Making Strategies
and Decision
Problem Solving
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Introduction

The Problem Solving and Decision Making Strategies course consists of 6 modules:

- Problem Solving: The Fundamentals
- Problem Solving: Determining and Building Your Strengths
- Problem Solving: Digging Deeper
- Decision Making: The Fundamentals
- Decision Making: Tools and Techniques
- Decision Making: Making Tough Decisions

In the first module, you will learn that problem solving involves goal-oriented thinking and action in situations for which no ready-made solutions exist. You will also learn how you can greatly improve your problem-solving effectiveness by gaining a better understanding of the problem-solving process, essential skills, and required competencies, as well as an awareness of the mind traps and pitfalls that impair the process. This module takes you through the essentials of problem solving and explores some of its challenges.

- sequence key activities performed in the six-step problem-solving model
- recognize the effects of five types of mind traps
- determine how to counteract the effects of problem-solving traps exhibited in a given scenario
- recognize activities that demonstrate the type of skills best suited to resolve a given type of problem
- match problem-solving competencies to their descriptions

In the second module, you will learn how to assess and develop your problem-solving skills, and also aims to help you recognize and overcome several types of bias. The module first takes you through the process of assessing and interpreting your existing problem-solving styles. It then introduces approaches for identifying areas for improvement in your problem-solving skill set and recommends
strategies for enhancing key skills. Finally, it explains how to recognize and overcome biases in a problem-solving situation.

- interpret a problem-solving style chart
- recognize sound approaches for identifying areas for improvement in your problem-solving skill set
- recommend strategies for building needed problem-solving skills in a given scenario
- classify the type of bias exhibited in a scenario
- identify tactics for handling bias in problem solving

In the third module, you will learn how to recognize the value of honest, fact-based analysis and it demonstrates how the application of a few tools greatly assists you when determining the root cause of a problem and the best solution. This module first discusses problem analysis, illustrates steps to follow when analyzing problems, and outlines the tools used for uncovering the root causes. It then describes how to use evaluation and analysis when choosing the best solution from the alternatives available, as well as some of the tools you can use to assist in your endeavors.

- recognize when to use specific fact-based analysis tools
- apply the steps in a five-why analysis to determine the root cause of a problem
- apply the steps in a cost-benefit analysis to determine the best solution to a problem

In the Fourth module, you will learn about the fundamentals of decision making and it will illustrate techniques to help you become an effective decision maker. This module first walks you through the steps of a widely accepted decision-making process. Then it leads to a description of the factors influencing your decision-making style and shows how to adapt that style to suit a given situation. So you'll have everything you need to start on the road to becoming an effective decision maker.
• sequence examples of the steps in the decision-making process
• match each example with the decision-making style it best exemplifies
• adapt your decision-making style to suit a given situation

In the Fifth module you will learn how to use a variety of tools and techniques at the three most important steps of the decision-making process: generating, evaluating, and choosing between alternative modules of action. Nominal group technique (NGT) is used to brainstorm and prioritize options as a team. Return on Investment (ROI) measures distill the costs and benefits of each alternative into a monetary value, thus enabling you to easily compare your options on financial terms. Three other decision-making tools – the devil's advocate technique, Plus/Minus/Interesting (PMI) analysis, and the ease-and-effect matrix – provide alternate methodologies for challenging and evaluating alternatives before making a decision. Equipping yourself with these tools will ensure you have an edge when you're facing an important decision.

• distinguish between the last three steps in the decision-making model
• recognize how to perform key steps as the leader of a nominal group technique session
• use ROI measures to choose between alternatives
• distinguish between three decision-making tools

In the sixth module you will learn how there are many situations that can make decision making particularly challenging, such as when you have to weigh very similar or very disparate alternatives then make compromises and trade-offs between them. Another situation is when you have to determine whether to trust logic, intuition, or some combination of the two.

This module will also review a number of these decision-making challenges and introduces strategies for dealing effectively with
uncertainty, making informed trade-offs using a systematic process, and placing appropriate trust in your intuition when making difficult decisions.

- recognize how to deal effectively with uncertainty in decision making
- using a consequence matrix, make a decision that involves a trade-off
- recognize the proper role of intuition in decision-making

You may use this manual to review and highlight important concepts as you progress through the media presentation.

Enjoy your course!
In this module, you will learn that problem solving involves goal-oriented thinking and action in situations for which no ready-made solutions exist. You will also learn how you can greatly improve your problem-solving effectiveness by gaining a better understanding of the problem-solving process, essential skills, and required competencies, as well as an awareness of the mind traps and pitfalls that impair the process. This module takes you through the essentials of problem solving and explores some of its challenges.

The following lessons are covered in this module:

Lesson 1: Problem solving Essentials
Upon completion of this lesson, you will be able to:

- sequence key activities performed in the six-step problem-solving model
- recognize the effects of five types of mind traps
- determine how to counteract the effects of problem-solving traps exhibited in a given scenario
- recognize activities that demonstrate the type of skills best suited to resolve a given type of problem
- match problem-solving competencies to their descriptions
problem solving is the mental process you follow when you have a goal but can't immediately understand how to achieve it. It's a process that depends on you – how you perceive a problem, what you know about it, and the end-state you want to reach.

Solving a problem involves a number of cognitive activities:

- Ascertaining what the problem really is
- Identifying the true causes of your problem and the Opportunities for reaching your goal
- Generating creative solutions to the problem
- Evaluating and choosing the best solution, and
- Implementing the best solution, then monitoring your actions and their results to ensure the problem is solved successfully

Clearly, problem solving isn't a one-step process. Your success will depend on whether you approach and implement each of the stages effectively. The best way to do this is to use a well-established, systematic problem-solving model.

The six steps of problem solving

Problems vary widely, and so do their solutions. Sometimes a problem and its solution are clear, but you don't know how to get from point A to point B. At other times, you may find it
hard to define what's wrong or how to fix it. Regardless of what a problem is, you can use a six-step problem-solving model to address it. This model is highly flexible and can be adapted to suit various types of problems. It also comes with a flexible set of tools to use at each step. The model is designed to be followed one step at a time, but you may find that some stages don't require as much attention as others. This will depend on your unique situation.

The steps in the problem-solving model are as follows:

1. Define the problem
2. Analyze the problem
3. Identify as many potential solutions as you can
4. Choose the best solution
5. Plan of action
6. Implement the solution

1. Define the problem –

Defining the problem is a crucial step that involves digging deeper to identify what it is that needs to be solved. The more clearly a problem is defined, the easier you'll find it to complete subsequent steps. A symptom is a phenomenon or circumstance that results from a deeper, underlying condition. It's common to mistake symptoms for problems themselves – and so to waste a lot of time and effort on tackling consequences of problems instead of their causes. To define a problem, you can use gap analysis, which involves comparing your current state to the future state you want to be in, to identify the gaps between them.
2. Analyze the problem –

You decide what type of problem it is – whether there's a clear barrier or circumstance you need to overcome, or whether you need to determine how to reach a goal. You then dig to the root causes of the problem, and detail the nature of the gap between where you are and where you want to be. The five-why analysis is a tool that'll help you get to the heart of the problem. Ask "Why?" a number of times to dig through each layer of symptoms and so to arrive at the problem's root cause. You can get to the root of a more complicated problem using a cause-and-effect diagram. A cause is something that produces an effect, result, or consequence – or what contributed to the current state of affairs. Categories of causes include people, time, and the environment.

3. Identify as many potential solutions as you can –

Brainstorm creatively – ask lots of questions about the who, what, where, when, and how of the causes to point to various possibilities. Don't limit yourself by considering practicalities at this stage; simply record your ideas.

4. Choose the best solution –

In evaluating your ideas, more options could present themselves. You could do this by rating each possible solution you came up with in step 3 according to criteria such as how effective it will be, how much time or effort it will take, its cost, and how likely it is to satisfy stakeholders.
5. Plan of action –

During this step, you determine what steps must be taken, designating tasks where necessary. And you decide on deadlines for completing the actions and estimate the costs of implementing them. You also create a contingency plan in case of unforeseen circumstances so that if anything goes wrong with your plan, you have a "plan B" in place. Typically, this stage involves narrowing down the possible ways to implement the solution you've chosen, based on any constraints that apply. You also should draw up an action plan. The complexity of the plan will depend on the situation, but it should include the who, what, and when of your proposed solution.

6. Implement the solution –

This is an ongoing process. You need to ensure the required resources remain available and monitor progress in solving the problem; otherwise, all the work you've done might be for nothing.

Remember that this model is highly adaptable. Although you shouldn't skip any of the six steps, you can tailor the amount of time you spend on each stage based on the demands of your unique situation.

The six-step problem-solving model, and the tools it provides, is an effective, systematic approach to problem solving. By following each step consciously, you can ensure that generating solutions is a fact-driven, objective, and reliable process. It encourages you to dig deeper to the root cause, allows you to get input from others, to be creative when finding solutions, and to monitor your solutions to
make sure they're working. So by following this model you're more likely to come up with good, original, lasting solutions.

To solve problems effectively, you need to use a good problem-solving model. The six-step model is a tried-and-tested approach. Its steps include defining a problem, analyzing the problem, identifying possible solutions, choosing the best solution, planning your course of action, and finally implementing the solution while monitoring its effectiveness.

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The two main types of barriers to problem solving are mind traps and process traps:

- **Mind traps** are internal. They reside in the mind of the problem solver.
- **Process traps** are external. They're problems or mistakes in the approach used to solve a problem.

Mind traps can prevent you from understanding what the real problem is, pinpointing its causes, or "thinking outside the box" to come up with helpful solutions.

**Types of mind traps**

Common mind traps that prevent effective problem solving include:

- Being influenced by people's initial ideas
- Defending prior choices,
• Selecting supporting information based on bias people already have,
• Making assumptions,
• Conformity.

Initial ideas

A popular saying states that "first impressions last." When considering a problem, the same can be said of first thoughts – the initial ideas you have when first considering the problem. The starting point of your thinking – whether an idea, a particular fact, an estimate, or something else – usually influences your subsequent thinking about the problem.

The initial ideas trap is most likely to affect the second and fourth steps of the problem-solving model – when you analyze a problem and when you choose what appears to be the best solution. Initial ideas about the nature of the problem and the best way to address it can color your thinking at these steps and prevent you from engaging in honest, thorough analysis of problems and solutions. It's important to avoid this mind trap because the roots of a problem are often deep; and if the problem and solutions are not analyzed properly, you could end up with less effective solutions.

Defending prior choices

When you're faced with a problem, it can be tempting to make a decision that protects your previous decisions. This is particularly true if your prior choices involved costs to you or your company. If you've already invested in a decision, it's hard to change it – even if doing so would be much less
costly in the long run. This mind trap has a particularly strong impact on the fourth step of the problem-solving model – when you choose what seems the best alternative from possible solutions.

Initial bias

Even when people try to be neutral, mentally they've often decided on an alternative before they even begin investigating. As a result, it's common to seek out supporting information that confirms an initial bias. The trap of selecting supporting information based on an initial bias is especially likely to affect the second, fourth, and sixth steps of the problem-solving model:

• **Step 2: Analyzing the problem** – Your analysis of a problem will depend on the information you use. But your initial bias about which alternative solution is best can influence your decisions about where to collect information and about which information is significant. This becomes a cycle – because you're selective in choosing data, it in turn appears to confirm your original bias. Your analysis of a problem will depend on the information you use. But your initial bias about which alternative solution is best can influence your decisions about where to collect information and about which information is significant. This becomes a cycle – because you're selective in choosing data, it in turn appears to confirm your original bias.

• **Step 4: Choosing the best solution** – Because initial bias skewed the evidence on which you based your problem analysis, your interpretation of the solution will also be skewed. Also, you may be more likely to
choose an alternative you originally favored than to seriously consider other alternatives.

- **Step 6: Implementing the solution and reviewing progress** – You're likely to be more lenient in judging the success of a solution if it's one you originally favored. You'll eagerly seek evidence that it's working, and may discount evidence that it's not.

**Assumptions**

Even if an assumption appears reasonable or based on common sense, by nature it's a belief that hasn't been verified. Especially when assumptions are strongly held, they can lead problem solvers to overlook or even ignore the facts. The first four steps in the problem-solving model are particularly vulnerable to the mind trap of assumptions.

**Conformity**

By nature, human beings are social creatures. Whether people like it or not, the actions of others often influence them. This leads to another type of mind trap – that of conformity. Conformity, or "groupthink," can lead problem solvers to accept the consensus of a group instead of being critical in assessing a problem and its possible solutions.

The conformity trap can impact every step of the problem-solving model but is likely to affect the fourth and sixth steps most. In a group, everyone else's support for a particular solution may convince you – or even pressure you – to support it too. And when it comes time to evaluate the success of the solution, the group may have a vested interest in reaching a positive conclusion.
The mind traps that commonly compromise the problem-solving model are consequences of the way people naturally think and behave. However, you can overcome these barriers by being aware of them, and by selecting and using the appropriate process tools.

Problem solving can be hampered by a variety of mind traps, which include holding on to initial ideas; defending prior choices; selecting supporting information in a way that supports bias; making assumptions; and succumbing to conformity. Each step in the problem-solving model is more vulnerable to certain mind traps than to others, but all traps impair your ability to solve problems objectively and systematically.
Ind traps can seriously derail the problem-solving process, but fortunately, you can use a variety of strategies to counteract their effects.

To counteract the trap of initial ideas, you should explore different sources and perspectives. By broadening your horizons, you're more likely to find the real roots of a problem and to generate a wider range of possible solutions. You should follow this guideline whenever you problem solve, but it's especially important during the earliest steps of the problem-solving model.

To minimize the trap of defending prior choices, you should:

- **Give your goals priority** – focus on achieving a particular goal rather than becoming attached to a particular decision or process
- **Get a neutral opinion** – consult someone who does not have a vested interest in your prior decisions, and
- **Accept your mistakes**, remembering that everybody makes mistakes sometimes and that it's better to move on than to hold onto past decisions

To avoid selecting supporting information, you should ask yourself and others open questions such as "What are your thoughts on this solution?" – rather than asking leading
questions such as "Why should I be keen about this solution?" Another good strategy is to examine counterarguments and information that conflicts with your own views.

One way to fight the trap of assumptions is to identify what your assumptions are and check their validity. Take the position of an outsider and ask basic questions to challenge your assumptions, like "Why do I think this way?" or "Why do we do things like this?" Another strategy is to focus on data. Investigate hard data, rather than relying on mental simplifications or falling victim to personal bias. You can also change the way you view the problem – restate the problem in new terms or break it down into its simplest components.

To protect yourself from the trap of conformity, shield yourself from social influence and persuasion. Remember that the popular opinion is not always correct. You should also be willing to defend well-founded viewpoints, even if they are unpopular.

Problem-solving process traps

Mind traps aren't the only pitfalls to watch out for in problem solving. Process traps, which are flaws or errors in the way the problem-solving model is approached, can also prevent you from finding effective solutions.

Four main types of process traps are common:

1. Failing to involve the right people
2. Taking on problems that are too vague
3. Bypassing analysis
4. Failing to plan or evaluate the implementation
1. **Failing to involve the right people**-

Those who know a problem best and are by it directly – is a common mistake. It can result in you choosing a solution based on insufficient information that isn’t viable or suitable.

