help communicate decisions to other interested people**
  Describing the thought processes that go into making a complex decision or solving an involved problem can be difficult. Decision support systems and their models can help you more effectively communicate your ideas to interested stakeholders. Figure 5-2 shows the steps, processes, and decisions involved in creating a new corporate travel department at the travel company you're working at.

FIGURE 5-1: Decision diagram

FIGURE 5-2: Comparing cost and volume of trips



REVIEW QUESTIONS

1. **A decision support system helps you:**
   - **a.** generate ideas
   - **b.** communicate with colleagues
   - **c.** identify and solve problems and make decisions
   - **d.** prepare for presentations
2. **Which of the following is *not* a benefit of using a decision support system?**
   - **a.** Provides better logistics
   - **b.** Adds objectivity
   - **c.** Improves efficiency in making complex decisions
   - **d.** Helps to communicate decisions

Lesson 2
Chapter 5

Modeling Decisions Quantitatively

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When solving complex problems, gather all the data you can related to the problem. Then you can **model** your decisions quantitatively, which means you represent the decision and its factors using numbers. Modeling decisions can help you see patterns in the data, make objective choices—especially among competing options—and provide substantiation for your decisions. case One of the new corporate clients at the travel company you're working for has headquarters in Jeddah, Makkah Province, and wants the company to open a branch office on its corporate campus. Some managers at the company want to open an office in the Eastern Province. Omar asks you to help him gather data and model the decision quantitatively.

ESSENTIAL ELEMENTS

QUICK TIP
Be sure to enter numbers carefully—a typo can ruin an otherwise useful model.

1. Assign numeric values to your data

Gather data you can measure, which includes numeric variables such as price, weight, temperature, square footage, and sales per week. Make sure you collect accurate information, and then enter the data in a tool designed for numeric analysis, such as a spreadsheet.

2. Compare apples to apples

The data you collect is not always available in the same format. For example, to compare salary data, convert an hourly or monthly wage to an annual salary or vice versa. See Figure 5-3. Make similar adjustments for quantities (single units vs. bulk quantities), monetary units (riyals vs. dollars), and other measures that describe the same item, but express it in different ways.

QUICK TIP
Survey designers recommend five-point scales as the most accurate; fewer points don't offer enough options, and more points create confusion.

3. Rate subjective variables

In addition to gathering objective data, you can collect subjective data. For example, you might want to poll the staff at the travel company you're working at to determine their preferences for opening a new office in Jeddah or other sites. To use this information in a quantitative model, you must first convert it to numbers. Ask people to rate or evaluate options and assign numeric values to their responses. You can use a five-point response scale similar to the one shown in Figure 5-4.

4. Use a decision model

To make numeric data useful, organize it in a **decision model**, which is one or more formulas that includes all of the relevant variables and calculates a result. For example, to choose between a Jeddah and Khobar branch office, you could rate staff preference, proximity to your clients, and building features and amenities for each location and calculate the sum of the ratings. Also calculate the sum of variables such as monthly office rent, taxes, utility costs, and salary. Determining these totals for each location provides a ranked listing of the options. See Figure 5-5.

YOU TRY IT

Practice modeling decisions quantitatively by selecting a solution. Go to page 80 and follow the steps for Chapter 5: Lesson 2.

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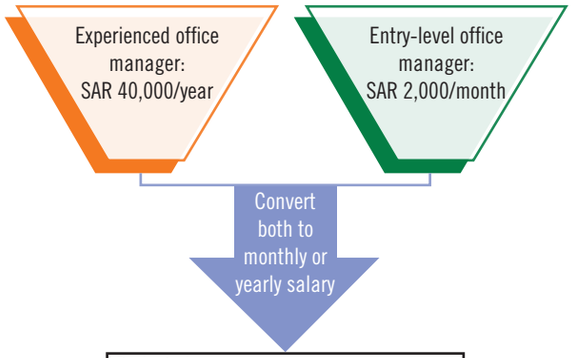
FIGURE 5-3: Comparing data

Problem: How much should the company budget for an office manager in the new Jeddah office?



Projected expenses		
	Experienced	Entry-level
Monthly salary for office manager	SAR 3,333	SAR 2,000

FIGURE 5-4: Rating subjective data

Answer the following questions according to the scale.				
• Do you think the company should open a branch office in Jeddah?				
Strongly agree	Agree	Neutral	Disagree	Strongly disagree
5	4	3	2	1
• Should the Jeddah branch be on a client's corporate campus?				
Strongly agree	Agree	Neutral	Disagree	Strongly disagree
5	4	3	2	1
• Do you think the company should open a branch office in Khobar?				
Strongly agree	Agree	Neutral	Disagree	Strongly disagree
5	4	3	2	1

FIGURE 5-5: Decision model

	A	B	C	D
1	**Decision Model: Company Branch Office**			
2		**Jeddah**	**Khobar**	
3	Staff preference	45	38	
4	Proximity to clients	40	40	
5	Building features	35	42	
6	Amenities	30	42	
7	**Total**	**150**	**162**	
8				
9	Rent per month	SAR 2,200.00	SAR 1,800.00	
10	Taxes	SAR 448.00	SAR 725.00	
11	Utilities	SAR 500.00	SAR 450.00	
12	Salary	SAR 800.00	SAR 650.00	
13	**Total**	**SAR 3,948.00**	**SAR 3,625.00**	
14				

Sums for each questionnaire rating

Ratings for Khobar branch office are the highest

Expenses for Khobar branch office are the lowest

REVIEW QUESTIONS

1. **When you create a numeric representation of the decision, you are creating a(n):**
   - **a.** presentation
   - **b.** model
   - **c.** analytical document
   - **d.** consensus
2. **What should you do before comparing subjective data?**
   - **a.** Plot the data
   - **b.** Find the mean
   - **c.** Create a model
   - **d.** Rate it on a response scale

Lesson 3
Chapter 5

Describing Data Objectively

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Most people can visualize images, concepts, and trends more easily than large sets of numbers. When presenting data to support a decision, provide your audience with an objective description of that data. You can use statistics to explain and compare the characteristics of data. Table 5-1 lists the do's and don'ts for describing data objectively. case Omar has developed pricing data for the new tours designed for business travelers. He asks you to calculate some basic statistics about the prices.

ESSENTIAL ELEMENTS

QUICK TIP
Technically, you can measure the average in other ways. The mean uses a particular calculation.

1. Mean

The **arithmetic mean** value of a set of data is usually referred to as the average. The mean is the most common descriptive statistic and is simple to compute. Sum the values in your data and divide by the number of items that you counted. The mean is a single value and describes the data in general by showing its central tendency. See Figure 5-6.

2. Median

The **median** value of a set of data is that point that separates the higher values from the lower values. The median is similar to the mean, but is less susceptible to distortion by extremely large or small values. The median is calculated by ordering all of your data from lowest value to highest value and selecting the middle one. If you have an even number of data points, use the mean of the two middle values.

3. Mode

The **mode** of a set of data is the value that occurs most frequently. The mode does not have to be a unique number. Some data sets might have more than one mode. Although means are affected by extremely large or small values in the data set, modes are not. This makes modes useful for describing data that includes widely varying numbers. The mode itself can also reveal useful patterns. For example, if you are measuring the week of the year (1–52) when people take particular tours, you might find that week 14 is the mode, as in Figure 5-6. This could be useful for planning future marketing campaigns and new tour offerings.

QUICK TIP
Data that is normally distributed is sometimes described as having a bell-shaped curve.

4. Standard deviation

Standard deviation is a measure of the variability of a set of data. A low standard deviation indicates that the data points tend to be very close to the mean (minimal variability). A higher standard deviation indicates that the data are spread out over a larger range of values and that they are farther from the mean (greater variability). For example, when planning what to wear on a tour, two destination cities might have the same average temperatures (24 degrees). However, the mean alone might not be enough information. One city has daytime highs of 35 degrees and evening lows of 13. The other varies between 26 and 22 degrees. You would need to instruct your clients to pack differently depending on their destination. The standard deviation provides an insight that the mean or median temperatures do not.

