Problem Solving for Managers

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Preface

This eBook describes root cause analysis and some of the most popular problem solving techniques that support it.

It describes the following tools and models:

- Root Cause Analysis
- CATWOE
- Five Whys
- Cause and Effect Analysis
- Interrelationship Diagrams
- Barriers to Problem Solving

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Introduction

This eBook describes six key principles for problem solving that all successful managers should know. Problems are an inevitable consequence of business and the following techniques will help you to identify and resolve them in a structured way.

1. Root Cause Analysis

   Problems and issues occur in every organization. For these to be properly resolved then the underlying causes of those problems or issues needs to be identified and fixed. Organizations that conduct root cause analysis will see both long and short-term improvements occur. This analysis tool is ideal for teasing out the root cause of complex problems and finding a timely and workable resolution. This important concept allows corrections to be introduced preventing its recurrence in the future.

2. CATWOE

   Problem solving tools such as CATWOE are the ideal method of addressing major problems you face now and in the future. The CATWOE method of solving problems requires you to look at an issue or problem from six unique perspectives - Customers, Actors, Transformation Process, World View, Owner & Environmental Constraints. This enables you to have a better understanding and appreciation of the problem and the best way to resolve it for the organization to benefit.

3. Five Whys Tool

   The ‘Five Whys’ tool relies on the experience and knowledge of the people involved in the problem solving exercise to reach a satisfactory conclusion. When using this method it is essential to

have the necessary 'knowledge base' within your problem solving group. This method simply requires you to continue asking '*why?*' as many times as you need to identify the root cause of the problem you face.

4. Cause and Effect Analysis

   A proven method of problem solving is known as 'Cause and Effect Analysis'. This process requires a problem to be precisely defined and preferably narrow in scope, such as, 'Why is production in City Ville always lower in December? In this example, you know what the problem is and can start to develop solutions based on the underlying causes that you determine in your analysis and research.

5. Interrelationship diagram

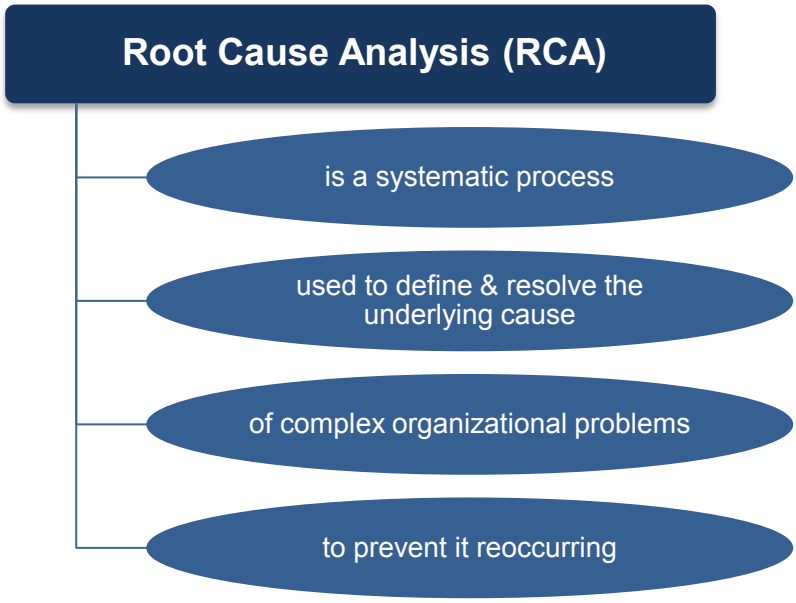
   Managers in large complex corporations cannot keep up-to-date with every facet of its organization. So when needing to solve problems they will use Interrelationship diagram (ID) to visualize exactly how a number of issues relate to one another within their organization. They are easy to use and extremely flexible so they can be used in a wide variety of situations.