2. **Taking on problem that are too vague**-

It can be frustrating and demotivating to take on a problem that’s too big, vaguely defined or general. This type of process trap can cause confusion and loss of momentum.

3. **Bypassing analysis**-

Problem solvers often bypass the analysis stage if they’re under pressure to produce solutions. This can result in superficial causes being blamed, or weak and faulty solutions being accepted.

4. **Failing to plan the implementation of a chosen solution or evaluation of its success** –

Sometimes, just coming to a solution is so exhausting that problem solvers give up when it comes to planning how to implement the solution and evaluate its performance. This can prevent a potentially viable solution from succeeding.

You can avoid common process traps by ensuring you use a systematic and well-defined problem-solving model. In the six-step model, each of the steps prevents particular types of process traps:
• **Failing to involve the right people –**

You address the trap of failing to involve the right people when you first define and analyze a problem, and assemble a problem-solving team. Assembling a team is not an "official" part of the six-step model, but it is vital for ensuring you get the most relevant information you can about a problem and its possible solutions.

• **Taking on problems that are too vague –**

The step of defining a problem clearly can prevent you from attempting to address problems that are too large or vague. By defining a problem well, you make it discrete – and ensure it can be subjected to further, useful analysis.

• **Bypassing analysis –**

In the six-step model, the steps of analyzing a problem, identifying possible solutions, and choosing the best solution ensure that you don't misdiagnose a problem, or simply accept the first feasible idea for addressing it. They encourage you to dig deeper, assess possible causes and solutions, and be critical.

• **Failing to plan or evaluate the implementation –**

The steps of planning action and implementing the solution and reviewing progress ensure that you don't fail to plan how to put a solution into action, to evaluate its success, and to have a backup plan in case it isn't working.
Recognizing and addressing traps

Perhaps the most dangerous trap of all is one that lurks behind all the other traps – that of complacency. If you're complacent, you'll fail to be vigilant to the traps, and it's unlikely you'll identify problems clearly or arrive at the best possible solutions.

To counter complacency, it's essential that you remain alert and aware of how various mind and process traps can compromise your effectiveness in solving problems. It's also critical that you be honest about your own weaknesses and encourage others to alert you to these when necessary.

Problem solving can be hampered by a variety of both mind traps and process traps. Common process traps include failing to involve the right people, taking on problems that are too vague, bypassing analysis, and failing to plan solution implementation and evaluation. You can overcome process traps by using a systematic problem-solving model. You can also use specific strategies to overcome each of the common mind traps.
Psychologist Robert Sternberg identified three types of intelligence, which all people use at some time or another:

1. Analytical intelligence involves the use of logic and reason to maneuver from A to B.
2. Practical intelligence involves finding the best fit between your actions and the demands of the situation, often by applying skills learned through experience.
3. And Creative intelligence involves thinking "outside the box" to come up with novel ideas. Solving different problems will require different types of intelligence.

1. Analytical–

You typically use an **analytical** approach when a problem is abstract, requires you to analyze information to find a solution, and is logical in nature, or when a familiar situation or an expected course of events is disrupted, and you need to identify the obstacles, address them, and get back on track.
2. Practical—

Practical skills are used to solve problems in everyday life, typically involving material things. They aren't easy to learn or control, because they draw on the problem solvers' extensive knowledge and experience solving similar problems. The problem solver will most likely find a solution intuitively. "Street-wise" people and those who have lived a long, rich life often demonstrate practical intelligence.

Practical problem solving doesn't involve a high degree of critical thinking, but it does rely on your ability to set your emotional reactions aside and accept the way things are. If your computer deletes your work for the day, reacting emotionally isn't going to get the information back. It's more practical to move on and find ways to make up for lost time.

Practical skills can't be acquired or sharpened as readily as creative or analytical skills can, so organizations can't encourage people to formally acquire this kind of intelligence. But they should recognize, encourage, and reward the application of practical problem-solving skills.

Problems involving unforeseen complications typically require analytical or practical problem-solving skills to break down the problem and overcome it. But unusual or unfamiliar problems that don't come with a lot of information often require lateral, creative thinking – in other words, creative intelligence. When you know where you want to be in the future, but don't know how to get there, a creative solution may be just what you need.
3. Creative—

**Creative** problem solving starts with being open to the idea that new, fresh solutions are possible. You put aside your assumptions and suspend judgment of your ideas while you come up with them. One method is to ask yourself lots of questions to free your mind from your usual thinking patterns and kick-start your imagination. You might ask "What would be an unusual way of doing this?" or even "What would a child suggest?" Asking "What if...?" as many times as possible can help you escape your own preconceptions.

Some problems require a combination of the different problem-solving approaches. If you stay open to the possibility of using a variety of skills, you'll have an advantage over people who tend to fall back on the same way of meeting challenges.

**Problem-solving competencies**

A **skill** is an ability to use your knowledge to accomplish a task. Skills can be inherited, or acquired through training and conscious effort. An example of a skill is knowing how to fix a motor or set a broken bone. A **competency** is more than this – it's a combination of knowledge, skills, and abilities required for achieving results. An example is being a charismatic leader with the ability and know-how to get people to follow you enthusiastically.

There are five important problem-solving competencies:

1. Drive and initiative
2. Methodical approach
3. Teamwork
4. Astute analysis
5. Innovative thinking

1. **Drive and initiative** –

   To solve problems effectively, you need to take the initiative, tackling new problems energetically and enthusiastically. People with drive and initiative feel confident that they can get things done, and don't get put off by setbacks. They have clear goals in mind and visualize the outcomes they want to see. Plus they are outgoing and able to lead and guide others towards their goals.

2. **Methodical approach** –

   People who are good at problem solving are able to adopt a methodical, step-by-step approach – and stick to it. They draw on tried-and-tested problem-solving techniques to help them find solutions. At any point in the process, they know where they are and have a clear understanding of what still needs to be done. Rather than trusting subjective emotional responses, they are committed to using logic and reason to work through problems.

3. **Teamwork** –

   Effective problem solvers are good team players. They value different opinions and are able to listen to them with an open mind. They seek out the collaboration of others, and are able to manage and structure discussions so that everyone is able to have their say. When building a team, they counteract the weaknesses of some with the strengths of others. And they
encourage open communication between everyone involved.

4. Astute analysis –

Good problem solvers dig deeper to the root causes of problems and reject superficial explanations. They systematically ask probing questions to uncover new information. They remain curious and seek out new advice or clues – and don't discount these even if they appear to contradict other assumptions. They're able to spot patterns or make links to make a situation clearer. Finally, they can describe complicated situations and concepts to others.

5. Innovative thinking –

Innovative thinking is a key competency of effective problem solvers – they constantly search for new ways to approach problems and find solutions. They try different techniques to determine which are best. They see each problem as one of a kind, with unique features that require fresh, objective analysis. Effective problem-solvers also remain open to their own intuitive, creative thought processes.

There are three kinds of problem-solving skills: analytical, practical, and creative. Each type is most effective for solving certain types of problems. Some complex problems require a combination of the skill types. A competency is a set of factors needed for success. Important problem-solving competencies include drive and initiative, using a methodical approach, teamwork, astute problem analysis, and innovative thinking.
Six-step Problem-solving Model

**Purpose:** Use this job aid to remind you of the six steps in the problem-solving model, and of the goal, key activities, and tools available for each step.

1. **Define the problem**

   In this step, you identify precisely what it is that needs to be solved and put this into words. You could use a **gap analysis** to help you define the problem by comparing where you are with where you want to be.

2. **Analyze the problem**

   In this step, you dig deeper past the symptoms of the problem to its root causes and gather information about them. Identify the causes so you'll know what sort of solutions you should look for. You could use a **cause-and-effect diagram** or the **five-why analysis** to better understand the problem and its causes.

3. **Identify possible solutions**

   In this step, you list as many possible solutions as you can. Be creative. Use **brainstorming** to do this, without analyzing or critiquing your ideas.
4. Choose the best solution

In this step, you narrow down your potential solutions by carefully evaluating each one while considering any limitations on your situation or resources. Then select the best option. You could use an **cause-and-effect matrix** to do this, or you could rate possible solutions according to specific criteria.

5. Plan action

In this step, you decide how to implement your chosen solution. Decide who will do what, and by when. Also plan what you'll do if something goes wrong. You can use an **action plan** to list the steps you need to take.

6. Implement solution and review progress

In this step, you carry out your plan of action. You also monitor the situation to make sure everything is being done and, if you've identified deadlines, make sure these are being met. Also check to see whether your plan is working, and fall back on your contingency plan if necessary. If you like, you can use a simple **checklist** to make sure nothing is forgotten while you're tracking progress.
Problem-solving Mind Traps and Process Traps

**Purpose:** Use this job aid to review common mind traps and process traps that can hamper problem solving.

**Mind traps**

**Trap of initial ideas**

The starting point of your thinking about a problem – whether an idea, a data point, an estimate, or something else – usually influences your subsequent thinking about the problem. It's important to avoid giving too much influence to initial ideas, because the roots of a problem are often very deep; and if the problem is not analyzed properly, you could end up with less effective solutions.

The initial ideas trap is particularly likely to impair thinking at the second and fourth stages of the problem-solving process when problem-solvers are analyzing the problem and choosing the best solution.

**Trap of defending prior choices**

When you're faced with a problem, it can be tempting to make a decision that protects your previous decisions. This is particularly true where past decisions involved costs to you or your company.

This mind trap is especially common in the fourth step of the problem-solving process: choosing the best solution.
Trap of selecting supporting information

Even when you try to be neutral, your mind often has decided on one alternative or another even before you begin investigating them. As a result, sometimes you tend to selectively seek out information that confirms bias.

The trap of selecting supporting information is most likely to impede the second, fourth, and sixth stages of the problem-solving process, when problem-solvers are analyzing the problem, choosing the best solution, and reviewing the progress of the solution.

Trap of assumptions

Assumptions sometimes cause problem solvers to forego problem analysis using the recommended process tools. This is especially true where the problem solver holds strongly to the assumptions.

The trap of assumptions impairs problem solving particularly in the first two steps of the problem-solving process: defining the problem and analyzing the problem. It also subsequently affects the third and fourth steps of the process, when problem solvers are generating, evaluating, and choosing solutions.

Trap of conformity

The opinions of others can have an influence on us – even when we know that others hold erroneous views. This sometimes leads us to conform to the general consensus, rather than critically look for the best solution. This conformity occurs when group members let their desire for agreement override their need to assess all realistic options.

The conformity trap can impact every step of the problem-solving process, but will likely have particular impact at the fourth and sixth steps, when problem solvers are choosing solutions and reviewing the progress of solutions.
Process traps

Failing to involve the right people

Problem solving can take longer, or be less effective, when problem solvers fail to involve the right people in the problem-solving process. The people who know the problem best are those that are directly involved in the problem. So, if you fail to involve these people, problem solving is likely to be less efficient, and the solution you choose may not be ideal in the real-life situation.

Taking on problems that are too large or vague

Problem solvers can end up frustrated and demotivated when the problem is too big to tackle, too vaguely-defined, or too general to analyze. This process trap can cause confusion and loss of momentum.

Bypassing analysis

Problem solvers can be tempted to bypass the analysis of problems and solutions when they are under pressure to produce a solution. Without analysis, problem solvers may accept a weak or faulty solution that comes quickly to mind, rather than investigate whether it is the best solution.

Failing to plan implementation and evaluation

Sometimes just coming to a solution is so exhausting that problem solvers slack off when it comes to planning how to implement the solution and how to evaluate the solution's performance. Poor planning and review can prevent potentially viable solutions from succeeding.
Six-step Problem-solving Model
In this module, you will learn how to assess and develop your problem-solving skills, and also aims to help you recognize and overcome several types of bias. The module first takes you through the process of assessing and interpreting your existing problem-solving styles. It then introduces approaches for identifying areas for improvement in your problem-solving skill set and recommends strategies for enhancing key skills. Finally, it explains how to recognize and overcome biases in a problem-solving situation.

The following lessons are covered in this module:

**Lesson 1: Assess and Improve Your Problem-solving Approach**
Assess and Improve Your Problem-solving Approach

Upon completion of this lesson, you will be able to:

• interpret a problem-solving style chart
• recognize sound approaches for identifying areas for improvement in your problem-solving skill set
• recommend strategies for building needed problem-solving skills in a given scenario
• classify the type of bias exhibited in a scenario
• identify tactics for handling bias in problem solving
When a team is faced with a problem, one person may focus on analyzing facts. Another may quickly work on a solution that's practical, although it doesn't take all possibilities into account. A third person may favor a group approach, in which everyone's thoughts are considered. And someone else may focus on thinking laterally to come up with a creative solution nobody else would've identified.

Types of problems vary, and people often use a combination of approaches to solve them. However, each person typically has a dominant problem-solving style – an approach they tend to favor or turn to first when problems arise.

A person's dominant problem-solving approach depends on many factors – some voluntary and others not. For instance, your typical approach may depend on your past experiences, your personality, the skills you have, and what you believe yourself to be good at. It may also be affected by the education you've had.

Different problem-solving styles can be grouped into four main types. Each type has both advantages and disadvantages:

1. Rational
2. Nonlinear
3. Pragmatic
4. Interpersonal

1. Rational –

People with a predominantly rational style favor an analytical, structured approach to problem solving. They like to work with the facts of a situation and approach problems objectively.

2. Nonlinear –

This style is characterized by creative and original thinking. People who employ this style are able to conceptualize a situation. They are intellectually driven and have vision.

3. Pragmatic –

This style is a practical, goal-oriented approach to problem solving. People with this style focus on finding quick, workable solutions. They may appear confident and have a reputation for getting things done efficiently.

4. Interpersonal –

Someone with a predominantly interpersonal style approaches problems collaboratively, relying on interpersonal communication and the company and opinions of others. This is the most emotional and spontaneous style – friends, family, and colleagues may influence the decisions reached.

A disadvantage to relying on one style over others is that this can lead to blind spots. You may fail to see potential
Assess and Improve Your Problem-solving Skills

determining factors in a situation, and you may overlook a potential solution.

Those with a rational approach may find the most logical or well-considered solutions to problems. However, they may also be indecisive, overcautious, overly analytical, and rigid in their thinking.

The blind spots for people who favor the nonlinear style are that they tend to be unrealistic or impractical, disorganized in their approach to problem solving, and occasionally naive. Their ability to think out-of-the-box may produce innovative solutions, but these may not be compatible with realities such as nonnegotiable budgets or schedules.

Pragmatists' dedication to finding a practical resolution to a problem may lead them to be short-sighted or impulsive in devising solutions. Because they know they can get things done efficiently and focus on finding solutions without being distracted, they may disregard the interpersonal aspects of problem-solving, and overlook colleagues' opinions.

People with an interpersonal approach to problem solving may be seen as fair and sensitive to others. But they may also be impulsive or sentimental. They may personalize situations and lose their objectivity. If you rush to find a solution that others agree on, it's likely you'll overlook facts. This can mean spending time and money on implementing a response that's ineffective – or that works only over the short term.

**Identifying your dominant style**

Once you're able to identify the characteristics and blind spots of each of the four problem-solving styles, you can
Problem Solving and Decision Making Strategies

determine your own dominant style by creating a problem-solving style chart. Knowing your dominant style can help you identify and then address your weaknesses.