YOU TRY IT

Practice describing data objectively by calculating statistics. Go to page 81 and follow the steps for Chapter 5: Lesson 3.

FIGURE 5-6: Basic statistics

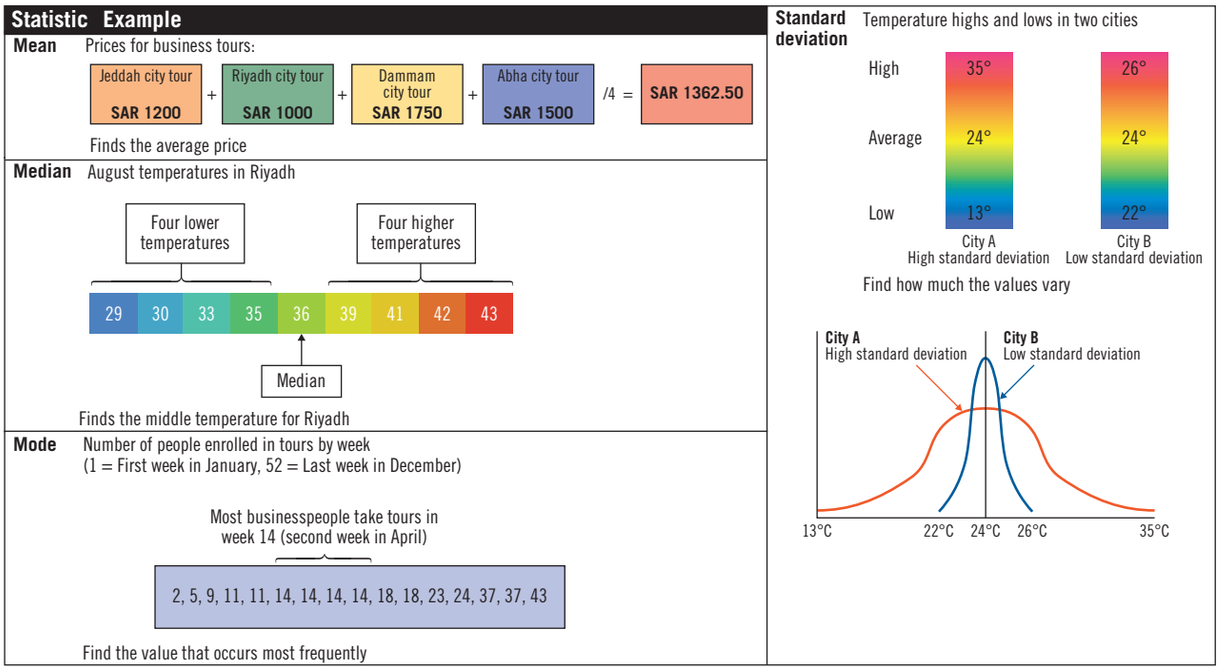

TABLE 5-1: Modeling decisions do's and don'ts

guidelines	do	don't
Mean	• Add the values and divide the sum by the number of values • Calculate the mean to find the tendency in the data	• **Don't** include extremely high or low values; they are outliers
Median	• Sort values from low to high or high to low, and then find the middle value • Find the median to determine the middle value, which is not affected by extreme values	• **Don't** confuse the median with the mean
Mode	• Sort values and find the ones that occur most frequently • Use to describe data that includes widely varying numbers	• **Don't** look for the mode in all sets of data—some don't have a mode
Standard deviation	• Interpret low standard deviations to mean that the values are very close to the mean so they don't vary much • Interpret high standard deviation to mean that the data are spread over a larger range of values and are farther from the mean	• **Don't** evaluate standard deviations as better or worse—they show which values are more consistent than other values

REVIEW QUESTIONS

1. **When you sum the values of items and then divide by the number of items, you are calculating the:**
   - **a.** arithmetic mean
   - **b.** median
   - **c.** mode
   - **d.** arithmetic standard
2. **Which of the following calculations is useful for describing data that includes widely varying numbers?**
   - **a.** Median
   - **b.** Mode
   - **c.** Standard deviation
   - **d.** Norm

Lesson 4
Chapter 5

Weighing Factors

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www.ien.edu.sa

Sometimes more than one variable can affect results in a decision model. For these types of decisions, you can assign weights to the variables. For example, deciding which tours to offer to corporate customers involves variables such as amount of travel time, level of activity, meeting facilities, and weather. After surveying potential customers, the travel company you're working at determines that the amount of travel time is worth 50% of the decision and meeting facilities are worth only 10%. Weigh these factors in your decision model to make more accurate decisions. Table 5-2 lists the do's and don'ts for weighing factors.

ESSENTIAL ELEMENTS

case Omar wants to return to the decision about which tour to offer first to corporate customers and evaluate it by weighing factors.

1. Identify the most important decision variables

The most important factors are the decision variables that are most likely to affect the output variables. If the decision includes many independent variables, it should be limited to those that have the most effect on the decision. In Figure 5-7, for a tour of corporate customers, the four variables might be activity level, meeting facilities, travel time, and weather.

2. Determine the appropriate weights

Each decision variable is assigned an appropriate weight. This is a number that the variable is multiplied by to reflect the significance in the decision. In Figure 5-7, the most important variable is travel time, which has a weight of 50. Activity level and weather are the next most important, and have a weight of 20 each. The least important variable is meeting facilities, which has a weight of 10. To calculate the weighted ratings, multiply each rating by the weight. Then total the weighted ratings for each alternative to find the best option.

QUICK TIP
When normalizing, you usually multiply or divide the data by a variable so you can compare the variables fairly.

3. Normalize variables

The range of values for one decision variable might vary widely. For example, the travel company you're working at is considering five local tour operators to use in Riyadh. The most expensive tour operator charges SAR 50 per person and the least expensive charges SAR 10. The range of values for the price variable varies widely. Before adding other factors such as transportation and hotel costs to select a tour operator, you can normalize the price variable. **Normalization** makes the values consistent so you can compare them accurately. A simple way to normalize is to divide each variable by the largest instance of that variable. Then you can use the normalized variables as weighted factors. See Figure 5-8.

4. Consider the runners-up

The weights assigned are subjective. When considering the results, the analyst should ask if a small change in the weights would affect the outcome. Look at the runner-up options and see how near they are to the leader. Values close to the top value are often important decision variables.

YOU TRY IT

Practice weighing factors by assigning weights. Go to page 81 and follow the steps for Chapter 5: Lesson 4.

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FIGURE 5-7: Assigning weights

	A	B	C	D	E	F	G
1	**Tours to Offer Corporate Customers**						
2	**Ratings (1–5)**						
3			Jeddah	Riyadh	Dammam	Abha	
4	Activity level		4	3	2	5	
5	Meeting facilities		1	3	5	4	
6	Travel time		3	5	1	2	
7	Weather		2	5	3	5	
8							
9	**Weighted factors**						
10		Weight	Jeddah	Riyadh	Dammam	Abha	
11	Activity level	20	80				
12	Meeting facilities	10	10				
13	Travel time	50	150				
14	Weather	20	40				
15	**Total**	**100**	**280**				
16							