6. Barriers to Problem Solving

   These barriers are things that prevent individuals from identifying a practical resolution to a problem. They are often referred to as - cognitive blocks – how we think and feel – as well as, physical and social blocks. Every individual has their own specific cognitive blocks and these affect which of the barriers they will encounter. Being aware of problem solving barriers helps us identify the best tools and techniques to use in our, or team, problem solving activities to remove such pitfalls.

Root Cause Analysis

Solving problems is the core of having success in business, or really, in any professional field. If you can successfully solve problems in a timely manner, you should be able to stay on track toward satisfactory outcomes.



Unfortunately, some problems are rather complex to unravel, which is why root causes analysis is so important. By employing this important concept when trying to solve problems, you can make efficient corrections to prevent similar problems from occurring in the future.

Finding the End of the Chain

Some problems are solved quickly and easily, as the root cause is only one step away from the issue that has arisen. In this case, a thorough root cause analysis is not really necessary, as it is easy to see what it is that has caused the problem in the first place. Of course, this is not usually how it goes in the real world, as real-life problems tend to have complex root causes that can be many steps down the line.

Those who are going to apply root cause analysis correctly are not going to just solve the immediate problem and hope it doesn't come back – they are going to look deeper, finding the underlying cause and correcting it appropriately.

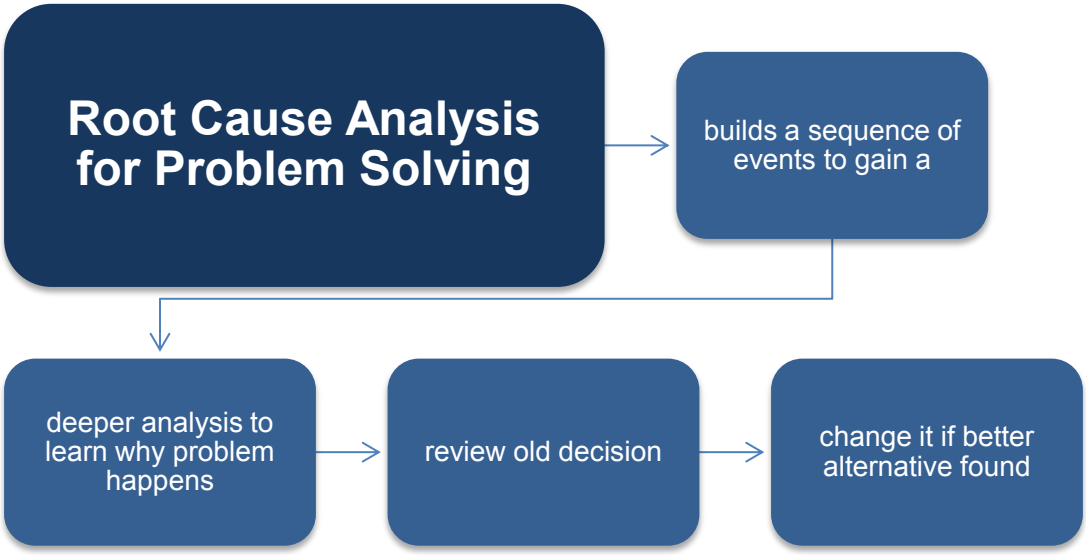
Root cause analysis should be a systemic process that is ingrained into the culture of an organization. Usually, it isn't going to be possible for just one

person to complete the entire RCA without assistance. Rather, there will frequently be many people (or teams) that come together in order to track down the actual cause of a negative outcome. When an entire group works together as one, it will be easier to trace the problem back to the root cause that needs to be addressed.

The best organizations tend to be those who are adept at tracking down these root causes quickly and efficiently. If your organization is always fixing symptoms instead of getting down to the root of the matter, you will quickly fall behind the competition. Master root cause analysis and you should be able to take a step forward in your day-to-day operations.

Building the Sequence of Events

The concept of building out a sequence of events for any problem that you are facing is core to good root cause analysis. This is what takes your analysis beyond a simple cause-and effect point and moves it into a deeper mode where you can truly understand all of the variables at play. This idea is perhaps better illustrated with the use of an example.