You can create your own chart by using five steps:

1. review a few problems you recently solved to uncover the impetus and reasoning behind your actions
2. when reviewing the problems, assign each style a value from 1 to 5 depending on how you used it in solving the problem, then plot the points on the chart
3. connect the points that represent the highest values of each style
4. identify the dominant style you used, and
5. identify possible blind spots

The four problem-solving styles are rational, nonlinear, pragmatic, and interpersonal. Each style has strengths and weaknesses, or blind spots. You can determine your own dominant style by developing a problem-solving style chart. First, you review a few problems you recently solved to discover how you responded to them. You then assign a value from 1 to 5 to each style depending on the extent to which you exhibited it when dealing with the problems. You plot the values on a chart and connect the highest points. Knowing your dominant style can help you identify your blind spots so that you can work to overcome them. Relying on a balance of styles – rather than on any one in particular – is best.
Assess and Improve Your Problem-solving Skills

Topic 2
Developing Your Problem-solving Skills

More often than not, the problem-solving style you adopt will depend, at least in part, on your problem-solving skills. In other words, you'll tend to favor the type of approach you're best equipped to use. There are three main types of problem-solving skills:

1. Analytical
2. Creative
3. Practical

1. An analytical approach to problem solving is rational, linear, and logical. It involves addressing a problem by assessing hard data and asking questions. Critical thinking is the main skill required for this approach.

2. A creative approach to problem solving focuses on the creation of unusual ideas and solutions that are unique to specific problems. The starting point for creative problem solving is realizing that the possibility of a novel or atypical solution exists.

3. A practical approach to problem solving involves relying on your experience and intuition to solve problems as they arise. It requires a willingness to tackle existing difficulties, to use trial and error when necessary, and to not overreact emotionally to problems. Practical problem-solving skills don't depend on your level of education or require a
lot of functional analysis or critical thinking. Instead they rely on experience and adaptability.

Analytical and creative skills are those that can be specifically developed. However, all three types of skills are important in problem-solving situations. Just as there are many types of problems, there can be many possible solutions to a single problem. These can evolve from analytical, creative, and practical approaches.

Being able to use your skills effectively to solve problems doesn't assist you only in overcoming obstacles or reaching goals. It also has emotional benefits. It can build your self-confidence and satisfaction in the work you do. In turn, this can make you an even better and more flexible problem solver.

It's important to be aware of the problem-solving skills you have and those you don't. Knowing what your weak areas are is useful when you're trying to develop your skills.

**Improving analytical skills**

To improve your analytical skills, you need to enhance your critical thinking. Critical thinking involves asking as many questions as possible to analyze all the possible solutions to a problem. Simply making critical thinking a habit can improve your ability to be analytical. Your education may also have given you a strong foundation for critical thinking.

Analytical thinking is used throughout the six-step problem-solving process. The key aspects of problem solving that are affected by your ability to think critically include problem formulation, the assessment of proposed solutions, and solution implementation:
• **Problem formulation** – It's common to mistake the symptoms of problems for problems themselves. It takes critical thinking to identify what a problem really is and to uncover its root causes.

• **Proposed solutions** – Once you're familiar with the nature of a problem, you need to think critically to formulate possible solutions – and to analyze each of these.

• **Solution implementation** – When you've decided which solution is best for solving a problem, you need to put it into practice. To evaluate the success of a solution, you can ask questions such as "Is the solution having satisfactory effects?"

Three main strategies – or types of exercises – can help you develop your critical thinking skills:

• **Text analysis** can involve identifying specific issues or points of interest in text, explaining their significance and your thoughts surrounding them, and identifying how the points are related.

• **Socratic thinking** refers to the disciplined use of questioning to explore complex issues, concepts, theories, or problems.

• **Critical thinking exercises** such as questions and puzzles promote creative and critical thinking.

**Improving creative skills**

You can also use specific strategies to improve your creative problem-solving skills. The first of these involves allowing for the saturation, incubation, and illumination of ideas:
• **Saturation** – To think creatively, you need to tap into the knowledge you've accumulated over many years. If you restrict yourself to thinking logically and rationally, this could stifle your ability to think creatively. Your aim at this stage is to saturate your mind with all sorts of information about the problem.

• **Incubation** – This relies on your stepping back from a problem and allowing your mind to focus on something else. Temporarily stepping away from a problem can allow the creative part of your brain to continue working on it.

• **Illumination** – This refers to the "Eureka!" moment when a creative solution first occurs to you. Often this occurs while you're engaged in something totally unrelated to the problem. Once you've uncovered creative ideas for approaching a problem, you need to determine whether they're realistic and appropriate.

A second strategy for improving your creative thinking is to practice thinking "outside the box." It involves challenging or overcoming the conventional ways in which you think, because these limit your ability to approach problems creatively.

Lateral-thinking exercises can also encourage creative thinking. You can also improve your creative skills by using existing ideas for alternative purposes – building on or adapting them in creative ways. A final strategy for honing your creative skills is to incorporate more randomness in your thinking.

Although it's always good to acquire new problem-solving skills, it's also important to refine the skills you already have.
You can work on developing and sharpening these skills both individually and collectively within your organization.

Different problem-solving styles depend on different problem-solving skills, including analytical, creative, and practical skills. Analytical skills encompass logic, reason, and abstract thinking, whereas creative skills relate to the ability to devise innovative solutions. Practical skills are those used when solving situational problems using your experience and intuition. To improve analytical skills, get into the habit of asking questions to analyze your problems and solutions. Also engage in text analysis, Socratic thinking, and critical thinking exercises. Creative thinking can be enhanced by allowing for the saturation, incubation, and illumination of ideas; thinking outside the box; using existing ideas for alternative purposes; and incorporating randomness into your thinking about a problem.
Topic 3

Recognizing Bias in Problem Solving

Bias is a widely studied phenomenon in problem-solving research. It involves allowing mental or emotional factors to distort your perception of reality. This skews the problem-solving process. It can influence the data you choose to gather, your analysis of a problem, the solution you choose, and the way you go about implementing the solution. Ultimately, it's the source of most mind traps people fall into when attempting to solve problems.

Two of the most important categories of bias are cognitive bias and motivational bias:

- **Cognitive bias** is a deviation that occurs when you don't follow rational and predictable methods of information processing.
- **Motivational bias** causes people to see things in a way that relates to their own goals or needs – preventing them from seeing things completely objectively.

Your mind can only process a limited amount of information. However, various mental shortcuts – the different types of cognitive bias – help you to raise this limit. Because these shortcuts introduce bias, your thoughts and actions differ from what can be measured objectively.
Different types of cognitive bias include the following:

- **Framing** – Framing refers to the way you present or initially perceive a situation. Positive framing emphasizes possible benefits, whereas negative framing emphasizes possible losses or risks. The way you frame a situation affects traits such as risk-taking. A phenomenon related to framing bias is task perception bias, which can affect how you interpret problems. This occurs if you allow your view of a situation to be influenced by superficial details, such as the way tasks or processes are named.

- **Anchoring** – Anchoring bias occurs when you allow your initial data on a problem to outweigh later information that differs from it. It results from the way you build up ideas – by taking initial values and adding to them as you acquire more data. Anchoring bias can also appear when you allow results obtained in similar but different situations to influence your decisions.

- **Availability** – The availability bias occurs because you don't process all forms of information equally. How data is presented influences your reaction to it.

- **Overconfidence** – Being too confident can impair your judgment, leading you to overestimate the likely success of possible solutions and to overlook potential risks. Research has shown that overconfident problem solvers are more confrontational, and ignore alternative solutions that could provide better results.

Motivational bias arises because people's approaches to problems are affected by their own goals or needs. It's difficult to guard against motivational bias because it can be difficult to spot. Types of motivational bias include the following:
• **Self-enhancement bias** — This occurs when you choose solutions that maximize your well-being or make you look good, instead of the solutions that address problems most effectively.

• **Cooperation bias** — Cooperation bias arises when you focus on finding solutions that will please everyone, in order to avoid jeopardizing future cooperation within a group. Sometimes this goal can bias your judgment and prevent the best possible solution to a problem — which may not please all participants — from being chosen.

• **Need for closure bias** — It’s natural to want to solve problems and move on — and sometimes deadlines mean that solutions are needed quickly. However, a need for closure can create bias by leading you to cut the problem-solving process short. Working under pressure can cause you to oversimplify complex situations and overlook possible solutions.

**Recognizing bias in problem solving**

Recognizing the types of distortions that may creep into your thinking is the first step toward dealing with bias in your problem-solving process. One way of eliminating bias is by following a systematic problem-solving process, like the six-step model.

In addition, you can take specific actions to help prevent bias from skewing the results of the problem-solving process:

• **Identify types of bias likely to arise** — Different types of bias are likely to appear at different stages of the problem-solving process. Knowing which types of bias to look out for — and when — can help you ensure that the problem-solving process stays objective.
• **Redesign your approach** – Each step of the problem-solving process can be completed in a variety of ways. So you can redesign the process to help eliminate specific types of bias.

• **Watch for evidence of bias** – It's important that you keep watch for any of the types of bias that can arise during the problem-solving process. This ensures that you can then take action to prevent the process from becoming skewed. In a team, it's important to ensure all members are aware of the types of bias that can arise and of the negative effects they can have.

• **Act to counter bias** – Once any bias is detected, it's important to take immediate steps to counter it. You can do this by making participants aware that they are demonstrating bias and encouraging them to adjust their thinking appropriately. It can also help to encourage problem solvers to record their ideas and to examine and clarify them.

Taking action to detect and deal with bias will help you keep your problem-solving process as objective as possible.

Bias occurs when people allow mental or emotional factors to distort their perceptions. It's the source of most mind traps that prevent effective problem solving. Cognitive bias is caused by faulty information-processing methods, and includes bias that arises through framing, anchoring, the relative availability of different types of information, and overconfidence. Motivational bias arises from people's needs and goals, and includes self-enhancement, need for closure, cooperation, and accountability bias. To guard against bias in problem solving, you should identify the types of bias common to each problem-solving stage, redesign your problem-solving approach if necessary, watch for evidence
of bias throughout your problem-solving process, and counter bias as soon as it arises.
Assess and Improve Your Problem-solving Skills
Tips for Improving Your Problem-solving Skills

**Purpose:** Use this job aid to review tips you can use to improve your problem-solving skills.

**Surveying your strong and weak areas**

1. **Problem-solving style chart**

   A problem-solving style chart allows you to rate your strength in each problem-solving style – rational, pragmatic, nonlinear, and interpersonal – using a rating of 1 to 5, to produce a clear indication of where your strengths and weaknesses lie. Normally, analytical skills are associated primarily with the rational and pragmatic styles of problem solving, whereas creative skills are associated with the nonlinear and interpersonal styles.

2. **Problem solver composite**

   One way of assessing your problem-solving strengths and weaknesses is to develop a "Mr/Ms Perfect Problem Solver" composite. This is done by assessing the strong problem-solving skills of several individuals whom you consider to be good problem solvers. Write down their names and next to each make a note of the problem-solving skills that you've observed in them. Determine which ones you wish to
develop. Be aware, however, that there is no such thing as a perfect problem solver, and it's not feasible to try to emulate perfection. You will need to assess your work requirements, aptitudes, and goals to identify which skills you should focus on enhancing.

**Enhancing your analytical skills**

1. **Ask as many questions as possible throughout the problem-solving process:**

**As you formulate problems**

To solve a problem effectively you have to clearly identify and analyze the problem. Ask yourself, "What are its root causes?", "What results would I like to achieve?", and "What conditions must the solution satisfy in order to be viewed as successful?"

**As you assess proposed solutions**

Once you're familiar with the nature of the problem you're facing, you'll be better placed to formulate possible solutions. Consider the risks and benefits of each potential solution based on evidence, and if possible, discuss the risks and effects of various solutions with colleagues or a mentor. Ask yourself certain questions, such as, "What is my goal and how will this solution help me achieve my goal?", "How will this solution impact individuals who are involved?", "What is the expected return on investment of each solution?", and "How acceptable is each solution to various stakeholders?"
As you implement solutions

When you've decided on a solution, you should assess it critically as you implement it. You want to ensure that the solution is really effective in solving the problem so ask yourself certain questions: "Is the solution and its effects satisfactory to me?" and "Am I comfortable to leave the situation and move on to other matters?"

2. Engage in exercises:

Engage in information, system, and text analysis; research and editing; Socratic thinking; and critical thinking exercises such as logic puzzles and brain teasers.

Enhancing your creative skills

1. Allow ideas to follow the processes of saturation, incubation, and illumination.
2. Make a point of thinking "outside of the box."
3. Use existing ideas for alternative purposes.
4. Incorporate randomness in your thinking as often as possible.

Additional tips

• Identify individuals in your organization whom you consider to be good problem solvers. Ask them if they wouldn't mind you interviewing them in an attempt to understand how they have developed their skills.

• Make a note of a bad decision made in your organization within the last 12 to 18 months and extract five key lessons to be learned from this bad decision.
• Set yourself a goal to read at least one leadership book and one biography of an exceptional person in your field, in one year. Make notes about any key principles or ideas that come to light.
• If you get the opportunity to attend any talk or seminar that deals with problem solving or critical and creative thinking, be sure to go.
• Be open to criticism about your problem-solving skills and use any feedback as a means of developing and improving your skills.
A Guide to Bias in Problem Solving

**Purpose:** Use this job aid to remind you of the types of bias you may encounter during the problem-solving process.

**Cognitive biases**

- Framing
- Anchoring
- Availability
- Overconfidence

**Motivational biases**

- Self-enhancement
- Cooperation
- Need for closure
- Accountability
Job Aid

Six-step Problem-solving Model

**Purpose:** Use this job aid to remind you of the steps in the six-step problem-solving model, and of the goal, key activities, and tools for each step.

1. **Define the problem**

   In this step, you identify precisely what it is that needs to be solved and put this into words. You could use a **gap analysis** to help you define the problem by comparing where you are with where you want to be.

2. **Analyze the problem**

   In this step, you dig deeper past the symptoms of the problem to its root causes and gather information about them. Identify the causes so you'll know what sort of solutions you should look for. You could use a **cause and effect diagram** or the **Five Whys analysis** to better understand the problem and its causes.

3. **Identify possible solutions**

   In this step, you list as many possible solutions as you can. Be creative. Use **brainstorming** to do this, without analyzing or critiquing your ideas.
4. Choose the best solution

In this step, you narrow down your potential solutions by carefully evaluating each one while considering any limitations on your situation or resources. Then select the best option. You could use an **ease and effect matrix** to do this, or you could rate possible solutions according to specific criteria.

5. Plan action

In this step, you decide how to implement your chosen solution. Decide who will do what, and by when. Also plan what you'll do if something goes wrong. You can use an **action plan** to list the steps you need to take.

6. Implement solution and review progress

In this step, you carry out your plan of action. You also monitor the situation to make sure everything is being done and, if you've identified deadlines, make sure these are being met. Also check to see whether your plan is working, and fall back on your contingency plan if necessary. If you like, you can use a simple **checklist** to make sure nothing is forgotten while you're tracking progress.
Problem-solving Styles

Purpose: Use this job aid to remember the characteristics and the blind spots of each style.

The different problem-solving styles can be grouped into four main types. No one of these approaches is always better than the others. Each has both advantages and disadvantages.