Four factors are rated for each tour

Each rating is multiplied by the weight

The total weight is always 100

These calculations need to be completed

FIGURE 5-8: Normalizing variables

C5 *fx* =C4/B4

To normalize the other charges, divide each by the value in cell B4

	A	B	C	D	E	F	G	H
1	**Riyadh Tour Operators**							
2	**Surcharges per person**							
3		1	2	3	4	5		
4	Surcharge	SAR 50.00	SAR 40.00	SAR 25.00	SAR 20.00	SAR 10.00		
5	Normalized	1	0.8	0.5	0.4	0.2		
6	**Transportation per person**							
7		1	2	3	4	5		
8	Charge	SAR 75.00	SAR 100.00	SAR 80.00	SAR 65.00	SAR 50.00		
9	Normalized	0.75	1	0.8	0.65	0.5		
10	**Daily hotel per person**							
11		1	2	3	4	5		
12	Charge	SAR 105.00	SAR 85.00	SAR 90.00	SAR 125.00	SAR 80.00		
13	Normalized	0.84	0.68	0.72	1	0.64		
14								
15	**Charge comparison**							
16		Weight	1	2	3	4	5	
17	Surcharge	50	50	40	25	20	10	
18	Transportation	15	11.25	15	12	9.75	7.5	
19	Hotel	35	29.4	23.8	25.2	35	22.4	
20	**Total**	**100**	**90.65**	**78.8**	**62.2**	**64.75**	**39.9**	
21								

The highest charge is SAR 50 in cell B4

After normalizing, assign weights to compare factors

TABLE 5-2: Weighing factors do's and don'ts

guidelines	do	don't
Decision variables	• Identify the decision variables that have the most effect on the decision	• **Don't** include minor decision variables
Weights	• Assign a weight to each important decision variable	• **Don't** assign weights to all decision variables
Normalization	• Account for differences in variables by normalizing them	• **Don't** compare values without normalizing them first

REVIEW QUESTIONS

1. **How can you indicate the significance of each variable in a decision?**
   - **a.** Assign an appropriate weight
   - **b.** Convert the values to the same format
   - **c.** Use one as a constant in the model
   - **d.** Normalize the variables
2. **How can you account for differences in variables?**
   - **a.** Create a decision tree
   - **b.** Normalize them
   - **c.** Find the mean, mode, and median
   - **d.** Find the standard deviation

Lesson 5
Chapter 5

Creating Decision Trees

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When you want to use a rational approach to select the best option from several alternatives, use a decision tree. A **decision tree** is a support tool that models decisions using a treelike diagram. Each branch of the tree represents an option and its benefits, costs, and likelihood. Organizations use decision trees to identify the strategy or choice that will lead them to a desired goal. Because a decision tree is a graphic, it helps you explore possibilities and track their outcomes. It also creates a simple summary of a complex decision that you can share with other stakeholders. You can create a decision tree by hand or using any basic graphics or drawing package on a computer. case The travel company you're working at finds that culture tours in the Al-Madinah region are becoming more popular among corporate clients, and has identified potential destinations. Omar asks you to create a decision tree to determine the best option.

ESSENTIAL ELEMENTS

1. Start with your primary decision

Begin by determining the primary decision to make or problem to solve. This becomes your goal, such as to identify the ideal destination in the Al-Madinah region for a culture tour. Draw a small box on the left side of a piece of paper or on your computer screen. Label this objective box with a description of the problem. You can also draw a decision tree on software such as MS Excel or Decision Tree Maker (https://www.smartdraw.com/decision-tree/examples/)

2. Identify your options

Identify the options in the decision or problem. For example, as shown in Figure 5-9, the destinations are Dhi'ain village in Al-Bahah, Mada'in Saleh in Al-'Ula, or neither one. Draw a line for each option from the objective box to the right. Keep the lines far apart to leave yourself room to include labels and add your thoughts. Label each line with a short description of the option.

QUICK TIP
Squares represent decisions; circles indicate that a choice must be made.

3. Consider the results

At the end of each line, insert the result. If the result of choosing that option is uncertain, draw a small circle. If the result requires you to make a decision, draw a small square. Repeat this process from each decision square until you've drawn lines representing all of the possible outcomes that you identified.

QUICK TIP
Use your best judgment about what you think each option is worth and compare each option to the others.

4. Assign values and probabilities

Estimate how much each option is worth to you or your organization. This can be a monetary amount or a score, such as one based on a 1–5 rating scale. For example, if the Dhi'ain village tour was very popular it could generate SAR 900,00 in revenue. If it were not very popular it would only generate SAR 220,000. The Mada'in Saleh tour, if very popular, could generate SAR 1,000,000 or only SAR 175,000 if not very popular. Label the outcome with this value. Next, for each circle (called an uncertainty node), estimate the probability or likelihood of each outcome. In this case, using current regional tours as a guide, it has been estimated that the probability of the Dhi'ain village tour being very popular is 0.75, and it being not very popular is 0.25. For Mada'in Saleh, the likelihood of the tour being very popular is 0.60, and it being not very popular is 0.40. The total at each circle must equal 100%. Repeat this for all of your decision nodes.

5. Calculate the value for each option

Calculate the value associated with each possible outcome. Start at the right side of your decision tree and work back to the left. See Table 5-3.

YOU TRY IT

Practice creating decision trees by completing a diagram. Go to page 82 and follow the steps for Chapter 5: Lesson 5.

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FIGURE 5-9: Decision tree

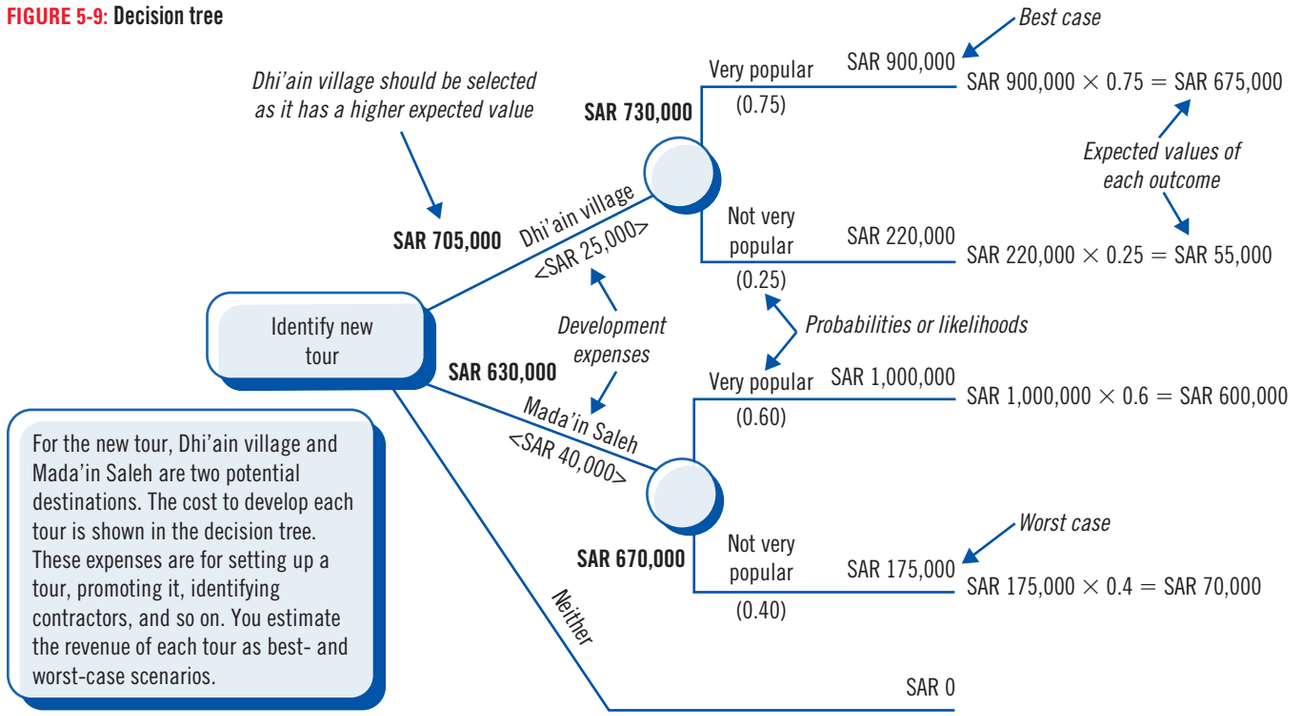

TABLE 5-3: Calculating the value for each option

element	shape	description
Uncertainties	Circle	• Multiply each outcome by its probability • Insert this value in the decision tree • Repeat this for each uncertainty
Decisions	Square	• Estimate the costs associated with each option • Subtract cost of the outcome value you calculated to find the benefit of that decision • Repeat this for each decision
Results	Line	• When you have calculated all of the decision benefits (value–cost), choose the option that has the largest benefit. This is the optimal decision.