Imagine your company produces a product that is sold directly to consumers. This product is used around the house on an everyday basis, and it has a few moving parts. One of those parts is consistently breaking, and customers keep sending in requests for replacements. In an effort to

please your customers and uphold your reputation, you continue to ship out replacement parts, at considerable cost. You need to stand behind your product, but you also know that these replacements are taking a serious toll on your bottom line.

So, rather than just continuing to replace the part, a root cause analysis would require you to dig deeper in an effort to figure out why the part is breaking in the first place. While doing your RCA, you realize that the materials used to create that specific part are sourced from a different supplier than the rest of your parts. As it turns out, the decision was made long ago to use this less-expensive supplier for materials to use in the manufacture of this specific part in an effort to save money. However, now that you are having to replace the part on a regular basis, the cost of shipping replacements is far outweighing the savings that are being experienced.

So, in the end, the obvious choice is to upgrade the supplier and eliminate the need to ship replacement parts. This conclusion would only be reached, however, by going through a root cause analysis process. If you were simply content to provide good customer service by sending out replacement parts, your company would have continued to lose money in the process. Investing some time and effort in root cause analysis can pay off in a big way when you are unable to uncover a mistake in your operations.

Meeting Resistance

There is a chance that some in the organization will meet the push for in-depth root cause analysis with resistance. Why is that? Simple – root cause analysis has the potential to expose mistakes made by various managers and other employees along the way. Looking into the processes that are used to create a product or service will make it extremely clear where they are breakdowns within a business.

Therefore, some of the employees who are not confident in their work are likely to balk at the idea of using RCA on a regular basis. Of course, any

employees who express resistance to this idea should be carefully monitored, as they are likely the weak points within the organization.

The other reason for employees to resist the use of RCA is basic laziness. This is a highly-effective tool for improving your organization, but it is also a tool that requires some hard work to use effectively. Your entire team has to be willing to 'buy in' to the process of tracking down the underlying causes of problems that exist somewhere in the business. Without the commitment of everyone involved, this is a method of analysis that will fail to yield results.

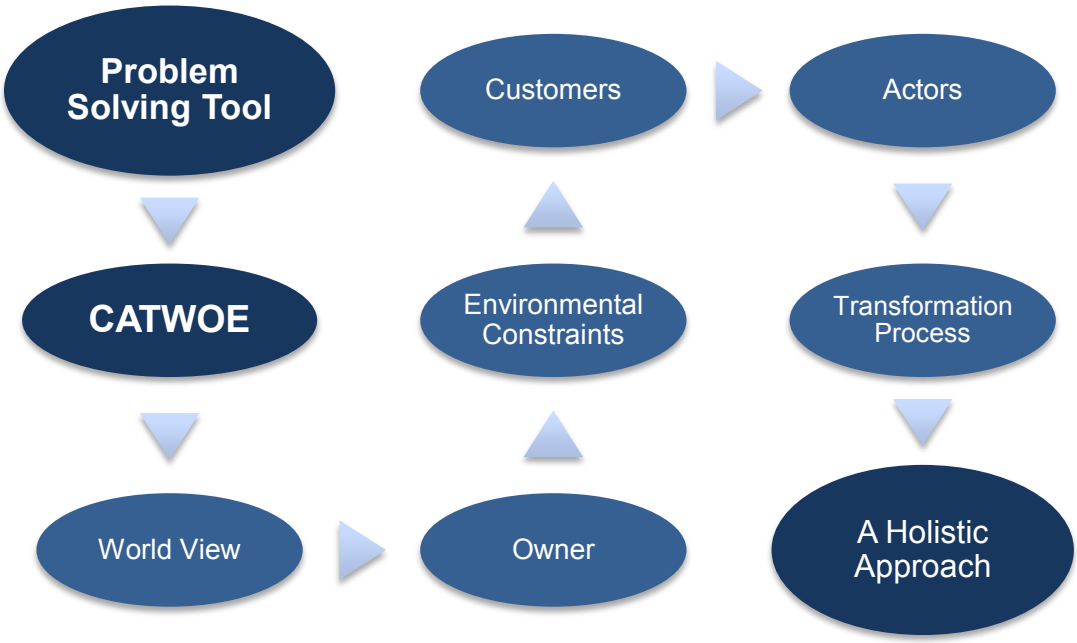
Nearly every kind of organization can benefit from using root cause analysis on a regular basis. Continuing to fix problems on a superficial level will only get you so far – at some point, the underlying causes of those problems will need to be fixed if you are going to improve your operations and reach organizational goals. Implement root cause analysis throughout your company and watch for signs of improvement in both the short and long term.