Rational

People with a predominantly rational style favor an analytical, structured approach to problem solving. They like to work with the facts of a situation and approach problems objectively.

Those with a rational approach may find the most logical or well-considered solutions to problems. However, they may also be indecisive, overcautious, overly analytical, and rigid in their thinking.

Nonlinear

A nonlinear style is characterized by creative and original thinking. People who employ this style are able to conceptualize a situation. They are intellectually driven and have vision.

The blind spots for people who favor the nonlinear style are that they tend to be unrealistic or impractical, disorganized in their approach to problem solving, and occasionally naive. Their ability to think out-of-the-box may produce innovative solutions, but these may not be compatible with realities such as nonnegotiable budgets or schedules.
Pragmatic

A pragmatic style is a practical, goal-oriented approach to problem solving. People with this style focus on finding quick, workable solutions. They may appear confident and have a reputation for getting things done efficiently.

Pragmatists' dedication to finding a practical resolution to a problem may lead them to be short-sighted or impulsive in devising solutions. Because they know they can get things done efficiently and focus on finding solutions without being distracted, they may disregard the interpersonal aspects of problem-solving, and overlook colleagues' opinions.

Interpersonal

Someone with a predominantly interpersonal style approaches problems collaboratively, relying on interpersonal communication and the company and opinions of others. This is the most emotional and spontaneous style – friends, family, and colleagues may influence the decisions reached.

People with an interpersonal approach to problem solving may be seen as fair and sensitive to others. But they may also be impulsive or sentimental. They may personalize situations and lose their objectivity.
In this module, you will learn how to recognize the value of honest, fact-based analysis and it demonstrates how the application of a few tools greatly assists you when determining the root cause of a problem and the best solution. This module first discusses problem analysis, illustrates steps to follow when analyzing problems, and outlines the tools used for uncovering the root causes. It then describes how to use evaluation and analysis when choosing the best solution from the alternatives available, as well as some of the tools you can use to assist in your endeavors.

The following lessons are covered in this module:

Lesson 1: Determining the Root Causes and the Best Solution
Upon completion of this lesson, you will be able to:

- recognize when to use specific fact-based analysis tools
- apply the steps in a five-why analysis to determine the root cause of a problem
- apply the steps in a cost-benefit analysis to determine the best solution to a problem
Fact-based analysis involves studying and dissecting a problem to help you identify the true cause of your problem – and not to wrongly focus your problem-solving efforts on a symptom of the problem. It also requires you to evaluate potential solutions to ensure you implement that which is most beneficial.

Without first identifying the cause of a problem, you might choose a solution dealing only with its symptom. The problem will remain unsolved and you'll have wasted time and resources.

Several analysis tools are available to you:

- **Five-why analysis** is an informal and relatively simple tool for determining the root cause of a problem.
- You use the **cause-and-effect diagram** to help you determine all the potential causes of a problem.
- **Force-field analysis** is a tool you use to analyze the factors that help or impede a potential solution to a problem.
- **Cost-benefit analysis** is a tool for determining the financial payback of a potential solution or plan.
• You use **multi-attribute analysis** to compare various solutions to a problem, under a range of different attributes.

These tools are generally used sequentially but can be used at other stages too. They are presented for illustrative purposes and aren't recommendations for real-life problem-solving situations.

**Five-why analysis**

Five-why analysis asks "Why?" until you have moved past the symptoms to the problem's underlying cause. You begin the analysis with an accurate statement of the problem and repeat the question until you find its cause. Each time the question is asked, it is informed by the preceding answer. The technique generally calls for five questions.

The possibility of people pursuing a single line of inquiry is a potential drawback of this tool. If a question yields multiple answers, you should ask "Why?" of each. The tool is beneficial because it is quick, effective, and can be used in almost any situation – from business to home life.

**Cause-and-effect diagram**

A cause-and-effect diagram – also known as a fishbone diagram – helps you identify the main causes of a problem and the areas in which to search for solutions. Ideally, it is used during a brainstorming session. You first write down the problem and add "connect" branches containing categories of potential causes. You then add causes associated with each category and determine their effect on the problem.
Determining the Root Causes and the Best Solution

**Force-field analysis**

You use force-field analysis to evaluate potential solutions by listing factors that support or work against them. You write down the current situation and its proposed solution, and then brainstorm the forces impacting on it – driving forces working for the solution and restraining forces working against it. You then identify forces that can be strengthened or eliminated to make the solution work.

**Cost-benefit analysis**

Cost-benefit analysis assesses a proposed plan of action in terms of its financial potential. You’d use it when proposing a plan requiring funding or when weighing up the financial gain of expenditure.

Cost-benefit analysis involves listing all a plan's costs and financial benefits, assigning values to each, and balancing them out to get an end figure. You can also divide the total benefit figure by the total cost figure to determine the return value for each unit of currency spent.

It can be difficult to put a price tag on something that may only save money over time or offers secondary benefits saving money in areas not related to the planned purchase. You therefore need to work out reasonable estimates for inclusion in your analysis.

**Multi-attribute analysis**

You use multi-attribute analysis to evaluate multiple solutions against weighted criteria. Criteria are standards used to evaluate a solution, like cost and feasibility. When you weigh criteria, you assign each a value relative to the
others. This allows you to conclude, for example, that cost is three times more important than feasibility.

This tool is similar to cost-benefit analysis because it arrives at a numerical result. However, it takes more than money into account. It can include quantitative, qualitative, and normative criteria within a single chart.

Fact-based analysis is vital to effective problem solving as it ensures you get to the root cause of the problem and helps you choose the best potential solution to that problem. The five fact-based analysis tools are five-why analysis, cause-and-effect diagrams, force-field analysis, cost-benefit analysis, and multi-attribute analysis.
The five-why analysis

In the six-step problem-solving model, the second step is to analyze the problem. The aim of this step is to uncover the root cause of the problem. It's important not to assume that you know what this cause is. Instead, you need to dig deeper to avoid dealing with the mere symptoms of a more fundamental, underlying problem.

The second step is about gathering and sorting through information about the problem — after all, there might be several possible causes. Analyzing this information is most effective when you follow certain key sub-steps:

- **Identifying potential causes** – Although a problem may have a single cause, a combination of factors could also contribute to it. If you list all possible causes, you'll have more information to work with. Types of causes contributing to problems include materials, people, methods, and environmental factors.
- **Determining the most likely cause** – You then determine the causes that contribute most to the problem. If you're working with a team, try ranking each possibility a given score.
- **Identifying the root cause** – You then analyze the most likely causes to reveal the root cause. You can
then prevent the same problems from surfacing again by identifying and solving its underlying cause.

There are two tools you can use to analyze a problem. One is the cause-and-effect diagram, which you use to map out the various complex causes contributing to the current problem. The second tool is five-why analysis. While both tools are useful, the focus here is on the five-why analysis because it's the quickest and most straightforward way to get to the root of a problem.

Five-why analysis has a few simple steps you take to get to an underlying cause of a problem:

1. State the problem
2. Ask a question about the problem
3. Continue to ask "Why?"
4. recognize the root cause

1. **State the problem** –

   The first, crucial step is to state the problem clearly. This means defining the problem explicitly so it's clear how it is a problem for you and why you want the situation to change. This step doesn't involve trying to provide a complex, overall picture of the situation. Putting the problem into words helps you ask the right questions about it. If you're working with a team, it's a good idea to write down the problem so you can stay focused on it.

2. **Ask a question about the problem** –

   The next step is to ask the question that reveals the cause of the problem. This is the first layer. It's important that you stay focused on the issue and don't get sidetracked
by assumptions, ask unfocused questions, or ask about things you can't measure or observe.

3. **Continue to ask "Why?"** –

Often, the first answer won't reveal the root cause of the problem. After you've found your initial, superficial reason, you ask a "Why?" question of it. You then ask a question about succeeding answer as frequently as you need. Depending on your problem's complexity, it could take approximately five questions to identify the root cause.

4. **recognize the root cause** –

When you no longer find answers to questions or cannot frame a question with which to interrogate a statement, you've likely reached the problem's root cause. You should be wary of stopping too soon as you'll then only be addressing a symptom of the problem. If you're working with a team, it's useful to achieve consensus on whether to stop at the identified cause.

Analyzing a problem is most effective when you first identify potential causes, determine the most likely cause, and then dig deeper to identify the root cause. You can do this by using a five-why analysis. This tool involves stating the problem clearly, then asking a series of "Why?" questions based on each answer to peel away the layers and find the true, underlying cause of the problem.
Topic 3
Problem-solving Solutions: Looking Beyond the Obvious

Collecting potential solutions

To find a solution to a problem, you should analyze the problem until you find its root. Once you've done so, you can then explore different solutions. At this stage, you should generate as many solutions as possible. You should gather a wide range of solutions from different perspectives because it will help you to settle on the most effective solution.

When you want to find a solution for a problem, you have to look beyond the obvious. You can generate solutions in several different ways:

- **Brainstorming** enables you to have a relaxed discussion about the solutions proposed by individuals in a group. Having experts and nonexperts in the group ensures the discussion will extract various perspectives.
- **Additional research** – including an analysis of both primary and secondary origin documents – helps you formulate more solutions and generates feedback for existing ideas.
- **Looking outside our own experience** is helpful to note people’s experiences when dealing with similar
problems. You can interview them to find out what they did and whether it was effective. You can also investigate benchmarks and best practices. It's important not to assume a solution will work for your problem just because it worked for someone else's.

- **Consulting the decision maker** and asking for the decision maker's opinion is important because that person will select the final solution. The decision maker will have the appropriate objectives in mind and will most likely be able to contribute good ideas.

**Shortlisting your solutions**

Now that you have a general list of possible solutions, you can analyze them in more depth to decide which options are the most advantageous. To shortlist the most advantageous solutions, it's useful to go back to defining the problem. You can then compare the objectives of solving the problem to your possible solutions and delete the least appropriate. This provides you with a shortlist of appropriate potential solutions.

After you've created your shortlist, you can analyze the potential solutions so that you're able to select the one that's most suitable. You can choose between three techniques when analyzing the potential solutions in your shortlist:

- cost-benefit analysis
- multi-attribute analysis, and
- force-field analysis

Out of the three, cost-benefit analysis is a very popular way to analyze the different solutions because financial benefits
are frequently the deciding factor. This type of analysis enables you to select the most financially beneficial solution.

The cost-benefit analysis

To perform a cost-benefit analysis, you complete eight steps:

1. Determine time scale
2. Brainstorm list of cost factors
3. Specify costs
4. Brainstorm list of benefits
5. Translate benefits into monetary terms
6. Sum up total costs and benefits
7. Determine cost-benefit ratio
8. Choose best solution

1. **Determine time scale** –

   You first have to determine a time scale for your analysis. For example, you might predict the prospective costs and benefits over a five-year time scale.

2. **Brainstorm list of cost factors** –

   You need to brainstorm all the cost factors associated with implementing the potential solution. This might include new machinery, training, advertising, and overtime.

3. **Specify costs** –

   For each cost factor, you specify the cost in monetary terms.
4. **Brainstorm list of benefits** –

   Now you brainstorm the benefits of your potential solution. This might include benefits like increased sales, reduced overtime, and increased productivity.

5. **Translate benefits into monetary terms** –

   You need to translate each potential benefit into an actual monetary value.

6. **Sum up total costs and benefits** –

   You sum all the costs to get total costs and all the benefits to get total benefits.

7. **Determine cost-benefit ratio** –

   To determine the cost-benefit ratio, you divide the total benefits by the total costs.

8. **Choose best solution** –

   Finally, you compare the solutions with their cost-benefit analysis and ratios, and choose the most effective solution for your problem. If the ratios are too close to decide, you can compare the net benefit in monetary terms.

To analyze a problem, you first collect as many potential solutions as possible. You then generate a shortlist of the most appropriate potential solutions. Next you analyze the shortlist. To choose the most financially beneficial solution, you use a cost-benefit analysis. This technique involves eight steps: deciding on a time scale for the analysis, brainstorming the costs and the benefits for each potential solution, expressing them in monetary terms, summing the
costs and the benefits, calculating the cost-benefit ratio for each solution, and comparing the ratios and choosing the solution with the best ratio.
Determining the Root Causes and the Best Solution
# Benefits and Limitations of Analysis Tools

**Purpose:** Use this job aid to review the benefits and limitations of analysis tools.

<table>
<thead>
<tr>
<th>Analysis tool</th>
<th>Benefits</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cause-and-effect diagrams</td>
<td>Structured but relatively informal, showing categorized results of possible root causes. Adaptable, showing the overall picture of a problem.</td>
<td>Challenge – because it's simple, it's easy to label the information incorrectly. Categories might be limiting.</td>
</tr>
<tr>
<td>Five-why analysis</td>
<td>Gets to heart of issue quickly so you can focus on the underlying root cause and not waste time.</td>
<td>Tends to follow only one path and not to investigate all paths fully.</td>
</tr>
<tr>
<td>Cost-benefit analysis</td>
<td>Easy to determine if a solution makes sense financially. Easy to assess whether one option is better than the</td>
<td>Not suitable for large, multi-faceted projects, or where there are intangible costs and benefits.</td>
</tr>
</tbody>
</table>
## Analysis tools

<table>
<thead>
<tr>
<th>Analysis tool</th>
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<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-attribute analysis</td>
<td>Measures many factors at a time using a matrix.</td>
<td>Only worthwhile if options can be truly compared and if criteria can be fairly applied.</td>
</tr>
<tr>
<td></td>
<td>Multiple evaluative criteria allow you to compare solutions side by side.</td>
<td>Works on assumptions about factors and criteria.</td>
</tr>
<tr>
<td>Force-field analysis</td>
<td>Highly visual, capturing both positive and restraining factors so you can compare them.</td>
<td>Can only be used when one issue that's relatively clear cut exists – it's not suitable for complex situations.</td>
</tr>
</tbody>
</table>
Job Aid

Cost-Benefit Analysis

**Purpose:** Use this job aid to revise the steps in a cost-benefit analysis to determine the best solution to a problem.

The problem-solving process has six steps:

1. define the problem
2. analyze the problem
3. identify potential solutions
4. choose the best solution
5. plan action, and
6. implement solution and review progress

Choosing the best potential solution is step four. When you search for a solution using the cost-benefit analysis, you evaluate a number of solutions on whether they have financial advantages.

The eight steps of a cost-benefit analysis are as follows:

1. determine a time scale for your analysis
2. brainstorm a list of costs associated with your potential solution
3. determine a cost for each factor
4. brainstorm a list of benefits that your potential solution will effect
5. determine the benefits in monetary or tangible terms
6. sum the total costs and benefits
7. determine the cost-benefit ratio, and
8. decide which potential solution gives the best return
In this module, you will learn about the fundamentals of decision making and it will illustrate techniques to help you become an effective decision maker. This module first walks you through the steps of a widely accepted decision-making process. Then it leads to a description of the factors influencing your decision-making style and shows how to adapt that style to suit a given situation. So you'll have everything you need to start on the road to becoming an effective decision maker.