Saudi Vision 2030 and the art of infographics

When presenting information via graphics, the number one rule is to keep it simple: the clearer and more meaningful, the better! Many analysts fall into the trap of creating confusing and cluttered diagrams, charts, and graphics that fail to get their message across. When the Saudi Vision 2030 was announced, it was crucial that the information was presented in a way that was clear, accessible, and easy to understand. In recent years, there has been a steady rise in infographics for delivering information. The official Saudi Vision 2030 website (www.vision2030.gov.sa) put infographics to effective use, combining text with powerful and identifiable visuals to present its message. Goals are specific, quantifiable, simply presented, and supported by visual icons, making the information easy to disseminate at a glance. Never underestimate the power of presentation.

REVIEW QUESTIONS

1. **In a decision tree, what does each branch of the tree represent?**
   - **a.** An assignment to a member of the group
   - **b.** An option that is unlikely to work
   - **c.** A new idea
   - **d.** An option and its benefits, costs, and likelihood
2. **What shapes do you use in a decision tree?**
   - **a.** Circles, squares, and lines
   - **b.** Circles and diamonds
   - **c.** Rectangles only
   - **d.** Tree shapes

Lesson 6
Chapter 5

Using Graphics to Display Data

Link to digital lesson
www.ien.edu.sa

By representing your data, decisions, and solutions graphically you can see trends, relationships, and results that would be hard to detect in a list of numbers. Drawings, charts, and other illustrations also help make your case clearer and easier for others to understand. Software such as spreadsheets and presentation graphics programs provide tools to help you visualize and display data. Table 5-4 lists the do's and don'ts for displaying data graphically. case Before Omar makes a presentation to the other company managers about expanding services to corporate customers, he asks you to create charts to display data graphically.

ESSENTIAL ELEMENTS

QUICK TIP
Bar charts with vertical bars are called column charts.

1. Bar charts

A bar chart uses rectangular bars to display data values. The length of each bar represents a value. The longer the bar, the greater the value. Bar charts can be oriented horizontally or vertically. Simple charts use one set of bars to represent a single variables or point in time. Multiple variables or points in time may be represented by several adjacent bars. See Figure 5-10a.

2. Line charts

To create a line chart, you plot a series of points and then connect them with a line. Each point represents a measurement or value. The line shows directions or trends in the data over time. See Figure 5-10b.

3. Area charts

An area chart is similar to a line chart because it compares two or more variables over time. However, it displays the values for each variable as cumulative totals using numbers or percentages. This means that each variable is layered one on top of another. A color or fill pattern highlights each variable.

4. Pie charts

Pie charts are circles divided into sectors, with each sector resembling a slice of a pie. See Figure 5-10c. The size of the slice represents the relative size or frequency of the corresponding variable. Because the entire chart forms a complete circle, it shows the percentage of the whole that each variable represents. Use pie charts to compare data at one point in time, usually to the whole. Pie charts are easiest to interpret when the largest slice represents at least 25–30% of the data. Ideally, a pie chart should emphasize a single variable and compare that slice with the rest of the pie.

QUICK TIP
Most software tools can display 3D scatter plots with up to four dimensions.

5. Scatter plots

Scatter plots display two variables for a set of data. You plot the data for one variable along the horizontal axis and the other variable on the vertical axis. A scatter plot shows correlations between variables, especially nonlinear ones. If the points appear random and unordered, the two variables do not have a strong relationship. See Figure 5-10d.

YOU TRY IT

Explore how graphics are used to display data. Go to page 82 and follow the steps for Chapter 5: Lesson 6.

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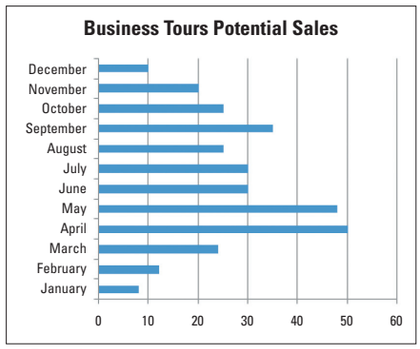
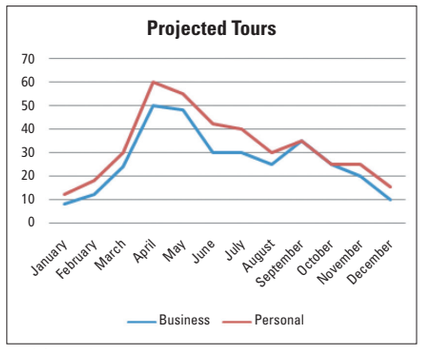
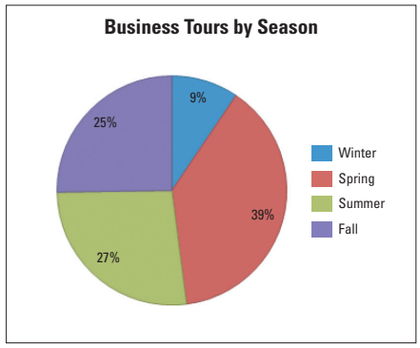
FIGURE 5-10: Types of charts



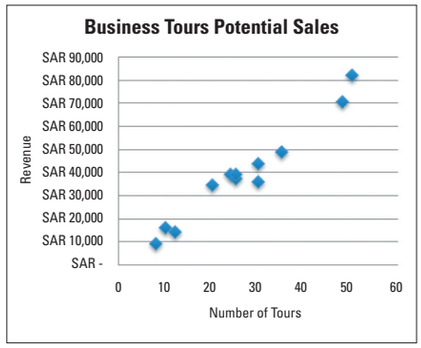
a. Bar chart



b. Line chart



c. Pie chart



d. Scatter chart

TABLE 5-4: Using graphics do's and don'ts

guidelines	do	don't
Bar chart	• Use bars to represent data, with the length of the bar corresponding to the size of the data	• **Don't** use long text on the horizontal axis
Line chart	• Plot a series of points and then connect them with a line to show directions or trends in the data over time	• **Don't** plot too many points or you might not be able to see the pattern
Area chart	• Display values for each variable as cumulative totals using numbers or percentages • Use different colors or fill patterns to differentiate each layer • Choose an area chart to represent the volume of data	• **Don't** hide the area you want to emphasize in the middle of the chart—place it along the baseline • **Don't** use if you are making a comparison between multiple series—consider using a bar chart instead • **Don't** use if you are analyzing trends over a period time—consider using a line chart instead
Pie chart	• Compare the percentage of an element with the whole • Use pie charts to compare data at one point in time	• **Don't** use pie charts to show changes over time • **Don't** compare sectors across multiple pie charts • **Don't** create pie charts with many small slices
Scatter plot	• Display two variables for a set of data • Show correlations among variables, especially nonlinear ones	• **Don't** plot more than two variables • **Don't** interpret a scatter plot the same way as a line chart because a scatter plot combines two values in one point

REVIEW QUESTIONS

1. In a line chart, what does the line show?

a. The relation of parts to the whole
b. Directions or trends in the data over time
c. Accumulated values
d. Where data is not related

2. Circular charts divided into sectors are called:

a. circle charts
b. area charts
c. pie charts
d. slice charts

Technology @ Work: Spreadsheet Tools

You use spreadsheet software such as Microsoft Excel, OpenOffice Calc, or Google Spreadsheet to create and format numeric data and calculations, such as for budgets, commission calculators, schedules, and income statements. You use electronic spreadsheets to track numeric information, perform calculations, and create charts, for example. Spreadsheets are especially helpful when recording and analyzing financial information—if you change one cell, the spreadsheet updates all related calculations. case Omar asks you to review five readily available electronic spreadsheets.