Key Points

- Root Cause Analysis is a method that is used to address a problem or non-conformance, in order to get to the 'root cause' of the problem.
- Organizations often respond to problems with short-term solutions that require staff to repeat the same tasks over and over again without addressing the underlying problem.
- If this is to be avoided then root cause analysis should be a systemic process that is ingrained into the culture of an organization.
- Root cause analysis involves five steps: define the problem, understand the problem, take immediate action, take corrective action, and confirm the solution.
- The process is often met with resistance because it has the potential to expose mistakes made by people inside the organization.
- Without the commitment of everyone involved, this is a method of analysis that will fail to yield results.

CATWOE

Every business owner or manager knows what it is like to try to solve a problem. Solving problems is a daily activity for those in any line of business, as it is the solving of problems that usually leads to the best outcomes. If you were to simply ignore the problems in your business, for example, you would quickly be passed by the competition and your company would be a thing of the past.



You already have some degree of problem solving experience and knowledge thanks to your background in business, but using tools like CATWOE can help you improve how you deal with the major problems that you may face in the months and years to come.

A Holistic Approach

Problems in business are often complex, and they can be difficult to unravel if you only look at one or two components at a time. Usually, in order to get to the heart of the matter and truly solve a problem once and for all, you need to look deeper at what is lying below the surface in order to reach a solution that is going to stand up for the long run.

CATWOE is a method of problem solving that asks you to look at an issue from six unique perspectives. This in-depth approach requires that you think

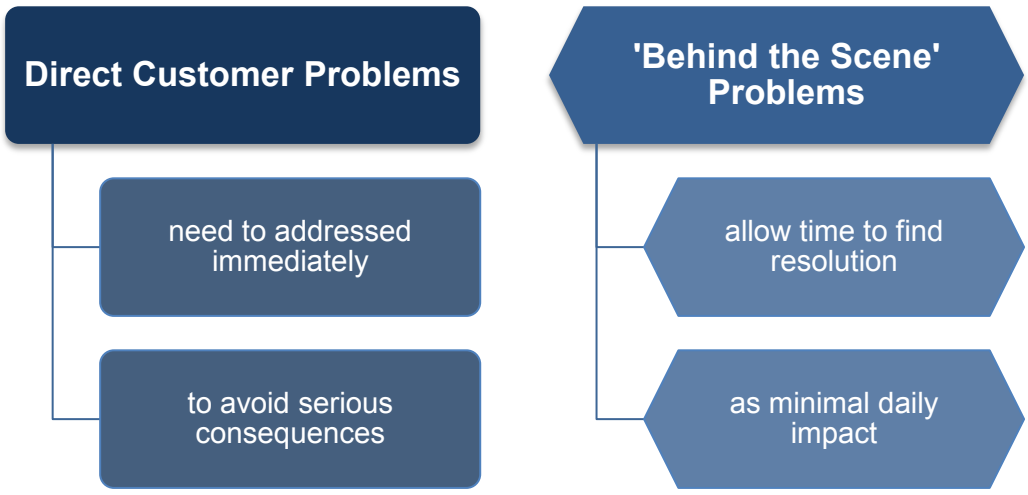
about any given problem in a variety of ways, and you will find that you have a better understanding and appreciation for the issue after you do so. The six elements that are to be considered in a CATWOE analysis are as follows:

- Customers
- Actors
- Transformation Process
- World View
- Owner
- Environmental Constraints

To help you better understand how each of these six elements can come into play with regard to problem solving, we are going to work through them one at a time below.