The following lessons are covered in this module:

Lesson 1: Understanding Effective Decision Making
Upon completion of this lesson, you will be able to:

- sequence examples of the steps in the decision-making process
- match each example with the decision-making style it best exemplifies
- adapt your decision-making style to suit a given situation
The decision-making process involves identifying alternatives, analyzing their consequences and the outcomes you want, and making the best choice. People make decisions for a lot of different reasons, both good and bad:

- **To solve problems** – If several alternative remedies are available, you have to choose the best.
- **To move organizations forward** – These decisions are frequently complex and difficult, so it’s important you have effective decision-making skills.
- **To cover up mistakes** – This can have negative consequences because decisions aren't made for the good of other people or the organization.
- **To improve one's standing** – A desire to gain prestige or impress others isn't a good reason to make a decision.
- **To facilitate fitting into a peer group** – Sometimes people make popular or unpopular decisions because they think they will help them fit in or further their careers.

Given the variety of decisions people make every day, it’s important to be good at decision making.
Effective decision making

Effective decision making is important for personal and professional success. People who don't think things through or who consistently make rash or bad decisions struggle to achieve their goals and find fulfillment.

Good decision making is also essential for career advancement. Any authoritative or responsible position requires good decision-making skills. Typically, managers need to be decisive and able to choose the right course of action.

Alternatively, they need to know when it's appropriate to involve others in the decision-making process. Good decisions move teams and organizations forward, give them competitive advantage, and help them achieve their goals.

Finally, as an effective decision maker, you'll be more confident about the outcome of your decisions. This is because you will have carefully analyzed the potential consequences of your actions.

The decision-making process

You follow logical steps when you make a decision. It's useful to think of decision making as a conscious, established process so that you don't miss or compromise any steps. A basic decision-making model includes five sequential steps:

1. Establishing a context for success
2. Framing the issue properly
3. Generating alternatives
4. Evaluating alternatives
5. Choosing the best alternative

1. Establishing a context for success –

The first step is to establish a context in which to address the problem effectively. To do this, you involve the right people, keep the decision group small, encourage participation, choose diverse settings for meetings, and avoid advocacy.

2. Framing the issue properly –

Your experiences and expectations affect your perceptions. So when a complicated situation arises, you need to frame it properly to make sure you address the key issue. To avoid misframing, question initial perceptions. Try to pinpoint your and others' biases. Seek out the perspectives of other team members and try to approach the issue from several angles.

3. Generating alternatives –

You need to be creative at this stage – try to come up with as many ways of understanding the situation as you can. You can **brainstorm**, which you do as a team by writing down as many possible alternatives as you can, without criticizing or judging them. You can also **involve creative people**; you should include people who tackle problems energetically and are original, thereby sparking healthy debate. Your list should include as many alternatives as possible, but it shouldn't be overwhelming.
4. Evaluating alternatives –

You now need to evaluate your alternatives. This involves determining how well each meets your objective. Several tools enable you to reach informed decisions, including:

- **Prioritization matrix**– In a priority matrix you detail and give each of the problem’s criteria a numeric value reflecting its priority.

You then address your alternative solutions. Assess how well they meet the needs of individual criteria. Then give them a numeric rating- say on a scale of one to ten - in rows beneath the relevant criteria.

You then total the product set of each alternative matched to each criterion’s priority rating in other words, you multiply the values of each criterion and its matching alternative. Then add together the total for each alternative. The alternative with the highest total is that which is best suited to meeting your objective.

- **Trade-off table** – In a trade-off table, you compare how well each alternative meets your objectives. You list the objectives, fill in specific data about the alternatives, and weigh them against each other.

- **Decision tree** – A decision tree is a graphic representation of each alternative’s possible outcomes. Outcomes can include success and failure, percentage estimates, profitability, and other possible events. The complexity of this diagram depends on the complexity of the problem.
• **Software programs** – Various software programs can assist you when evaluating alternative requires sifting through lots of data. These range from simple spreadsheets you use to add up figures to more sophisticated programs tailor-made for individual companies.

5. **Choosing the best alternative** –

Once you've considered the merits of each alternative, you need to choose the best. An important aspect of this is that you need to know when to end the deliberations. If you make a decision too quickly, you might miss a better alternative. If you take too long, you might miss valuable opportunities. You'll then need to turn the decision into action. First, communicate your team's finding to everyone who was and will be involved. Consider everybody that has given their input by stating why their suggestions were or were not taken up. To implement your decision, you'll need to delegate, set deadlines, and follow up. Ensure everyone is aware of their responsibilities and of how they may be affected by them.

Decision making is more than making a choice – it involves analyzing potential decisions while focusing on a desired outcome. Effective decision making is essential for personal and professional success, is necessary for career advancement, leads to greater efficiency, moves organizations forward, and allows for greater confidence in decisions. Consciously following the steps of a clear-cut process results in more effective decisions. The five steps in a basic decision-making model are: establishing a context for success, framing the issue properly, generating
alternatives, evaluating alternatives, and choosing the best alternative.
The four decision-making styles

Decisions can be approached in several ways. Approaches can be categorized into four styles:

1. the authority or expert style
2. the consultative style
3. the traditional majority or voting style, and
4. the consensus style

The four styles of decision making are sometimes grouped more simply into two broader categories. These are the authoritative style and the democratic style. The authoritative style is similar to the authority or expert style. The remaining three styles – consultative, traditional majority or voting, and consensus – are more democratic.

1. The authority or expert style–

The authority or expert style is used most in a business environment. You can think of it as the "I decide" style. For example, a manager simply makes a decision and expects all staff to abide by it. Or a specialist makes an independent decision because others lack the expert knowledge on which a decision must be based.
If you use the authority or expert style of decision making, you should discuss the decision you make with those affected by it. You should explain why you reached the decision and what effects it'll have on employees and your organization as a whole. If you don't approach this style properly, you could create a situation in which employees feel alienated and unappreciated – they may feel that their opinions or ideas don't count, or that your approach is unfair.

Although an advantage of the authority or expert style is that a decision can be made quickly, a disadvantage is that others aren't involved. They don't have a say and aren't called on to develop their decision-making skills. Also, with this style, the quality of the decision that's made depends solely on the knowledge and expertise of one person.

2. The consultative style–

The consultative style involves incorporating input from others in the decision you make. It can be likened to an "I decide but with your input" approach. For instance, an executive gathers opinions from all floor managers before deciding how best to change a company's product-assembly process. The executive considers the floor managers' information, but retains responsibility for making the final decision.

The consultative approach to decision making takes longer than the authority or expert style but generally results in better, more informed decisions being made. It also leads to a greater sense of trust because others feel that they've been part of the decision-making process.
3. The traditional majority or voting style–

The traditional majority or voting style is an approach in which the most popular decision is the one taken. This style is used quite often – sometimes just to get an idea of people's feelings on a particular matter. It's a quick process and is good for coming to a decision that's based on what the majority of participants feel.

The traditional majority or voting style also has disadvantages. This approach creates a "winners-and-losers" mentality. Unless the voting process is anonymous, people may vote with the majority – regardless of their actual views – so that they appear to support the "winning" or most popular decision. It also means that those in the minority – the "losers" – don't get to air their views, which may be valid or pertinent.

4. The consensus style–

The consensus style is a "we all decide" approach. It involves including all affected parties in the decision-making process and adopting a final decision only when everyone agrees that it's the best one. The consensus style incorporates the different opinions and perspectives of all individuals. The aim is to reach decisions everyone is happy with, although this can be time consuming.

The consensus style is often the best style to use if you really want all individuals concerned to be involved. Bear in mind though that because it's a time-consuming process, it's critical to ensure you use it only to decide key issues. If you choose this style but find that you're running out of time because it's taking too long, you can switch to
a "back-up" style. After sufficient discussion, you may, for example, put the decision to a vote.

When you use the consensus style, it's not necessary that everyone agrees completely. However, once a decision is made, everyone must be able to answer yes to two important questions:

1. "Am I able to live with the decision made?" – For consensus to exist, everyone involved must feel able to accept a final decision – even if it isn't necessarily the one they'd reach independently. So the decision that's chosen can't infringe on anyone's beliefs or ethics, or violate anyone's personal values.

2. "Will I be able to support the decision that's made?" – Once a decision has been reached, those who participated should feel that they can support and uphold that decision when others question them about it, and through their attitudes and conduct. They should not leave the room feeling that they simply went along with a decision others made for them.

Remember that no one decision-making style is always best. The most appropriate style often depends on the situation you're facing. In a crisis that requires an immediate response, for example, it can make the most sense for one person to make a decision and impose it on others – because this will be the fastest. In another case, it may be vital to consider everyone's opinions and ask for their input so that a final decision is perceived as fair.

Approaches to the decision-making process can be categorized into four main styles – the authority or expert style, the consultative style, the traditional majority or voting
style, and the consensus style. Each style has advantages and disadvantages, and suits specific situations.
Influential factors in decision making

The most effective decision makers don't just stick to one decision-making style – they adapt their styles to suit the situations they face. Several factors can influence your choice of style. These factors include:

- **The time that's available** – If you need to make a decision quickly, it's generally most effective to use either the authority or expert style, or the traditional majority or voting style. These styles enable a decision to be reached rapidly. For example, a team leader who has to decide between two alternatives may have a team vote and then simply go with the decision that's most popular. This is much less time consuming than consulting extensively with others or attempting to reach consensus in an open session with the team.

- **The importance of a decision** – A decision may be especially important because it will have a significant impact or because it revolves around a controversial issue. In this case, it's best to use either the consultative style or the consensus style, provided time allows for this.

- **Required levels of knowledge** – If a team is very knowledgeable about an issue, it pays to use a consultative approach. This ensures everyone's
expertise, insights, and experience can be pooled to determine the best possible decision. However, if the team lacks knowledge about an issue, it's better to use the authority or expert style – and then to explain your decision and its likely impact.

- **Whether there's a need for buy-in from others** – When you need others to support a decision and its implementation, the majority or voting style may work. However, it's generally better to use the consensus style. That way, you know that you'll have the support of others going forward – and you're less likely to be undermined by parties who disagree with the decision.

- **Experience** – If your team has sufficient experience in making decisions as a group, you should use the consensus style. This style acknowledges your team members' capabilities and involves them in the decision-making process. However, if your team is inexperienced in group decision making, lacks relevant knowledge, or time is short, you should use a different style.

**Adapting your style**

In each decision-making situation, you need to weigh up different factors and then decide which decision-making style best suits the situation. Many issues are critical in choosing the style that will be the most effective. People often need to make decisions in business contexts, and these may involve or affect teams or larger parts of an organization. Choosing the most appropriate decision-making style can have important consequences for you and the organization. While it's often equally important to consider all the factors when you choose how best to approach a personal decision – or
one you need to reach on your own – this topic focuses on decision making in a business environment.

The next time you're faced with a decision, consider factors such as the time constraints, the experience and knowledge of those around you, the importance of the decision, and the level of buy-in required. Then use these factors to help you choose the decision-making style that is most appropriate.

To be an effective decision maker, you have to tailor your decision-making style to each situation you face. While one style may work for a particular situation, it may not be appropriate in a different situation. In each decision-making situation, you need to weigh up different factors, such as the time available, the importance of the decision, the availability of knowledge, the importance of securing buy-in from others, and experience. Once you've considered these elements, you should decide which decision-making style best suits the situation.
The Decision-making Model

**Purpose:** Use this job aid as a reminder of the five steps in the decision-making model.

**Step 1: Establish a context for success**

- Involve the right people and encourage participation
- Keep the decision group small
- Choose diverse settings
- Avoid advocacy – keep arguments balanced, calm, and fair

**Step 2: Frame the issue properly**

- Don't accept your initial perception – try to pinpoint your biases and assumptions
- Seek out the perspectives of others
- Don't impose your perceptions on others
- Think creatively to find new ways of understanding the issue

**Step 3: Generate alternatives**

- Brainstorm to help uncover new ideas
- Involve creative people in the alternative-generating process
- Make sure alternatives are broadly defined, don't repeat themselves, and are viable
• Generate enough options for there to be a set of choices, but not so many that the list becomes overwhelming

Step 4: Evaluate the alternatives

• Often the option with the best financial value will be best
• Rate your alternatives against the objectives you set out to achieve at the outset
• Use tools to help weigh options according to different criteria

Step 5: Choose the best alternative

• Know when to end deliberations – don't take too long, but don't rush either
• Turn the decision into action
Job Aid

The Four Decision-making Styles

Purpose: Use this job aid to review the characteristics of the four decision-making styles.

The authority or expert style

The authority or expert style is most commonly used in business and makes use of an individual's authority and expertise to make a decision. It can be referred to as an "I decide" style. Generally this style is used when one person, who has authority or is an expert, makes a decision and other individuals are expected to abide by it.

When using this style of decision making, it's important to discuss your decision with staff. This avoids your authority or expertise being viewed in a negative light. Take the time to explain your decision – why you made it and its effects on staff or the organization. If you don't approach this style properly, you could create a situation in which staff members feel alienated and unappreciated, perhaps feeling that their opinions or ideas don't count.

An advantage of the authority or expert style is that the process of making the decision can be quite quick. However,
a disadvantage is that other individuals are not involved and so are not able to develop their decision-making skills. Also, with this style, the quality of the decision that's made is placed squarely on the shoulders of the decision maker and depends entirely on this person's own knowledge.

The consultative style

The consultative style of decision making incorporates input from other individuals, not just the decision maker. As such, it can be likened to an "I decide with your input" kind of approach.

In this instance, the manager remains the one who ultimately makes the final decision. But in the case of the consultative style, the manager also seeks participation from others to aid in the decision-making process.

The majority or voting style

This decision-making style is used quite often – sometimes just to gauge peoples' feelings on a particular matter. One can liken it to a "majority rules" type of style.

This style of decision making can be quite quick and is good for coming to a decision that's based on what the majority feels. However, its downside is that it often creates a "winners-and-losers" mentality. People want to be part of the majority – the "winners" – regardless of their actual views, so they vote with the majority. It also means that those in the
minority – the "losers" – don't get to air their views, and no one actually develops the skill of reaching a decision based on different viewpoints.

The consensus style

The consensus style of decision making is a "we all decide" approach. It is often the most complicated and time-consuming approach, but it's the best style to use if you really want all individuals concerned to be involved with the decision making.

Because it is a time-consuming process, it's critical to ensure that it's only used to decide on key issues, and if you choose this style, but feel that you're running out of time, ensure that you have a "backup" style that can be used to come to a conclusion.

The consensus style of decision making depends greatly on the different opinions and perspectives of all individuals. So it's important that all those involved have an opportunity to talk through their thoughts or ideas. Consensus aims to make a decision that everyone is happy with.

Consensus, however, doesn't necessarily require unanimous agreement among people. It can only be reached when individuals can, after making the decision, answer yes to two important questions:

- Am I able to live with the decision made?
• Will I be able to support the decision that's made?
Influential Factors in Decision Making

**Purpose:** Use this job aid to review the factors that influence your choice of decision-making style in a given situation.