ESSENTIAL ELEMENTS

1. **Microsoft Excel**
   Part of the Microsoft Office suite of programs, Excel (www.office.microsoft.com/excel) is widely used in business, education, and research. One reason that Excel dominates is that you can use it to create a basic spreadsheet quickly or to develop a sophisticated set of worksheets for making business decisions.
2. **Google Spreadsheet**
   Part of Google Docs, Spreadsheet is a basic tool for creating and editing spreadsheets. Google Spreadsheet (www.google.com/docs) offers basic importing and editing features, and more limited formatting tools than Excel. However, like other Google applications, Spreadsheet is designed for online collaboration and sharing.
3. **OpenOffice Calc**
   A free open source spreadsheet tool, OpenOffice Calc (www.openoffice.org/product/calc.html) is an all-purpose spreadsheet modeled after Microsoft Excel, and is freely available on the OpenOffice Web site. Unlike Excel, Calc can define series for creating charts based on the layout of your data. It can also save spreadsheets as Portable Document Format (PDF) files, making them easy to share with non-Calc users.
4. **Gnumeric**
   Like OpenOffice Calc, Gnumeric (www.gnumeric.org) is a free, open-source spreadsheet program that is part of the GNOME desktop for computers running the Linux operating system. It is designed to be similar to Excel, though it lacks some features. Professionals consider it a reliable spreadsheet tool.
5. **Apple Numbers**
   If you use a Macintosh computer, you can use Apple Numbers (www.apple.com/iwork/numbers), which is part of the iWork suite of programs. Numbers is designed to be easy to use and can create visually rich charts and tables. It lacks the more sophisticated features of Excel, such as PivotTables, PivotCharts, and a programming language for customizing spreadsheets.

YOU TRY IT

Learn more about spreadsheet tools. Go to page 83 and follow the steps for Chapter 5: Technology @ Work.

REVIEW QUESTIONS

1. **Which of the following is *not* an example of spreadsheet software?**
   a. Microsoft Excel
   b. OpenOffice Calc
   c. Apple Spreadsheets
   d. Google Spreadsheet
2. **Which of the following is an advantage of using Gnumeric?**
   a. It is a free, open-source spreadsheet program
   b. It is designed for online collaboration
   c. It is popular with Macintosh users
   d. It creates elegant PivotTables

Extra Practice

Critical Thinking Questions

1. **How can decision support tools help you in making decisions in your own life?**
2. **What are the advantages of using mathematical decision tools such as decision trees and weighted factors?**
3. **Suppose that you are about to make a major decision, such as buying a new computer or taking a particular course in your education. How could you use a tool discussed in this chapter to help you as you make your decision? Recall a big decision you made recently and describe your process for making that decision.**

Real Life Independent Challenge

You can apply the problem-solving techniques you learned in this chapter to the decisions you need to make in other parts of your life. Suppose you need to purchase a new computer for your academic or professional work. Complete the following steps to make the purchase decision.

a. In a document or spreadsheet for personal use, list any money you have saved to buy a new computer.
b. List the factors that are important to you, such as computer type (laptop or desktop), monitor type (flat panel, wide screen, or high definition, for example), amount of memory, and so on. These are your decision criteria.
c. Rank how important each factor is in your decision.
d. Assign weights to each factor according to your rankings.
e. Gather information about available computers using online resources or catalogs, for example. List the factors each computer has and compare them to your weighted rankings. In other words, compare each computer against the criteria you selected.
f. The computer with the highest score is the one you should purchase.

Team Challenge

You are working for Qassim Builders, a company in Buraydah, Al-Qassim Province, specializing in sustainable building. In line with the Saudi Vision 2030, the company is committed to solving environmental problems through green building practices. In its next ad campaign, Qassim wants to promote one example of 'green' technology it uses in sustainable building, such as solar panels, environmentally-friendly insulation, or wind power. You have been asked by your manager to help Qassim Builders decide which technology to promote.

a. Based on the topics discussed in this chapter, consider what types of data you might collect and which tools you might need to analyze the data, to help Qassim Builders in making a decision.

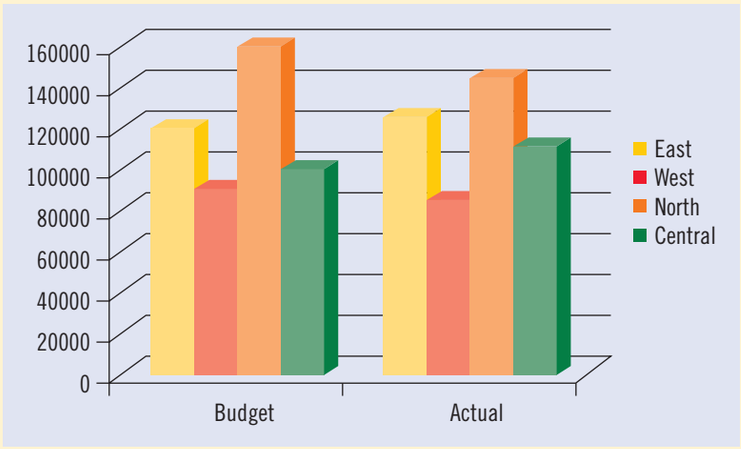
b. Describe how creating a decision tree might help in selecting the right option.

Be the Critic

You are working for Ummah Wheels, a company in Dammam, Eastern Province that provides hybrid and electric vehicles for short-term rental in the Dammam area, in support of Saudi Vision 2030's initiative to promote environmentally conscious energy sources. Ummah Wheels is analyzing its expenses and deciding which ones to reduce. To compare alternatives, the owner has created the chart shown in Figure 5-11. However, there are some flaws in the way the owner has presented the information in his chart.

Analyze the chart, using the insights on decision support tools discussed in this chapter. Note any weaknesses, explaining any elements that might be missing, and suggest how it might be improved. If the owner asked you to analyze the company's expenses for him, how would you approach the task?

FIGURE 5-11



You Try It

Chapter 1: Lesson 2 Analyzing Problems

Practice analyzing problems by listing the steps you would take to analyze a problem. Complete the following steps.

1. Get ready

Read the following descriptions of the travel company you're working at and its problem.

Company description: A tour company based in Riyadh that organizes adventure, cultural, and educational tours in Saudi Arabia. The company's travelers enjoy activities ranging from hiking to wildlife spotting, while becoming familiar with the culture of the region—the food, the people, and the history.

The company sponsors tours to the various provinces of Saudi Arabia. Customers are usually traveling for pleasure, though the company occasionally organizes business trips.

Problem: Typically, the late spring and summer months are the most popular times for personal travel. For the last five years, the top sales months have been April–August. This year, however, sales did not increase during these months. For the first time in five years, the company's annual sales are declining—they now expect to make less this year than last year.

2. Now you try it

Based on the information available, list the next steps you would take to analyze this problem. Tip: Note that this question is about nurturing your analytical skills. Is there enough background information to solve the problem? If not, how would go about gathering the information needed? You may wish to revisit the steps provided in Lesson 2 of Chapter 1.

Chapter 1: Lesson 3 Developing Effective Problem Statements

Practice developing effective problem statements by writing a problem statement. Complete the following steps.

1. Get ready

Read the following description of a problem.

Problem: Typically, the late spring and summer months are the most popular times for personal travel. For the last five years, the top sales months have been April–August. This year, however, sales did not increase during these months. In fact, tours overall have decreased by 8% compared to last year.

This is true for most travel companies. Only 5% said they sold more tours, 10% said sales were the same, 35% said sales were somewhat lower, and 50% said they were significantly lower.

The travel company you're working at expected adventure travel to increase substantially, but it remained steady compared to last year. Adventure travel includes exploring remote or exotic areas and engaging in activities such as hiking, sightseeing, and outdoor exploring.

Although the company promoted popular cultural tours, sales for those tours are also flat. Two of the most popular destinations are Abha and Dammam. Another problem is that tour operators in these regions are charging more for their services.