Customers

In business, everything comes down to customers. Whoever your customers are, they are the most important 'thing' about your business. Without caring for your customers and successfully meeting their needs, you will have nothing.



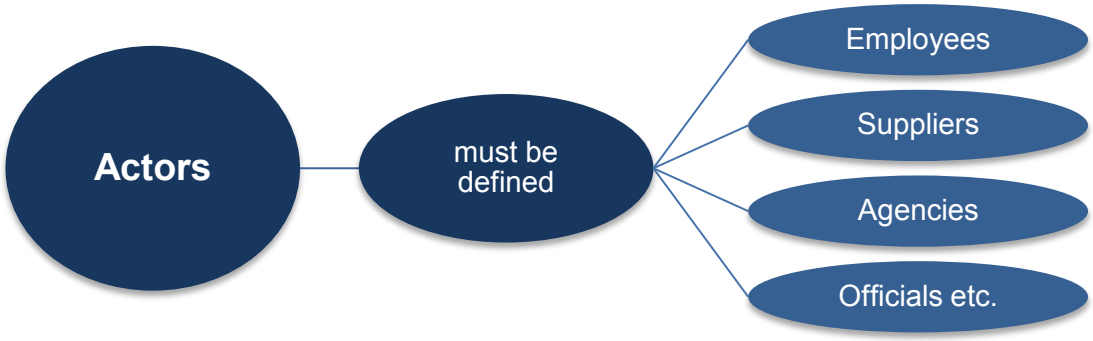
The revenue that you generate comes from your customers, and that revenue is only going to flow if they are happy and satisfied with your

products and/or services. Therefore, it only makes sense to consider their needs first and foremost when solving a problem that has arisen.

Is this a problem that has a direct, powerful impact on your customers? If so, you will need to address it immediately to avoid serious consequences. Or, is this a 'behind the scenes' problem that won't be felt by your customers at all? If that is the case, you may have more time to solve the problem without an adverse affect on day to day operations.

Actors

The 'actors' that are involved in any given business problem are those who are involved in the situation and will likely be involved in its resolution.



Frequently this group includes a number of employees, but it could also include outside agencies such as vendors or even government officials (in the case of regulations). Before you are going to be able to chart a path toward resolving this problem, you will need to figure out the role that every actor in the scenario is going to need to play.

Transformation Process

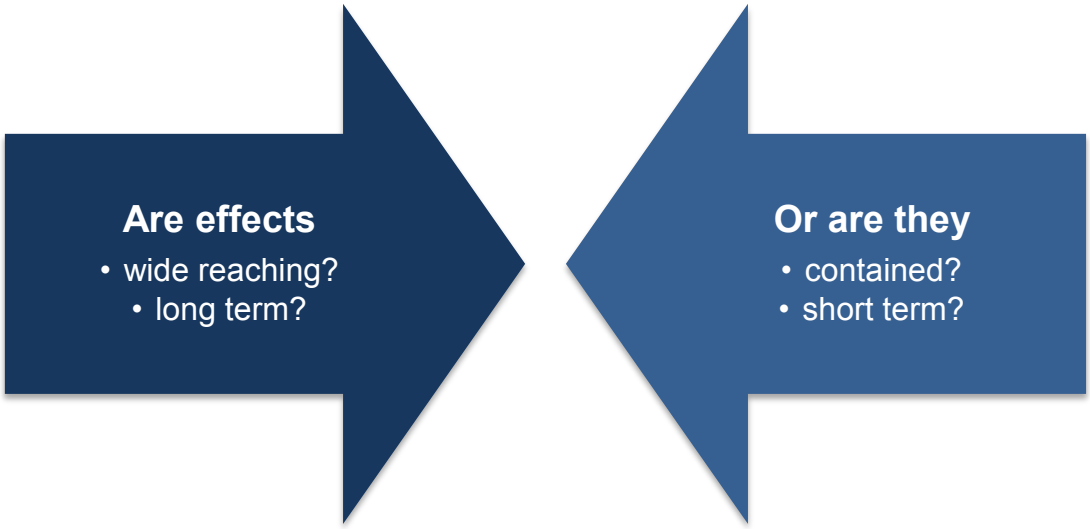
Most businesses are made up of a number of processes that are executed on a periodic basis. For instance, a manufacturing company uses a set of processes to create their final product, which is then sold to customers. No matter what kind of company you run or own, there are a number of processes that need to work perfectly for you to succeed.