Several factors can influence your choice of decision-making style.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>If you need to make a decision quickly, the most effective styles are the authority or expert, and the traditional majority or voting style.</td>
</tr>
<tr>
<td>Importance</td>
<td>Where decisions are important or likely to have a significant impact on others, it's best to use either the consultative style or the consensus style.</td>
</tr>
<tr>
<td>Knowledge</td>
<td>If your team is knowledgeable about an issue and has relevant expertise and information, you should use a consultative approach.</td>
</tr>
<tr>
<td></td>
<td>If the team lacks relevant knowledge, it's better to use the authority or expert style; and then to explain your decision and its impact.</td>
</tr>
<tr>
<td>Buy-in</td>
<td>When you need others to support a decision and its implementation, the traditional majority or voting style may work. However, it's generally better to use the consensus style. This ensures that everyone will support the final decision.</td>
</tr>
</tbody>
</table>
### Influential factors in decision making

<table>
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<td>Experience</td>
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</tr>
<tr>
<td></td>
<td>If your team is inexperienced in group decision making but has relevant knowledge about an issue, you should rather use the consultative style.</td>
</tr>
</tbody>
</table>
In this module, you will learn how to use a variety of tools and techniques at the three most important steps of the decision-making process: generating, evaluating, and choosing between alternative modules of action. Nominal group technique (NGT) is used to brainstorm and prioritize options as a team. Return on Investment (ROI) measures distill the costs and benefits of each alternative into a monetary value, thus enabling you to easily compare your options on financial terms. Three other decision-making tools – the devil's advocate technique, Plus/Minus/Interesting (PMI) analysis, and the ease-and-effect matrix – provide alternate methodologies for challenging and evaluating alternatives before making a decision. Equipping yourself with these tools will ensure you have an edge when you're facing an important decision.

The following lessons are covered in this module:

**Lesson 1: Key Tools and Techniques for Decision Making**
Key Tools and Techniques for Decision Making

Upon completion of this lesson, you will be able to:

• distinguish between the last three steps in the decision-making model
• recognize how to perform key steps as the leader of a nominal group technique session
• use ROI measures to choose between alternatives
• distinguish between three decision-making tools
A thorough decision-making model contains five steps:

1. establish a context for success
2. frame the issue properly
3. generate alternatives
4. evaluate the alternatives, and
5. choose the best alternative

1. Establish a context for success-
   This may mean you ensure team sets appropriate ground rules to encourage participation and deliberation, and you have the right people on a team to help you make a decision.

2. Frame the issue properly–
   That is you, define, understand, and put it into context. If this isn’t done, you’re unlikely to make a suitable decision.

3. Generate alternatives–
   You need several alternatives to make a good decision. However, generating too many alternatives makes it hard to grasp the situation or what is practical or possible in resolving it.
Also, you must assess and evaluate each alternative you generate. This takes time and energy, which you shouldn't squander by generating and assessing alternatives needlessly.

A useful way of generating alternatives is to brainstorm. In a brainstorming session, individuals or groups are encouraged to provide as many ideas as possible, without evaluating or judging them. This allows people to think creatively without self-censorship. The list is then thinned down to include only workable alternatives. When brainstorming in a group situation, it may help if people generate ideas individually first. This can minimize censorship through peer pressure.

After brainstorming ideas, it's important to assess how good the alternatives are. Useful alternatives meet three minimum requirements:

1. **They're broad** – When a range of alternatives is created, the goal is to cover all the major possible strategies and courses of action. If several potential courses of action are not covered by the alternatives, the alternatives may not give rise to adequate decisions.

2. **They’re genuine** – Each alternative should represent a genuine option. You should also avoid rehashing ideas that have already been rejected.

3. **They’re feasible** – If an alternative can't be practically implemented, it should not be considered.

To generate better alternatives, you take these steps:

1. invite a creative and diverse group of people to participate in coming up with alternatives
2. consider existing solutions other companies have adopted
3. try to view the situation and possible solutions from multiple perspectives, and
4. think creatively and consider whether alternatives can be combined

4. Evaluating alternatives–

Once alternatives have been generated, you need to evaluate them. This process involves assessing each alternative according to whether it meets your objectives in terms of costs, benefits, and feasibility. Key questions to consider are "What are the costs and benefits of each alternative?" and "Which alternative is most feasible?"

The costs and benefits of an alternative aren't always obvious, and can't always be quantified in financial terms. So you need to assess this aspect carefully, searching out hidden costs and benefits and considering a variety of angles and variables.

To assess the relative feasibility of each alternative, you ask whether the organization has adequate human resources, financial capacity, and infrastructure. Variables to consider when evaluating the feasibility of alternatives depend on the objectives you're pursuing.

Commonly Considered alternatives include:

Financial impact

You assess financial impact in terms of costs and benefits. When assessing costs, you need to review the short-term and long-term expenses, hidden costs, potential savings, budgetary constraints, required financial liquidity or loans, and the likelihood of additional costs in the future. When assessing benefits, you need to consider short- and long-term profits, the efficiency of income generation, and the likelihood of actually generating projected turnover. You also need to analyze whether each alternative will affect the net present value of the organization and when this effect is likely to be realized.
**Intangibles**

Costs and benefits may be significant yet intangible. Intangibles to consider include an organization’s reputation and image, customer satisfaction, employee morale, and the quality of products and services.

**Time and other resources**

The time it takes to implement an alternative is a serious consideration because it has a direct impact on costs and on when you're likely to realize the benefits. You should take the probability of delays, as well as their potential impact and effects, into account. You also need to consider resources such as employees, locations, buildings, and equipment for some alternatives.

**Risks**

You need to carefully assess the risks associated with an alternative. This includes determining the cost of the information you need to reduce uncertainties. You also need to assess each alternative's potential impact on profits, competitive advantage, competitors, suppliers, and customers.

**Ethics**

You need to consider the ethical implications of each alternative. Additionally, you need to ensure alternatives comply with the laws governing your organization. The particular interests of customers, the community, and employees may each be affected differently. A useful benchmark is whether outsiders regard your organization’s activities as ethical. During the evaluation phase, you estimate how well each alternative meets the objectives you established at the outset of the process.
5. Choosing the best alternative

Once you've evaluated each of the alternatives separately, you should have a good understanding of them. Before you can choose the best alternative though, you need to compare your findings. Also, the members in a decision-making team may have different views of the costs, benefits, and feasibility of different alternatives, or they may have unaddressed subjective and qualitative concerns. For these reasons, you may fail to reach consensus on the best alternative.

To identify the best alternative, you need to consolidate your analyses of all the alternatives and establish criteria. You then weigh and compare these criteria. In a group situation, you aim to generate consensus to ensure qualitative and subjective viewpoints are included. Voting techniques and financial criteria are also useful when you make a final decision.

A methodical decision-making process involves establishing a context for success, framing the issue properly, generating alternatives, evaluating the alternatives, and choosing the best alternative. Generating alternatives involves brainstorming ideas and ensuring proposed alternatives are broad, genuine, and feasible. Evaluating the alternatives involves analyzing their costs, benefits, risks, and relative feasibility. You choose the best alternative by consolidating the results of evaluation, incorporating both subjective and objective information, and – in a group situation – reaching consensus or voting.
Provided it’s rigorously and carefully applied, the nominal group technique helps a group to generate and prioritize alternatives, and to choose the best alternative by voting. So this technique is mostly used for steps three and five of the decision-making process.

The technique isn't used specifically to evaluate alternatives. It relies on individual members' judgments, rather than on formal, rigorous analysis or evaluation. It's possible, however, to use the technique to arrive at a small set of favored alternatives, which the group then evaluates more thoroughly before reaching a final decision.

A group that participates in the nominal group technique is considered only "nominally" a group because the participants generate and vote on ideas privately, rather than by interacting as a group. This method works best with groups of eight to ten members.

When participants generate ideas anonymously and vote individually, it prevents them from being pressured or influenced by others. As a result, it encourages creativity and diverse opinions.

The nominal group technique also encourages everyone in a group to participate fully in the decision-making process.

Using the nominal group technique involves six steps.

1. Present goals
1. Present goals—

As the first step, you write the goals of the decision-making session on a whiteboard for the whole group to refer to. This helps ensure the session remains focused. You also ensure everyone understands the goals before moving to the next step.

Instead of a whiteboard, you could use a projector, a virtual medium, or any other means for displaying the goal and ensuring everyone can see it throughout the session.

2. Generate alternatives—

In the second step, each group member brainstorms alternative ideas for meeting the decision-making goals. Everyone does this separately and without discussing their ideas with others. This helps ensure the opinions of others don't influence anyone else. Group members may record the alternatives they generate on index cards.

3: Record the alternatives—

Once the group members have generated alternatives, you gather the alternatives and record them in a place that everyone can see – on a whiteboard, for example.

4: Consolidate the alternatives—

Working together, the group consolidates similar alternatives to eliminate redundancy. You should explain any option that group members don't clearly understand, although it's important that no
group member attempts to "sell" a particular alternative. The group moves on to the next step only once each alternative is clear to all participants.

5. **Rank the alternatives**

Each person works alone to rank the alternatives. You ask group members to give their least preferable alternative a score of one and the highest score to the alternative they think is best. You can again use index cards for this step in the process.

Before beginning, it's important to decide how many alternatives to rank. If you rank too large a set of alternatives, the process of voting and tallying the results becomes unwieldy. Generally, it's best to limit members to ranking only their three to five preferred alternatives, giving their most preferred alternative the highest ranking.

6. **Tally votes**

You tally the votes for each alternative in front of the group. You can then implement the idea with the most votes. Alternatively, you can use the results as a springboard for further discussion and evaluation of the favored choices.

The nominal group technique improves on simple brainstorming in a number of ways:

- it ensures all members' participation is maximized, while preventing dominant individuals from influencing others
- it encourages greater creativity
- it generates more ideas, and
- it's more satisfying and inclusive for participants

To be effective, a facilitator must properly manage the nominal group technique. For example, it's important that when people
generate ideas or vote, they don't discuss what they're doing with others.

When clarifying and consolidating alternatives, participants shouldn't be drawn into a debate of the merits of the alternatives. Otherwise, persuasive individuals may sway the opinions of others, thereby distorting the results.

As a facilitator, you need to double-check that everybody understands the alternatives before finalizing the list. You also need to tally the results carefully, ensuring that all results are counted and totaled accurately. If there has been any significant confusion, the group should vote again.

The nominal group technique is a way of ensuring all members of a group contribute fully to the decision-making process, without being influenced by others' opinions. Steps for implementing the nominal group technique include presenting the goal of the decision-making session, asking participants to generate alternatives individually, recording the alternatives, and then consolidating them as a group. Participants then rank a set of favored alternatives and the votes are tallied.
The importance of finance is most obvious when companies need to choose between alternatives that involve significant capital investments. In these cases, money is the bottom-line factor for determining which actions should be taken.

Return on investment, or ROI, calculations are perhaps the most popular financial measure of the merits of decision alternatives. So ROI is a key decision-making tool, especially in business situations. ROI helps you evaluate and select alternatives based on their costs and benefits, so you use it during steps four and five of the decision-making process. Costs and benefits are expressed in dollars, or other units of currency, and then compared for each alternative.

It's challenging, but possible, to estimate the monetary value of qualitative costs and benefits, such as staff morale, customer satisfaction, or a reputation for quality products or ethical actions. Though companies may not be able to measure qualitative variables precisely, they can firmly base their estimates on industry-accepted indices, rules of thumb, historical data, or benchmark data and norms.

Once all costs and benefits are given a monetary value, this common parameter can be used to measure and compare all the variables considered.

ROI helps you to compare ways to invest valuable resources, such as your time, money, and effort. This tool takes much of the guesswork out of decision making. People in leadership roles can
use ROI to determine how an organization's resources should be spent, what goals to move toward, and what budget standards to create.

Using ROI in decision making helps you to quantify information, calculate returns, and make rational and objective comparisons between decision alternatives. This tool is also useful when you inform leadership and justify the choice of specific alternatives, and it can help employees focus on tangible results.

**Calculating ROI**

An ROI value typically provides the ratio of the net return – or savings – of an alternative to the cost of the required investment. It can be written as a percentage. To calculate this percentage, you divide the net return by the total investment.

Total investment includes all the costs and expenditures required to implement the alternative. Net return is the profit you make over and above the costs of implementing the alternative.

To calculate the ROI, you divide the net return by the total investment. Then you multiply your result by 100.

Of course, most decisions are made before the solution is implemented and before you have precise figures for returns and investment. So typically, the values you use in an ROI calculation will be anticipated or projected values, rather than actual returns. You'll estimate the net return and the investment to the best of your ability based on established trends, benchmarks, and other sources of information.

Companies have to consider how long it will take for an investment to pay for itself. This period is known as the payback period. The payback period helps to determine the level of risk involved in an investment. Before the payback period is reached, the total cost of an investment exceeds the total returns that it generates. It's only
after the payback period ends that the company begins to earn money on its investment.

To calculate the payback period when the projected income is the same for each year, you divide the total amount of the investment by the annual revenue expected from the investment.

Although the theory of calculating ROI is fairly straightforward, in practice there are numerous complexities to take into account. And there are various methods of calculating ROI to choose from, depending on your needs.

Revenues and expenditures may not be entirely predictable, and many situations require you to apply more complex and sensitive formulas. For example, you may need to calculate the future value of money, for which you would use Net Present Value calculations.

If the projected income and expenditure differs each year, you won't be able to determine the payback period by dividing total expenditure by the annual revenue. Instead, you need to sum the cumulative anticipated revenue and expenditure. The investment would be paid back when cumulative revenue becomes equal to cumulative expenditure.

Whatever methodology you choose, it's important that it have these characteristics:

• it's easy to use and straightforward enough to explain to others
• it's comprehensive, clear, and meaningful enough to be used by top-level decision makers
• it accurately accounts for all costs and profits, and
• it enables ROI values to be appropriately calculated for the particular business process in question

ROI is a useful way of analyzing alternatives in terms of their impact on the bottom line. This is done by expressing in monetary terms all
the costs and benefits associated with the alternatives for a particular decision. Even intangible costs and benefits are given an estimated cash value. Once all the costs and benefits have been determined, you can divide the projected net return by the total investment and multiply the result by 100 to express the ROI as a percentage. This is one simple way to determine ROI for use in decision making. The payback period is the period it takes for an investment to pay for itself. One way to calculate this is to divide the total projected cost of an alternative by the annual revenue it's expected to generate.
Devil's advocate technique

In a group situation, individuals' desire to conform and reach consensus can damage the decision-making process, especially at steps three, four, and five. The danger arises because of three factors to which groups are susceptible:

1. **Groupthink** – The drive for consensus and group cohesion leads everyone to decide on a specific alternative before they've looked sufficiently at the options available.

2. **Majority influence** – The drive for conformity can lead to agreement on whatever the majority thinks is right. Participants with other views either don't voice them or are swayed by what the majority decides.

3. **Polarization** – If there's no dissent, it can polarize a decision. Views become more and more extreme because there are no conflicting perspectives to moderate them.

If dissent is encouraged in a group setting, it helps to free people from the drive to conform. It also stimulates the search for information and helps members to tackle an issue from a range of perspectives. In turn, this encourages creative solutions. So even when opposing ideas are wrong or inappropriate, they can improve the decision-making process. The devil's advocate technique works on this premise.

To use the devil's advocate technique, you assign a person the role of devil's advocate. This person must then challenge group assumptions, question alternatives, bring in ideas previously not
considered, and provide alternate perspectives or solutions. For this to be truly successful, the person you assign to the role should be experienced or an expert in the field.

Quite often, the devil's advocate's challenges will prompt decision makers to revise or reject their initial ideas in favor of more effective ones. The technique is most helpful at stage four of the decision-making process, as alternatives are being evaluated.