The company also expected tour sales overall to increase by 5% as it has in previous years. The company surveyed its customers and found that they are delaying travel plans because of concerns about international airline prices.

This means that plans to expand tours, staff, and the company Web site should be put on hold. Other expenses might need to be cut.

2. Now you try it

Revise the problem description to create a complete but concise problem statement.

Chapter 1: Lesson 4 Identifying and Managing Risks

Practice identifying and managing risks by ranking possible solutions to a problem. Complete the following steps.

1. Get ready

Read the following description of a problem.

Problem: Sales at the travel company so far this year are weak. What can the company do to increase sales?

2. Now you try it

In your notebook, or using a word processor, complete the following risk/reward table to score each solution according to the risks and rewards it presents. Assign a score of High, Moderate, or Low to each option. Identify the preferred alternative.

Option	Potential Reward	Potential Risk
Increase tour prices		
Offer popular tours more often		
Cut expenses, including staff		

Explain why you assigned the scores you did.

Chapter 1: Technology @ Work Crowdsourcing

Explore crowdsourcing sites. Complete the following steps.

1. Get ready

1. Open a Web browser such as Internet Explorer or Firefox, and go to a Web site that relies on crowdsourcing:
   Public Consultation Platform: https://istitlaa.ncc.gov.sa/ar/About/Pages/default.aspx
   Project Gutenberg: http://www.gutenberg.org
   National Business Innovation Portal: https://www.fikra.sa/
2. Explore the Web site and learn how to participate; sign up and participate, if possible.
3. Take at least three screenshots of your activities on the Web site.

2. Now you try it

Using a word processor, paste at least three screenshots of your activities on a crowdsourcing Web site into a new document. Alternatively, describe your activities in your notebook.

Chapter 2: Lesson 2 Developing Alternatives

Practice developing alternatives by generating a list of alternatives. Complete the following steps.

1. **Get ready**

   Read the following description of a problem.

   Problem: The main problem is that the travel company you're working at needs to increase its revenue. It also needs to improve its educational tours, which customers report are not very interesting. (An educational tour involves some type of instruction, such as on-site lectures about the history of a place, cooking classes, or art workshops.)

2. **Now you try it**

   Use a technique discussed in the "Developing Alternatives" lesson to generate a list of six ways the company can improve its educational tours.

Chapter 2: Lesson 3 Evaluating Options

Practice evaluating options by selecting an option and then explaining why you selected it. Complete the following steps.

1. **Get ready**

   Read the following description of a problem and possible solutions.

   Problem: One of the subproblems for the travel company you're working at is that its educational tours are not very popular.
   Possible solutions:

   - Create a partnership with an established educational tour company
   - Focus on one type of educational tour, such as cooking classes
   - Add a class or workshop to every cultural and adventure tour
   - Coordinate with on-site schools

2. **Now you try it**

   Review the list of possible solutions to the problem of unpopular educational tours and then complete Table 1 or Table 2 according to the guidelines in the "Evaluating Options" lesson.

TABLE 1: Comparing options

Options for improving educational tours						
	A	B	C	D	Row Sum	Rank
A. Create a partnership						
B. Focus on one type						
C. Add class/workshop to each tour						
D. Coordinate with schools						

1 = This option is better than the other option
0 = This option is not better than the other option

TABLE 2: Ranking and weighting options

Improving educational tours									
Each alternative = 25%	Easy to do		Popular with customers		Compared to competition		Amount of revenue		
	Points	Score	Points	Score	Points	Score	Points	Score	Total Score
Partnership									
One type									
Add class/workshop to tour									
On-site schools									

Points: Rank each option by assigning 1–5 points for each criterion
Score: Multiply the points by 25 for each option

Chapter 2: Lesson 4 Implementing the Solution

Practice implementing solutions by identifying why a solution was not successful. Complete the following steps.

1. Get ready

Read the following description of the events leading to a solution for the problem of improving educational tours at the travel company you're working for.

1. Asma, vice president of operations at the company, asked Rasheed to look into the problem of improving the educational tours and to help her implement a solution.
2. Rasheed gathered and analyzed some data, developed alternatives, and evaluated the options. He decided that adding a class, workshop, or other learning experience to each tour was the best way to solve the problem because that solution was the most popular with customers.
3. Rasheed talked to the tour developers and asked them to add an educational experience to each of their tours. When a few tour developers objected, saying specialized classes required too much effort and expense, Rasheed said they should start by adding just one class to one tour.
4. When Asma received reports from the tour developers requesting extra funds for the classes, she was not pleased. In fact, she told the tour developers to stop planning the classes until further notice.
5. Rasheed was very disappointed. He wanted to surprise Asma with a complete, successful program, and thought Asma would be delighted by his initiative.

2. Now you try it

List the reasons the solution was not successful.

Chapter 2: Lesson 5 Monitoring and Managing the Solution

Practice monitoring and managing the solution by describing how you would monitor a problem and solution. Complete the following steps.

1. Get ready

Read the following description of a problem and solution.

Problem and solution: The problem is the main one the travel company you're working at have been working on: to increase sales of their tours. The solution they selected is to offer the company's most popular tours more often. Three of the most popular tours are to Dammam, Abha, and Ha'il.

2. Now you try it

List the general steps the company should follow to monitor the solution they selected. Give specific examples about the kinds of activities they can perform.

Chapter 2: Lesson 6 Verifying the Solution

Practice verifying the solution by testing a solution with a worst-case scenario. Complete the following steps.

1. Get ready

Read the following description of a problem and solution.

Problem and solution: The travel company you're working at needs to increase sales of its tours. The solution is to offer the company's most popular tours more often. Three of the most popular tours are to Dammam, Abha, and Ha'il. The solution will be successful if sales to all tours increase by 12% in a year. That means enrollment in these three tours must increase by 20%.

2. Now you try it

1. Describe the worst-case scenario for this problem.
2. List at least two ideas to avoid the scenario.

Chapter 2: Technology @ Work Mashups

Explore online mashups and RSS feeds. Complete the following steps.

1. Get ready

1. Open a Web browser such as Internet Explorer or Firefox, and go to a Web site that provides mashups or uses RSS feeds:
   Saudi Ministry of Health: https://www.moh.gov.sa/en/Pages/default.aspx
2. Explore the Web site to discover how it uses RSS and mashup technology (for example, the interactive map).
3. Take at least three screenshots of your activities on the Web site.

2. Now you try it

Using a word processor, paste at least three screenshots of your activities into a new document. Alternatively, write down a description of your activities in your notebook.

Chapter 3: Lesson 2 Overcoming Obstacles to Critical Thinking

Practice overcoming obstacles to critical thinking by reacting to a scenario. Complete the following steps.

1. Get ready

Read the following statement and the reactions to it. Each reaction includes an obstacle to critical thinking.

Statement: The travel company you're working at can increase tour sales by promoting Dammam tours more aggressively.

Reactions:

1. I really think promoting Dammam tours is the right solution to the company's problem. And I am usually right.
2. Everyone in the travel business believes that increasing promotion results in increased sales.

2. Now you try it

Identify the obstacle in each reaction.

Chapter 3: Lesson 3 Becoming a Critical Thinker

Practice becoming a critical thinker by identifying the habits of critical thinkers. Complete the following steps.

1. Get ready

Read the following statements and consider whether each one describes a critical thinker.

1. It is unlikely that any overseas tour assistant will ever develop good customer service skills.
2. I assumed that the new tour assistant does not value promptness, but after talking to her, I think that assumption is wrong.
3. Based on my limited knowledge of business management, I recommend additional training for the new tour assistant.
4. I'll try to help the new tour assistant improve her time and customer management skills. But if that doesn't increase tour enrollments, I give up. Someone else can tackle this problem.

2. Now you try it

Decide whether each statement describes a critical thinker. Identify which habit each critical-thinking statement demonstrates.

Chapter 3: Technology @ Work Electronic Books

Explore electronic books. Complete the following steps.