How does this problem that you are facing impact those processes? What adjustments are going to need to be made, if any, to your processes after a

solution to the problem has been implemented? These are just a couple of the questions you need to ask at this stage of a CATWOE analysis.

World View

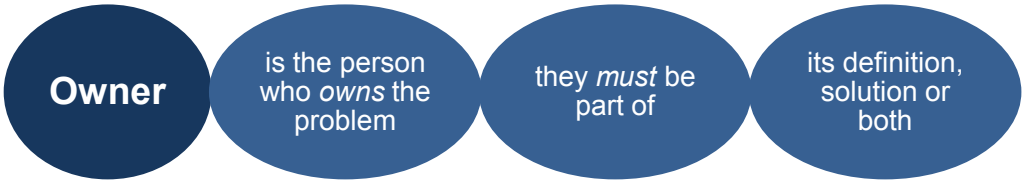
Step back from the problem and take a look at the bigger picture when you reach this stage of the analysis. Is this an issue that is going to have wide-reaching, long-lasting effects, or is it relatively contained and short lived?



You don't want to 'make a mountain out of a mole hill', but you don't want to underestimate a serious problem at the same time. Looking at the problem from a 'world view' will help you to get a handle on just how important it is in the scope of your business.

Owner

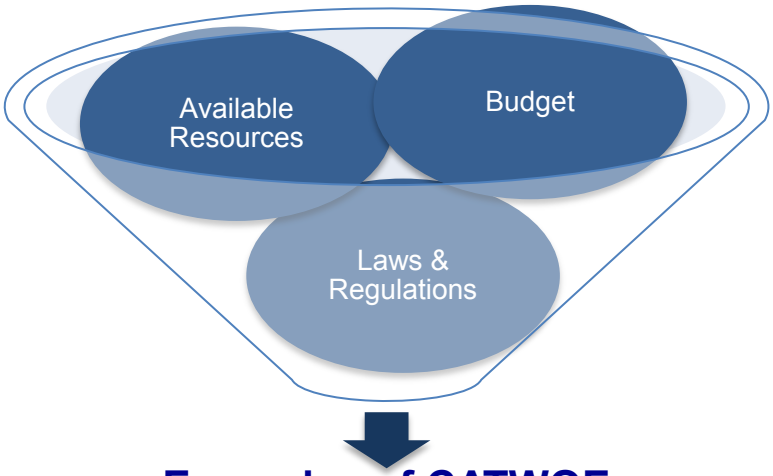
Rather than the owner of the company, this point refers essentially to the owner of the problem. Who is it that should be taking ownership of the situation at hand? Are they part of the problem to begin with, and can they be part of the solution?



Assigning ownership of the situation at hand is important because that person or group of people will likely need to be involved in some way in rectifying the matter.

Environmental Constraints

Some problems may have obvious solutions – but those solutions may be impossible to implement due to environmental constraints such as your budget or the time you have available.



Examples of CATWOE Environmental Constraints

This last step in the process is crucial because it brings you back to reality in terms of how you can solve the problem at hand. Once you have filtered out all of your potential solutions by thinking about the realistic constraints that you are working within, a final remedy may make itself clear.

Using the CATWOE methodology may not always be necessary from small, routine problems, but using this line of thinking when facing a significant issue in your business is a great idea. This six-pronged approach to problem solving will ensure that you think about the matter from all sides, and you should be able to come to a smart and viable resolution when you have finished. There will be some investment of time required to go through a CATWOE analysis properly, but that will be time well spent in the end.