**Plus-minus-interesting (PMI) analysis**

The PMI analysis tool builds and improves on the classic "pros and cons" analysis. It's useful in evaluating alternatives in step four of the decision-making model. Also, because it helps you decide whether an alternative is worth pursuing, it's particularly helpful as a final check once you've chosen a preferred alternative in step five.

To perform PMI analysis, you use a table with three columns:

- **Plus** – You add all the positive outcomes of taking a course of action to the Plus column and assign a numerical value to each based on its importance.
- **Minus** – In the Minus column, you enter all the negative outcomes of taking a course of action. These outcomes can also be assigned numeric values.
- **Interesting** – In the Interesting column, you enter any further implications of following the given alternative. The implications may be positive or negative in their outcomes. Typically, the Interesting column is reserved for the long-term implications of an alternative or its impact on areas of the organization other than those you are directly concerned with.

It's not always necessary to assign each factor a value or weight to represent its impact on the situation. Sometimes, just listing the relevant plus, minus, and interesting factors can make it obvious what you should decide.
But weighting the factors can clarify a decision. If you do assign values, be aware the scoring system you choose is subjective, based simply on how you judge the importance of each factor relative to the others under consideration.

In a weighted PMI analysis, your final total score for a decision doesn't just indicate a "yes" or "no" – it also indicates your level of certainty. A large negative or positive suggests you should strongly endorse or strongly disapprove the relevant course of action. In other words, smaller numbers indicate less confidence in the conclusion.

**Ease-and-effect matrix**

Prioritizing business decisions works in much the same way. You should generally prioritize solutions that are both easy and effective. The ease-and-effect matrix is useful for evaluating a number of alternatives at the same time, based on their effectiveness in achieving the desired result and their ease of implementation. It's a suitable tool during step four of the decision-making model – evaluating alternatives.

You follow four steps when creating an ease-and-effect matrix:

- rate ease of each alternative
- rate effectiveness of each alternative
- plot alternatives on the matrix according to their assigned ratings
- prioritize alternatives

The ease-and-effect matrix doesn't always produce a clear winner. You may have to decide whether it's more important that an alternative be easy to implement or effective in bringing about a desired outcome. Also, it's not always clear how you should rate an alternative. If you aren't sure how easy or effective an alternative will be, you may want to revise and reassess its pros and cons. You
may also find it useful to ask what could be done to make a particular alternative easier or more effective, then redefine the alternative accordingly. Because of this changeable quality of the ease-and-effect matrix, you can write alternatives on sticky notes, which you then move around the matrix.

Several decision-making tools can help you and your team in evaluating and choosing the best course of action. The devil's advocate technique forces decision-makers to consider their alternatives more carefully and protects decision-making processes against groupthink, majority influence, and polarization. PMI analysis helps you to assess alternatives based on their positive and negative outcomes and interesting long-term implications. The ease-and-effect matrix prioritizes alternatives on the basis of their ease of implementation and overall impact or effectiveness.
Using the Nominal Group Technique

**Purpose:** Use this job aid to help you facilitate a nominal group technique decision-making session.

Nominal group technique steps and best practices:

1. **Present the group with the decision-making goals** – write up the goals where everyone can refer to them throughout the process. Before continuing to step two, ensure that everybody in the group understands the goals.

2. **Generate alternatives individually** – it's important that people don't discuss their ideas with one another. Alternatives should be generated anonymously. For this reason, it's a good idea to give participants index cards to record the alternatives they generate. Participants should generate as many potential solutions as they can, without being critical of the ideas at this point.

3. **Record the alternatives in front of the group** – collect the alternatives each group member has generated and record them on a board that everyone in the group can see. You can keep the sources of the alternatives anonymous by shuffling the index cards before recording them.

4. **Consolidate alternatives as a group** – similar or overlapping alternatives are merged to remove redundancy and simplify the list. Then the meaning of each alternative should be made clear. If necessary, alternatives can be briefly explained or rephrased at this point so that everybody understands them. Ensure that when alternatives are explained, they're not sold as ideas.
5. **Rank the alternatives** – this step should be completed separately by each person, without interaction with others. Generally, participants decide on three to five preferred alternatives, which can then be ranked according to preference. The least preferable alternative is given a score of one. The most favored alternative gets the highest score.

6. **Tally the votes on the board** – the alternative that gets the highest total score is the most popular choice and can be chosen as the best option. The tallied alternatives can also be regarded as a springboard for further discussion and assessment using other techniques.
Job Aid

Three Analysis Tools

**Purpose:** Use this job aid to help you to use the devil's advocate technique, PMI analysis, and the ease-and-effect matrix.

**The devil's advocate technique**

Applying the devil's advocate technique requires that one person be assigned the role of devil's advocate. Ideally, this person should be experienced or an expert in the field. The devil's advocate must then use questions and comments to challenge group assumptions, question and critique alternatives, bring in issues previously not considered, and provide alternate perspectives or solutions. This helps prevent groupthink, majority influence, and polarization in a group situation.

**PMI analysis**

To apply PMI analysis, you place the consequences of a decision into three columns, titled Plus, Minus, and Interesting. The Plus column should list the benefits of the decision; the Minus column should list any negative consequences; and the Interesting column should list further long-term or extended consequences – whether these are positive or negative. You can go on to give each consequence a score, using a plus for positive consequences and a minus for negative consequences. Higher numbers represent more significant consequences. Totaling all the scores on the table gives a total score for the alternative. A relatively high positive score strongly suggests that you implement the alternative, while a high
negative score strongly suggests that you reject the alternative because it has too many drawbacks.

**The ease-and-effect matrix**

To apply the ease-and-effect matrix, you first create the matrix itself. The matrix has three columns and three rows. The columns under the heading Ease are Very easy, Moderate, and Difficult. The rows under the heading Effect are Very effective, Moderate, and Ineffective. Alternatives are plotted on the matrix according to how easy they are to implement, and how effective they are likely to be. This makes it possible to compare multiple alternatives at a glance, and prioritize those that are easiest and most effective.
In this module, you will learn how there are many situations that can make decision making particularly challenging, such as when you have to weigh very similar or very disparate alternatives then make compromises and trade-offs between them. Another situation is when you have to determine whether to trust logic, intuition, or some combination of the two.

This module will also review a number of these decision-making challenges and introduces strategies for dealing effectively with uncertainty, making informed trade-offs using a systematic process, and placing appropriate trust in your intuition when making difficult decisions.

The following lessons are covered in this module:

Lesson 1: Making Difficult Decisions
Making Difficult Decisions

Upon completion of this lesson, you will be able to:

• recognize how to deal effectively with uncertainty in decision making
• using a consequence matrix, make a decision that involves a trade-off
• recognize the proper role of intuition in decision-making
Statistician George Chacko said that uncertainty is the "commitment of resources today for results tomorrow." This type of uncertainty is often a factor in decision making.

So uncertainty complicates decisions. It means having to factor unknowns into the decision-making process. Also, it's natural for people to try to avoid uncertainty, and this tendency can compromise the decision-making process. It can lead decision makers to cling to alternatives already tried in the past, or to go with inferior decisions because their likely outcomes appear more certain.

Decisions you need to make can involve different levels of uncertainty:

- they may involve uncertainty about a single outcome
- they may involve uncertainty about a few outcomes
- they may involve uncertainty about a wide range of possible outcomes, or
- they may involve complete uncertainty

When you make a decision in uncertain conditions, you're essentially taking a risk. It's not possible to avoid this risk completely. But what you can do is prepare properly and take steps to reduce the risk of your decision.
Identifying areas of uncertainty

In business, most decision making involves some uncertainty. To make the best decisions without taking unnecessary risks, you need to confront the unknowns, analyze and understand the uncertainty that's involved as far as possible, and then take what steps you can to reduce the uncertainty.

So to tackle uncertainty head-on in your decision making, you should follow this series of steps:

1. Identify the unknowns – or areas of uncertainty – affecting your decision and quantify these
2. Prioritize the unknowns that you've identified, and
3. Take steps to reduce key uncertainties that affect your decision to minimize the associated risks

1. Identify the unknowns-

   The first step is to identify the areas where uncertainty exists. One way to do this is to brainstorm, either individually or in a group, to come up with a list of all the possible uncertainties that could affect a decision's outcome.

   You then attempt to quantify the risks. A good way to do this is to express each uncertainty as a possible range of values. This range of uncertainty, as opposed to providing just an initial estimate, leaves room for variation. Having only a single-point estimate wouldn't leave room for any variation and could throw subsequent budgeting out, whereas providing a range leaves room for variation.
2. Prioritizing the unknowns

The second step in tackling uncertainty head-on is to prioritize the unknowns you've identified, based on the extent to which they're likely to impact the outcome of a decision.

This involves three steps:

1. Gauging the impact of each unknown
2. Prioritizing the unknowns according to their impact, and
3. Identifying and clarifying the impact of unknowns that may work together

Once the uncertainties have been identified, you need to determine what kind of impact each uncertainty may have on the outcome of your decision.

Once you've determined the potential impact of each uncertainty, you can compare and prioritize them according to their impact on the company.

Another approach is to clarify the impact of uncertainties that may work together. To get a result for the combined uncertainties, you multiply the two values.

3. Reducing uncertainty

Once you've prioritized the areas of uncertainty surrounding a decision, you're in a position to move on to step three – reducing key uncertainties or the uncertainties you've identified as having the highest priorities or the lowest confidence estimates.
The final step in handling key uncertainties surrounding a decision is to reduce these uncertainties as much as possible. Several strategies help you do this. One of the primary strategies is simply acquiring relevant knowledge to reduce – or even possibly eliminate – uncertainty before you make a final decision.

To acquire relevant knowledge in an attempt to reduce uncertainty, you can choose to use these strategies:

- conducting customer research in the appropriate market
- inviting a wide range of people from different backgrounds to participate in group discussions about the product
- evaluating customers' previous experiences and satisfaction with a similar product
- conducting appropriate product testing and quality checks
- creating and testing a simulation or model of the product, and
- seeking additional information from others who have knowledge about the decision or experience with a similar one

In addition to various strategies, you may use a variety of tools and predictive models to help reduce the uncertainty surrounding decisions. Examples of these are statistical, mathematical, econometric, and software-based tools.

Acquiring the right knowledge can reduce or even eliminate uncertainty.
The most important thing is to manage uncertainty effectively. Instead of trying to eliminate it entirely before you make decisions, you can follow three steps. You can bring the "horizon" closer by reducing the time it takes to implement a decision, take risk-reducing steps when a decision is already being implemented, and create effective contingency plans.

- **Bringing the horizon closer** - means reducing the time gap between making a decision and realizing its consequences. This can reduce uncertainty simply because the near future is easier to predict than the distant future.
- **Take Risk-reducing steps** - another approach is to take risk-reducing steps during the implementation of a decision.
- **Create Contingency plans** - as a final step for handling uncertainty surrounding decisions, it's imperative that you create contingency plans. This involves envisioning what could go wrong and planning how to respond if it does.

Even using all the available strategies for handling uncertainty can't generally eliminate it altogether. However, these strategies can help you reduce its extent and, as a result, make more effective decisions.

Making decisions in uncertain conditions can be difficult. The best approach in these cases is to begin by identifying and quantifying the unknowns. Next, you should prioritize areas of uncertainty based on their potential impact on a decision's outcome. Finally, it's important to reduce key uncertainties. Strategies for doing this include acquiring relevant knowledge, reducing the time gap between making a
decision and realizing its outcome, taking risk-reducing steps during the implementation of a decision, and creating contingency plans.

**Topic 2**

**Compromises and Trade-offs in Decision Making**

You can think of a trade-off as a compromise. In decision making, people often compromise. They may opt for an alternative that's less than ideal for a variety of reasons. For example, a compromise may be convenient, serve vested interests, ensure approval of a decision by superiors, or simply represent the path of least resistance. It may also make the decision maker look good or even provide this person with a means of saving face if something goes wrong with a decision later.

In all these examples, compromising involves going with a decision that is not based on a rational, fact-driven evaluation that identifies the best alternative. More often than not, they simply rely on gut feelings, common sense, and guesswork. But there is another kind of compromise that's not just a "convenient" or "easy-way-out" option. This type of trade-off doesn't involve guesswork and instead provides a practical way of making trade-offs across a range of alternatives.

It can be difficult to decide on the optimum trade-off between objectives when you've got to make a decision that involves
Making Difficult Decisions

compromise. This is because you measure different objectives using different scales.

When making decisions, the problem is often that it's difficult to compare different objectives in separate categories. It's rather like trying to compare two fractions – for example, four-fifths and three-quarters. What's needed is a single scale for indicating how well each alternative meets each objective. Once you've got a common system of measurement, it becomes easier to compare values and so to make the best trade-offs. Applying this system to your fractions, you work with the common denominator of 20, making it much easier to identify the larger fraction.

A basic methodology that can help you make rational trade-offs comprises three steps. First you create a consequence matrix, with a single scale for ranking how well each alternative meets each objective. Next you eliminate weaker alternatives. And finally, you use the results to make logical trade-offs between the objectives.

Using this methodology doesn't mean that you won't have to make tough choices, but it simplifies the process of evaluating and comparing alternatives. It also helps ensure that when you do make choices, they're based on a rational process that identifies the best trade-offs.

1. Create a consequence matrix
2. Eliminate weaker alternatives
3. Make trade-offs

**1. Create a consequence matrix** –

Before considering trade-offs, you should have a clear idea of the decision at hand. You need to know your
alternatives and the objectives you want to fulfill, and then determine how each alternative affects each objective – or determine its consequence. Recording and making sense of this information can be a daunting task, especially when many alternatives and objectives are involved. This is where a consequence matrix comes in. It enables you to list alternatives and objectives in a manageable format and rank the consequences of each alternative in terms of each objective using a single scale.

If your decision involves many alternatives and objectives, it can result in a lot of descriptive information in a consequence matrix. This can make it tricky to figure out which alternative is the best overall. So it's a good idea to rank the consequences, according to how well they fulfill a given objective. If consequences meet an objective equally well, you can award the same ranking. In other words, rankings can be tied.

2. Eliminate weaker alternatives

To do this, you compare the rankings in the columns of the matrix. Lower values indicate better alternatives.

If a particular alternative is worse in relation to all objectives than another alternative, you can eliminate it straight away. This is because it's clearly a weaker alternative. You can take this a step further – if one alternative is weaker or the same as another alternative on all but one objective, and you judge that objective to be of minor value to you and your decision, you can remove that alternative. By removing weaker alternatives, you're left with fewer options, simplifying the process of making a decision and ensuring you're making fewer trade-offs.
At this stage in the decision-making process, you may be left with only a single alternative that clearly dominates all the others. If so, your decision is straightforward.

However, this often isn't the case. It's more likely that after the elimination stage, you'll be left with more than one alternative to choose from – each with its own advantages and disadvantages. You're now confronted with the task of making a choice – not by eliminating alternatives, or columns, but by artificially eliminating objectives, or rows, from the matrix.

3. Make trade-offs–

You have to make trade-offs between objectives. First you can eliminate an objective whose alternatives contain the same consequence, because it won't determine what the best alternative is.