1. Get ready

1. Open a Web browser such as Internet Explorer or Firefox, and go to the Amazon Web site at amazon.com.
2. Search for information about the Kindle.
3. Find a video or other explanation of how the Kindle works.
4. Find other sources of reading materials available for the Kindle, such as online reviews and articles.
5. Take at least three screenshots of your activities researching the Kindle.

2. Now you try it

Using a word processor, paste at least three screenshots of your research activities into a new document. Alternatively, describe your research activities in your notebook.

Chapter 4: Lesson 2 Evolving from a Group to a Team

Practice evolving from a group to a team by analyzing descriptions of group meetings. Complete the following steps.

1. Get ready

For each description of a meeting listed in Step 2, consider which team-building phase each meeting represents.

Phase 1: Socialize
Phase 2: Organize
Phase 3: Share
Phase 4: Solve problems

2. Now you try it

1. Omar meets with other company employees to discuss the mission and purpose of exploring business travel services.

Phase:

2. Employees meet to collaborate on materials that promote the company's business travel services.

Phase:

3. Ebtesam meets with other employees to get acquainted before dealing with the new business travel project.

Phase:

4. Omar organizes a lunch meeting so that members of the new business travel team can develop personal connections.

Phase:

5. During a meeting of the business travel team, Ebtesam schedules a work session for identifying tours that appeal to business travelers.

Phase:

6. At the beginning of a meeting of the business travel team, Omar sets a schedule so that everyone on the team can meet once a week.

Phase:

Chapter 4: Lesson 3 Using Divergent Thinking

Practice using divergent thinking by generating solutions to a problem. Complete the following steps.

1. Get ready

The travel company you're working at wants to offer new types of tours that will appeal to business travelers. Prepare to use the free writing technique to generate tour ideas.

2. Now you try it

Use the free writing technique to generate tour ideas as follows:

1. For one minute, think of the types of tours and destinations that would appeal to various business travelers, including salespeople, managers, owners, and staff members.
2. For five minutes, write down any ideas you have for increasing business travel. Write nonstop during this period without pausing to read or edit your work.

Chapter 4: Lesson 4 Using Convergent Thinking

Practice using convergent thinking by generating solutions to a problem. Complete the following steps.

1. **Get ready**

   At the travel company you're working at, one idea generated during divergent thinking activities was to expand the company Web site to provide general services for business travelers. The Web site would let business travelers do the following:

   - Find information about destinations
   - Request services from the travel company staff, such as group accommodation, travel reservations, and event planning
   - Look up information about flights, tours, excursions, and reservations

2. **Now you try it**

   Use a convergent thinking technique to evaluate the problem of whether the company should expand its Web site to include services for business travelers.

Chapter 4: Lesson 5 Reaching Closure

Practice reaching closure by reviewing a decision and choosing how to reach closure. Complete the following steps.

1. **Get ready**

   The travel company you're working at is deciding whether to open a new department dedicated to business travel. This department would coordinate travel arrangements for corporate travelers, focusing on special tours such as employee incentive trips, executive retreats, and conference and event tours.

   During a meeting, the company corporate travel team will determine whether to recommend creating the new business travel department or not. Some members of the team want to create the new department, others do not want to create the new department, and a few are undecided.

2. **Now you try it**

   Describe how you would reach closure during the meeting.

Chapter 4: Lesson 6 Building Sustainable Agreements

Practice building sustainable agreements by creating an action plan for a project. Complete the following steps.

1. Get ready

Read the following details for a project to expand the Web site at the travel company you're working at to offer business travel services.

Expanding the company Web site to provide business travel services:

- Hasan can design the Web pages. He estimates he needs about 5 hours and SAR 250 to do this.
- The Web pages should be designed June 1–5.
- Overall budget is SAR 2000.
- The tour database also needs to be expanded. Asma is in charge of this task. She needs SAR 150 and 8 hours per week during June 1–15 to complete this task.
- Hasan and Ebtesam can work together to create and test the Web pages from June 8–22. This will cost SAR 500 and take 10 hours to complete.
- Ebtesam can also work with Asma to add the new Web pages to the Web site and then maintain them. Starting June 24, this will take SAR 20 and 2 hours per week.
- The Web site needs to be promoted starting June 24. Hasan is in charge of this task. He needs SAR 500 plus SAR 50 per week. He estimates he'll also need 10 hours per week to promote the Web site.

2. Now you try it

Use the following form to complete the action plan in your notebook or using a word processor.

Action Plan:				
Objective: **Budget:**				
Action	**Cost**	**Time**	**Schedule**	**Assigned to**
•				
•				
•				
•				
•				
Start-up expenses				
Weekly expenses				

Chapter 4: Technology @ Work Online Scheduling Tools

Explore online scheduling tools. Complete the following steps.

1. Get ready

1. Open a Web browser such as Internet Explorer or Firefox, and go to the Doodle Web site at doodle.com.
2. Follow the steps to schedule an event, inviting yourself, your instructor, and at least one classmate.
3. Follow the poll results as you receive them.
4. Take a screenshot of the results.

2. Now you try it

Using a word processor, paste the screenshot of your results into a new document. Alternatively, describe your results in your notebook.

Chapter 5: Lesson 2 Modeling Decisions Quantitatively

Practice modeling decisions quantitatively by selecting a solution. Complete the following steps.

1. Get ready

Review the responses to the following questions, which are related to whether the travel company you're working at should open a branch office.

Do you think the company should open a branch office?

Rating	Number of responses
5 – Strongly agree	8
4 – Agree	8
3 – Neutral	2
2 – Disagree	2
1 – Strongly disagree	0

If the company does open a branch office, should it be in Jeddah?

Rating	Number of responses
5 – Strongly agree	6
4 – Agree	4
3 – Neutral	4
2 – Disagree	3
1 – Strongly disagree	3

If the company does open a branch office in Jeddah, should it be on our client's corporate campus?

Rating	Number of responses
5 – Strongly agree	4
4 – Agree	4
3 – Neutral	4
2 – Disagree	5
1 – Strongly disagree	3

If the company does open a branch office, should it be in Khobar?

Rating	Number of responses
5 – Strongly agree	6
4 – Agree	6
3 – Neutral	5
2 – Disagree	3
1 – Strongly disagree	0

2. Now you try it

Answer the question of whether the company should open a branch office, and if so, where.

Chapter 5: Lesson 3 Describing Data Objectively

Practice describing data objectively by calculating statistics. Complete the following steps.

1. Get ready

Review the following statistics for business tours:

1 – Jeddah city tour
2 – Riyadh city tour
3 – Dammam city tour
4 – Abha city tour

Month	Top Tour
January	2
February	4
March	2
April	3
May	2
June	1
July	3
August	1
September	2
October	2
November	4
December	2

2. Now you try it

Decide on the most popular tour for business travelers.

Chapter 5: Lesson 4 Weighing Factors

Practice weighing factors by assigning weights and calculating results. Complete the following steps.

1. Get ready

Consider an important decision that you need to make in your personal life, education, or career development. This could be choosing the right product to buy from a range of options, or which career path to choose as you get older.

2. Now you try it

1. Follow the steps in Lesson 4 in Chapter 5 to help you make the correct decision: identify the most important decision variables and determine the appropriate weights (the normalizing variables step may not be necessary).
2. Has this process helped you to make a decision? Remember to consider the runners-up. Remember that the weights you assign are subjective. In this case, would a small variation affect the outcome? In your notebook, or using a word processor, list the variables and their associated results, then explain how you arrived at your decision.