Key Points

- CATWOE is an acronym that stands for: customers, actors, transformation process, worldview, owners and environmental constraints.
- CATWOE was defined by Peter Checkland, as a part of his Soft Systems Methodology.
- Soft systems methodology (SSM) is an approach to business process modelling that can be used both for general problem solving and in the management of change.
- The primary use of SSM is in the analysis of complex situations where there are divergent views about the definition of the problem.
- SSM is a seven stage process: Enter situation considered problematical, express the problem situation, formulate root definitions of relevant systems of purposeful activity, build conceptual models of the systems named in the root definitions, comparing models with real world situations, define possible changes which are both possible and feasible, and take action to improve the problem situation.
- It was observed that SSM was most successful when the Root Definition included the elements captured in the mnemonic CATWOE that contribute to the problem under investigation.

Five Whys

Solving problems on a superficial level can be a major mistake in business. You might think you are doing the right thing by solving a problem as soon as it pops up, but you may only be taking care of the top-level of a problem that runs much deeper. When that is the case, you will start to notice that this same problem comes up over and over again – likely costing you time and money in each instance.

Rather than dealing with the same problems over and over again, and making your business less efficient in the process, you should consider using the 'five whys' technique in order to get down to the heart of the issue at hand.

Unlike many other business methodologies, the five whys is a very loose methodology that relies on the experience and knowledge of the people involved in order to reach a satisfactory conclusion. Basically, using the five whys simply demands that you continue to ask 'why?' with regard to a problem until you get deep down to the root of the issue that you are facing.

While the number five is used in the title of this problem solving technique, it will often be the case that more or less whys are needed before the problem in solved. For example, some issues will only need to have the 'why'

question asked two or three times before reaching a satisfactory solution, while other problems will require that you go six, seven, or even eight layers deep.

A Basic Example

To better explain this concept and how it can work in practical application, let's walk through a basic example that could be relevant to a number of businesses. For this purpose, let's assume that the problem at hand is that one specific product within a large product line is not selling well at market.

This product is similar to other products, which are selling nicely, but it is underperforming and is costing the company money at this point. So, at first blush, the immediate reaction might be to simply take the product off the market and cut losses. After all, if it isn't selling and other similar products are selling nicely, there must be a problem with the product that makes it unattractive to consumers.

However, instead of just taking that decision for what it is, the five whys method could be applied to look for the root cause of the poor sales figures.

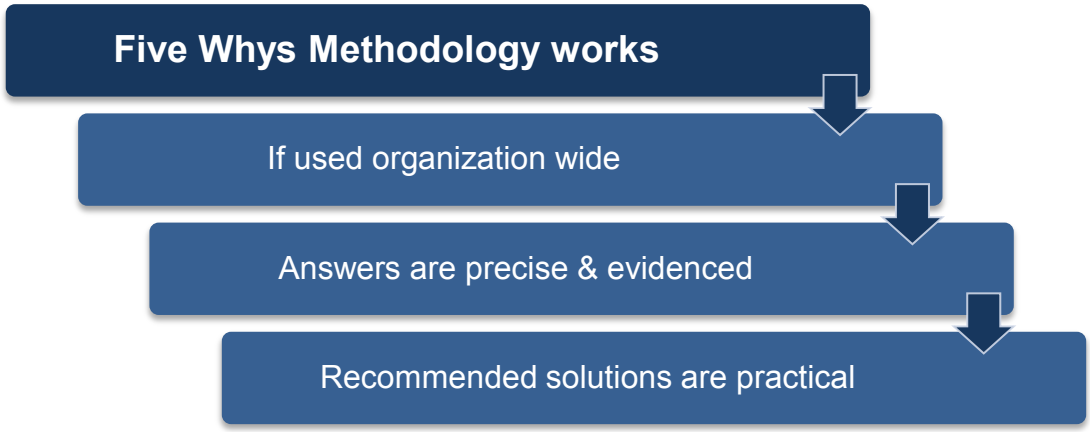
1. Asking why the first time could result in the answer that this product is sold at a higher price point than the other similar products in the line.
2. That higher price point could obviously be a deterrent to sales, so the natural follow up question would be why is this product being sold at a higher price? After consulting with another department in the business, you find that the product is made from more-expensive raw materials, resulting in the need for a higher price at market.
3. The next question asks why the product is made using more expensive materials, at which time it is discovered that the purchasing contract for those materials is old and should have been renegotiated. So, with that information uncovered, the business can work on a new deal for the materials, lower the cost of the unit, lower the price of the unit at market, and likely sell more in the end.