Once you've eliminated objectives with the same consequences, you have to deal with the remaining objectives. To do this, it's best to follow a four-step process:

• determine what change would eliminate an objective
• determine what change in another objective would compensate for the elimination
• make the necessary switch, and
• remove the canceled objective

However, it's not always possible to quantify consequences in terms of costs. And you may not always be left with only one, obviously preferable alternative. Often your values for consequences will be dependant on
factors such as organizational policy, strategic goals, or decision makers' preferences.

Decisions are especially complex when you need to evaluate alternatives in terms of multiple objectives because you'll often need to make compromises – or trade-offs. In these cases, using a methodical system can help you narrow down the alternatives to identify the best one. First you need to create a consequence matrix, listing alternatives and objectives. You then quantify or rank the consequence of each alternative on how well it meets each objective. Next, you eliminate obviously weak alternatives and any objectives for which the remaining alternatives have tied scores. You then make trade-offs and compromises to arrive at the best decision.
You can define intuition as the thoughts or feelings that guide your decisions. Other terms for this include instinct, gut feeling, or hunch. Some people rely heavily on their intuition to make decisions. This may be because they develop the habit of trusting their intuition or because they lack the tools and processes to analyze alternatives rationally. Others feel that instinct should have no part in decision making, and that the process should be purely rational.

A rational decision-making process includes six steps. You analyze a situation, formulate the issues, and determine the objective a decision must meet. You then evaluate alternatives logically to decide which is best, implement your decision, and, finally, monitor the implementation process and adjust it where necessary.

A strictly rational approach leaves little or no room for intuition. But this isn't always a good thing. In fact, it can be necessary – or even desirable – to rely on your intuition when making business and personal decisions.

Intuition involves factors such as:

- **Experiences** – The experiences you've had help shape your perceptions and expectations. You also carry what
you've learned from them into new situations. They create a reference point from which to approach new decisions.

- **Memories** – Your memories of actions that had either positive or negative consequences in the past are likely to inform your judgment of new situations.

- **Conditioning** – Without realizing it, people are conditioned to deal with situations in specific ways, based on how they've been taught or how they've dealt with similar situations in the past. If a particular type of decision or action was repeated and led reliably to a positive outcome in the past, implementing it again can become almost a matter of habit.

- **Pattern recognition** – The ability to recognize patterns plays a big part in your intuition. Consciously, or even subconsciously, your mind is able to link different areas or spot certain patterns. Remarkably, pattern recognition is also used in rational analysis. Good managers are able to use their intuition to spot patterns linking different data.

- **Inherent knowledge** – Your brain processes and stores information all the time. When you're making a decision, it may draw on the inherent – or tacit – knowledge you've accumulated, without you even realizing it.

In many situations, including personal and work life, trusting your instinct is a natural reaction. And more often than not, instinct is more desirable. In some situations, there is no choice but to rely on your intuition when making decisions. These situations can include when there is

- **Not enough time** – It can be very unnerving if the situation is moving fast and constantly changing when a
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decision needs to be made. As a result, some people feel more at ease about going through rational processes. But what if there's no time? Rational processes alone may not help you make the most effective decision. In this case, using your intuition in decision making is necessary.

- **Not enough factual information** – Sometimes a decision can be very ambiguous, and there's not always a lot of information to work with.

- **Decision too complex and ambiguous** – Using your instinct and natural insight plays a big part in complex, ambiguous, or urgent decision making. The more complex and difficult the decision, the more important and useful it is to use your intuition. In fact, high-level business decisions are such that there isn't always time to thoroughly analyze every alternative available to you. You have to rely on your business judgment.

Generally, you can classify decisions into two types:

- soft decisions that don't have much hard data, and
- hard decisions that are based on hard data

Intuition tends to play a larger role in soft decisions. Business areas such as marketing, communications, and people management usually benefit from intuition. However, information and data can still be useful. In other areas, such as planning, process management, and finance, more hard data is available for analytical approaches. Nevertheless, using intuition as well as considering the hard data can help lead to a more effective decision.

Regardless of whether you're making "hard" or "soft" decisions, intuition, knowledge, and the confidence required
to make a decision are what's important. Confidence can also improve your decision-making skills.

**Balancing intuition with logic**

Pattern recognition is an important area in decision making. It enables you to understand situations quickly, recognize what actions to take, apply past experiences from different areas, and spot potential future problems.

Pattern recognition requires effective analysis and, while rational techniques can help, the ability to recognize patterns requires more. It requires lateral thinking and knowledge from multiple domains and past experiences. It requires intuition.

Similarly, trying to adapt a single approach to decision making will have limitations. An overly rational approach to decision making can ignore instinct and past experiences. And an over-reliance on emotions and intuition can result in flawed judgment. Both lead to ineffective decision making. But remember, the intuitive and rational decision-making processes are not mutually exclusive.

When using intuition in your decision-making, you should combine it with other rational processes to create an effective balance between creativity and rational boundaries. As well as complementing each other, the two approaches keep each other in check. The secret to getting intuitive and rational decision making to work together is to evaluate the decision until you get to the point where your logical and intuitive perspectives are in harmony and balance. This empowers you to make effective and difficult decisions.
Intuition plays an important role in decision making, especially when decisions are complex, ambiguous, or urgent. Your experiences, memories, conditioning, pattern recognition, and inherent knowledge all contribute to your intuition, which can aid rational decision-making. Following your instincts also improves confidence, which in turn can improve your decision-making skills. The best approach to decision making involves balancing both intuition and logic, so that they complement one another.
# Steps to Deal with Uncertainty

**Purpose:** Use this job aid to review the steps in a systematic process for handling uncertainty during decision making.

## Handling uncertainty

<table>
<thead>
<tr>
<th>Steps</th>
<th>Substeps</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td><strong>Step 1:</strong> Identify the unknown areas</td>
<td>Brainstorm to generate a list of areas of uncertainty</td>
<td>The first step is to identify all areas of uncertainty that affect your decision. Brainstorming and consulting others can help you do this.</td>
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<tr>
<td></td>
<td>Translate each uncertainty into a range of possible values</td>
<td>Expressing each uncertainty as a range is more helpful than using single-point estimates, which don't identify the possible variations in values.</td>
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<td></td>
<td>Quantify the uncertainties using confidence estimates</td>
<td>By quantifying your uncertainties, you'll be able to give an idea of how likely they are to have an effect.</td>
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<td><strong>Step 2:</strong> Prioritize the unknowns</td>
<td>Compare and assess alternatives</td>
<td>You should compare the uncertainties and determine which ones will have the biggest impact on your decision. You then assign these the highest</td>
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## Steps to Deal with Uncertainty

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<td>priorities.</td>
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<td>Clarify the impact of uncertainties that may work together</td>
<td>Some uncertainties will work together. In this case, you need to identify them and multiply them to get a better idea of the effect they'll have.</td>
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<tr>
<td><strong>Step 3:</strong> Reduce key uncertainties</td>
<td>Collect information and acquire knowledge</td>
<td>To help reduce uncertainty, you can seek knowledge from a variety of sources.</td>
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<td></td>
<td>Bring the horizon closer</td>
<td>You can often reduce uncertainty by shortening the time over which a decision is implemented. This leaves less time for things to go wrong or for changes that impact the decision to occur.</td>
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<td>Take risk-reducing steps</td>
<td>Specific steps can reduce uncertainty and risk during the implementation of a decision. Examples include dividing implementation into stages and reviewing each completed stage before proceeding to the next, and using probationary periods if you're making a hiring decision.</td>
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<td></td>
<td>Create contingency plans</td>
<td>Being prepared if things go wrong is an important aspect of reducing uncertainty and the risk of a decision.</td>
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</table>
Job Aid

Choosing Appropriate Alternatives

**Purpose:** Use this job aid to review the steps in a process for making appropriate trade-offs when evaluating decision alternatives.

**Step 1: Create a consequence matrix**

- Create the matrix as a table, with alternatives listed as column headings and objectives listed as row headings.
- In the matrix cells, enter values describing how well each alternative meets each objective. For each objective, you can use qualitative values – like "good," "fair," and "poor" – or quantitative values – which are numeric. However, ensure you use the same format across each row.
- If the matrix contains too much information to allow for easy comparison of alternatives, consider substituting ranking values for your original entries. To do this, work row by row, one objective at a time, and decide which alternative best meets each objective. Assign the consequence of this alternative a value of 1. The second-best consequence can then be ranked as 2, and so on. Alternatives with equal impact on a specific objective can be assigned the same value.
Step 2: Eliminate weaker alternatives

If one alternative is worse than another on certain objectives, and no better on other objectives, you should eliminate it because it's a weaker alternative. Also, if one alternative is weaker or the same as another on all but one objective, and this objective is of minor value to your decision, you can remove it.

Step 3: Make trade-offs

Follow the four-step process for making trade-offs between the remaining alternatives:

1. determine what change would be necessary to eliminate an objective
2. decide which change in another objective would compensate for the elimination in the first step
3. make the relevant switch, and
4. choose the best alternative based on an assessment of the data that remains
Glossary

A

Accountability
A type of **motivational bias** involving overemphasizing the interests of those to whom you are accountable or for whom you're responsible.

Action plan
A problem-solving tool used to list the actions or tasks involved in a chosen solution. It includes such information as who will carry out the task, how much it will cost, and when it should be completed by.

Advocacy
The act of vehemently defending or advocating a particular viewpoint.

Analytical problem-solving skills
Skills associated with the use of logic, reasoning, and abstract thinking to solve problems.

Anchoring
A type of **cognitive bias**. It involves holding onto initial ideas, even when updated information or options become available.

Authoritative decision-making style
Similar to the authority or expert style, a decision-making style in which one person makes decisions independently and then informs others.

Availability
A type of **cognitive bias**, arising from people's tendency to remember and prioritize information that's readily available and vividly presented, and to overlook other information.

B

Bias
A distortion of reality caused by cognitive or motivational factors.

Brainstorming
A problem-solving tool used to come up with as many creative solutions to a problem as possible, while withholding criticism or analysis of the ideas generated.

C

Cause
Something that produces an effect, result, or consequence.

**Cause-and-effect diagram**
A problem-solving tool used to map out the complex, underlying causes of a problem. Also called a fishbone diagram due to its appearance.

**Cognitive bias**
A type of bias caused by faulty methods of information processing.

**Competency**
A set of success factors required for achieving results. It includes a combination of knowledge, skills, and abilities.

**Consensus decision-making style**
A decision-making style similar to a "we all decide" approach, in which individuals participate equally in reaching a decision. The final decision chosen is the one that everyone in the group can accept and support.

**Consequence matrix**
A table that lists decision alternatives as column headings and decision objectives as row headings, with each cell containing a rating or ranking indicating the consequence an alternative will have on a particular objective. It's a useful tool for making decisions in which alternatives must be evaluated in terms of multiple objectives.

**Consultative decision-making style**
A style of decision making in which the decision maker incorporates input from others but retains responsibility for making a final decision. It can be likened to an "I decide with your input" approach.

**Contingency plan**
A plan of action created for the use in the case of an unforeseen event.

**Cooperation**
A type of motivational bias involving selecting solutions that please others, rather than those that are the best.

**Cost-benefit-analysis**
A process to determine the financial payback of a potential solution.

**Creative problem-solving skills**
Skills associated with finding original and innovative solutions to problems.

**Critical thinking**
Any form of analytical thinking, involving the systematic use of logic.

**Democratic decision-making style**
A decision-making approach in which the opinions or views of others are considered. It's a broader categorization of the four decision-making styles, encompassing the consultative, traditional majority or voting, and consensus styles.

**Devil's advocate technique**
A decision-making tool that helps you to evaluate, revise, or reject alternatives through the use of repeated criticism of a given alternative by a formally appointed devil's advocate.

**Ease-and-effect matrix**
A decision-making tool used in evaluating alternatives based on their effectiveness in achieving the desired result and their ease of implementation.

**Five-why analysis**
A problem-solving tool used to get beyond the symptoms of a problem to the root cause itself. It involves asking 'Why?' as many times as necessary.

**Force-field analysis**
A process of analyzing and displaying factors that work for and against a potential solution.

**Framing**
A type of **cognitive bias** that involves presenting or perceiving the world in a particular way, which is often dictated by one's own expectations, biases, presumptions, and experiences.

**Gap analysis**
A problem-solving tool used to compare one's current state with the state one wants to be in.

**Interpersonal problem-solving style**
An approach to problems characterized by a focus on values, this style prizes relationships and loyalty, and favors introspection, empathy, and spontaneity. The ineffective qualities of this style include impulsivity, procrastination, subjectivity, and a tendency to overpersonalize issues.

**Low-hanging fruit matrix**
A problem-solving tool used to map the effectiveness of possible solutions against how difficult or demanding they are.

Motivational bias
A type of bias caused by people's underlying motives and needs.

Mr/Mrs Perfect Problem Solver composite
A list or table containing the names of individuals you deem to be good problem solvers and the skills these individuals exhibit.

Multi-attribute analysis
A process to compare different potential solutions, under weighted criteria, to determine the best one.

Need for closure
A type of motivational bias involving cutting the problem-solving process short to meet the desire to solve a problem quickly.

Nominal group technique
An alternative generating and decision-making tool that includes individual brainstorming and ranking of ideas within a group of 8 to 10 people.

Nonlinear problem-solving style
An approach to problem solving that's original, creative, and imaginative. This style can, however, also be idealistic, naïve, unrealistic, impractical, and disorganized.

Overconfidence
A type of cognitive bias that involves overestimating your chances of success.

Payback period
The period of time that it takes for an investment to pay for itself.

Plus/Minus/Interesting analysis
See PMI analysis

PMI analysis
The abbreviation for Plus/Minus/Interesting analysis which is an evaluation and selection tool used in decision making. This tool involves listing positive and negative outcomes as well as the extended implications of taking action, whether positive or negative.

Practical problem-solving skills
Skills applied to solve common, situational problems, using experience and intuition.

**Pragmatic problem-solving style**
A problem-solving style that focuses on practical solutions and is goal-oriented and assertive. Negative characteristics associated with this style can include being short-sighted, selfish, controlling, overbearing, or arrogant.

**Problem solving**
The mental process followed when one has a goal but can't immediately see how to achieve it.

**Quantify**
To express the quantity, percentage, or numeric value of an entity.

**Range**
All values between a specified lower and upper value. Ranges are useful for expressing possible values of uncertain variables when evaluating decision alternatives.

**Rational problem-solving style**
A problem-solving style applied by those who favor a systematic and logical approach. Negative characteristics that can be associated with this style include being indecisive, overcautious, unemotional, or rigid.

**Return on Investment**
See ROI.

**ROI**
The abbreviation for Return on Investment, which is a decision-making technique that acts as a financial measure of the merit of a decision alternative.

**Self-enhancement**
A type of motivational bias involving the selection of solutions that enhance your image or well-being.

**Skill**
An ability to use knowledge to accomplish a task. Skills can be inherited, or acquired through training and conscious effort.

**Sunk costs**
Funds that are currently being spent on existing resources such as staff and facilities.
T

**Traditional majority or voting decision-making style**
A decision-making style in which decisions are based on what the majority feels. It can be likened to a "majority rules" approach.

U

**Uncertainty**
An unknown or unpredictable variable. One, many, or even all variables in a decision may be uncertain.

W

**Weighted criteria**
A set of criteria that are assigned relative values within the set, i.e. within a certain set, the cost criterion could be worth three times as much as the ease of installation criterion.
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