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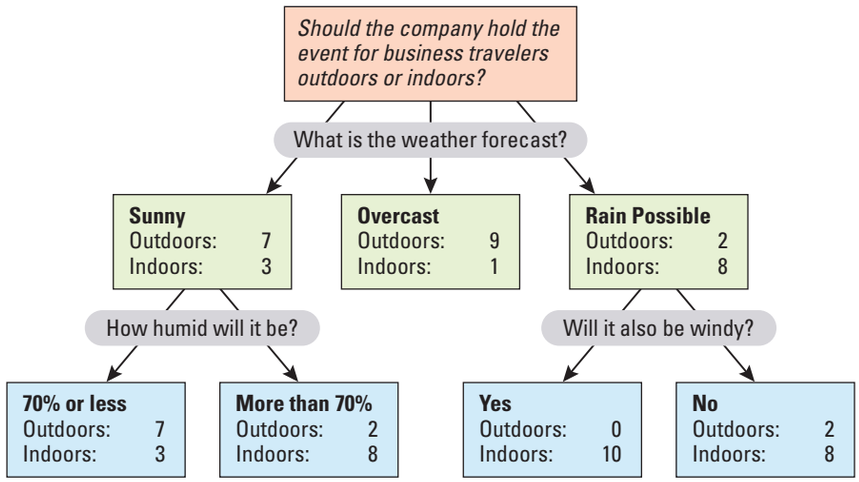
Chapter 5: Lesson 5 Creating Decision Trees

Practice creating decision trees by completing a diagram. Complete the following steps.

1. Get ready

The travel company you're working at is considering whether to organize an event for business travelers to promote the popular Riyadh city tour. The event would take place at King Abdullah Park in Riyadh. The company would serve food from under a large canopy, but otherwise the event would take place out in the open. Depending on the weather forecast, the company could also hold the event in a nearby event hall.

Below the diagram is a description of the decisions in the decision tree.



According to the diagram:

- If the weather is sunny, 7 people say the event should be outdoors and 3 people say it should be indoors (perhaps because it is too hot).
- If the humidity is over 70%, however, only 2 people say the event should be outdoors and 8 people say it should be indoors.
- If the humidity is 70% or less, 7 people still say the event should be outdoors and 3 people say it should be indoors.
- If it is overcast,
- If rain is possible,

2. Now you try it

Complete the description of the diagram to help the company make its decision.

Considering all of the factors and decisions in the decision tree, should the company hold the event for business travelers indoors or outdoors?

Chapter 5: Lesson 6 Using Graphics to Display Data

Research Web sites that use graphics to display data. Complete the following steps.

1. Get ready

1. Open a Web browser such as Internet Explorer or Firefox, and go to the following site:
   Saudi Vision 2030: www.vision2030.gov.sa
2. Explore the Web site and find examples of graphics that display data.
3. Take three screenshots of examples.

2. Now you try it

Using a word processor, paste the screenshots of your results into a new document, describing how the examples succeed in presenting the information. Alternatively, describe your results in your notebook.

Chapter 5: Technology @ Work Spreadsheet Tools

Explore spreadsheet tools. Complete the following steps.

1. Get ready

1. Open a Web browser such as Internet Explorer or Firefox, and go to each of the sites mentioned in this lesson:
   Microsoft Office: www.office.microsoft.com/excel
   Google Docs: www.google.com/docs
   OpenOffice Calc: www.openoffice.org/product/calc.html
   Gnumeric: http://gnumeric.org
   Apple Numbers: www.apple.com/iwork/numbers
2. Identify the top two or three pros and cons for each program.

2. Now you try it

List the pros and cons of each spreadsheet program.

Glossary

Action plan A plan that summarizes the activities the group and other members of the organization agree to perform to make sure the project succeeds.

Argument (1) A set of one or more claims that supports a particular conclusion. (2) A value or cell reference that a function uses in its calculations.

Arithmetic mean The value of a set of data that is usually referred to as the average. The mean is a single value and describes the data in general by showing its central tendency.

Assumption A proposition or claim that is taken for granted as though it were known to be valid.

Brainstorming A creativity tool for generating ideas and alternatives. A brainstorming session usually starts by defining a problem, and then listing possible solutions as they occur to you, whether they are obvious, impractical, or far-fetched. The goal is quantity, not quality.

Cause The reason for or the origin (root) of a change, such as customers being unable to afford travel vacations.

Claim A statement that someone says or writes about a topic.

Collective wisdom The shared knowledge and experience a group of people can apply to a problem.

Convergent thinking Thought processes or methods that narrow options to a manageable set.

Critical thinking The thoughtful, deliberate process of deciding whether you should accept, reject, or reserve judgment about a particular idea. The goal of critical thinking is often to improve choices and reduce the risk of adopting or acting on a flawed assumption.

Crowdsourcing A way of using groups to solve problems. The groups are usually online communities, such as members of a blog or visitors to a Web site, called a crowd. An organization broadcasts a problem to the crowd as an open call for solutions. The crowd submits solutions, and then the organization sorts through them, finding the best ones. The organization selects and owns the ultimate solution, and sometimes rewards members of the crowd.

Dashboard A window that graphically summarizes information about how a business is operating.

Decision A choice you make when faced with a set of options or alternatives.

Decision balance sheet A formal way of organizing an idea's costs and benefits.

Decision model One or more formulas that includes all of the relevant variables and calculates a result.

Decision support system (DSS) Interactive software designed to help you compile useful information from raw data, documents, and business knowledge.

Decision tree A support tool that models decisions using a tree-like diagram. Each branch of the tree represents a different option and its associated benefits, costs, and likelihood.

Divergent thinking Thought processes or methods used to generate ideas.

Evaluation criteria The variables that drive your decisions.

Fact A claim that is considered to be true.

Factual matter A claim about which you can collect and analyze data. This term suggests that you are not certain the claim is a fact, but could prove or disprove if necessary.

Fatal flaw An aspect of an idea that would make it unacceptable for some reason.

Group Two or more people who interact with each other, share expectations and obligations, and develop a common identity as a group.

Group dynamics The way that people work and interact with each other.

Groupthink When groups become so cohesive that the members minimize conflict and support consensus without critically considering the merits of ideas and decisions.

Impact analysis A way of evaluating the effects of an idea or alternative.

Indicators Words that signal the speaker is stating a premise or a conclusion.

Intuition Your knowledge of something without having to discover or learn it; typically your first reaction to a problem or question. When you solve a problem intuitively, you react immediately and instinctively, without following a particular procedure.

Issue Any challenging subject that you discuss, dispute, or review. An issue is different from a simple topic of conversation because it raises questions or concerns.

Median The value of a set of data that separates the higher values from the lower values.

Mode The value in a set of data that occurs most frequently. The mode does not have to be a unique number.

Model To create a numeric representation of the situation.

Normalization A way to make all of the data consistent with your decision model.

Opinion A claim that someone believes is true.

Organizational memory The history and culture that a group must function in, including the various processes, personalities, and subtleties of how the organization operates.

Outlier A value that is extremely high or low, or an experience that is extremely good or bad.

Output variable A value in the results that could change if the decision variables change.

Pecking order A hierarchy; the organization of people at different ranks in an administrative body.

Premise What you claim or contend.

Problem In an organization, an obstacle that stands in the way of achieving a desired goal. In short, a problem is the difference between the current state and where you want to be.

Problem statement A clear, concise description of the problem and the effect you expect from the solution.

Risk An exposure to a chance of loss or damage.

Social conditioning Conditioning that encourages you to accept the traditions and values of your social group. Social conditioning helps you feel part of the greater whole, but it can also prevent you from considering unpopular alternatives.

Stakeholder A person who is affected by a problem or decision, or whose involvement you need to resolve the matter.

Standard deviation A measure of the variability of a set of data.

Symptom Evidence of a change, such as a decrease in revenue.

Synergy When two or more people work together to produce something greater than the sum of their individual efforts.

Systematic Doing something such as solving a problem in a methodical and organized manner. Systematic problem solving takes a reasoned, rational approach and is appropriate for larger, more complicated problems or situations that involve a lot of risk.

Team A group of people who organize themselves to work cooperatively on a common objective.

Three Pile method A technique for reducing ideas to a manageable number.

Worst-case scenario A situation or conclusion that could not be any worse; the worst possible outcome.

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