In this case, we only went through three levels of 'whys', and we were able to get down to the heart of the matter. It won't always be that easy, but following the 'whys' is usually going to lead to a solution at one point or another.

Using Five Whys Successfully

While this is a methodology that is rather free form in its application, there are some rules that you should have in place in order to make sure that this concept is used correctly in your business. One such rule is to make sure that the five whys concept is used company wide.

If only some of the management team is using this method to uncover problems and track down solutions, it is going to be limited in its power. Just as with anything else in your business, the success or failure of this concept is largely going to come down to the consistency with which it is applied.



Another important rule for the use of the five whys is ensuring that it is processes and systems that are evaluated, rather than people. There are other mechanisms in place for evaluating the people within your organization (or, at least, there should be), so employees and others involved in the process should be left out of this matter. For now, you are looking only at how the system is performing, and how it may need to be improved.

One other point that should be made regarding the use of the five whys is that the answers to the question of why need to be as precise and specific as possible. Since this method of analysis does not include a specific

framework for how it is to be completed, there is a temptation or tendency to be somewhat general when coming to conclusions.

Of course, general conclusions are not going to get you very far in business. Instead, make sure that all answers are as specific as possible, in order to put yourself on track for a successful resolution of each problem that is addressed.

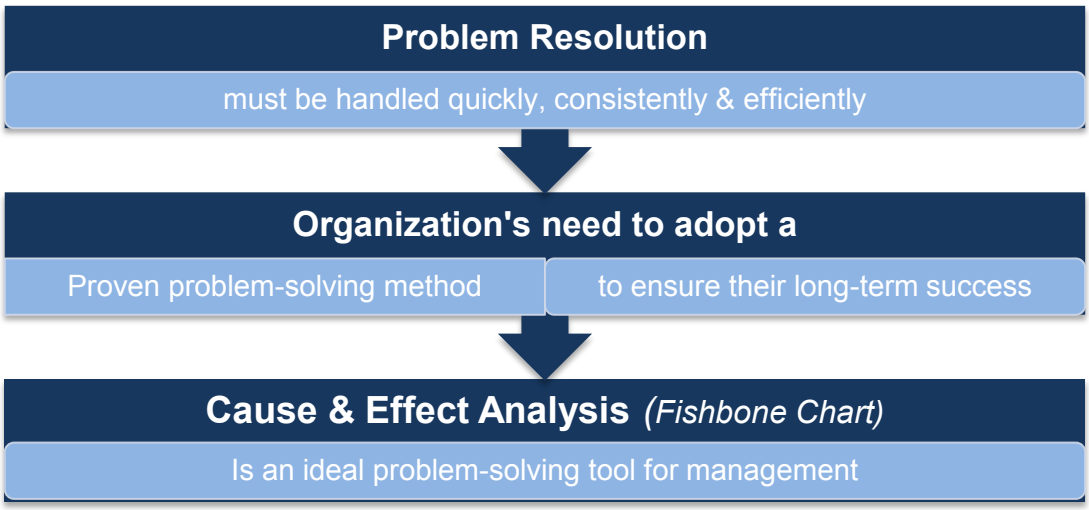
The five whys system can seem rather basic on the surface – and that's because it is. However, don't mistake the simplicity of this system for weakness, as it is capable of helping you to get down to the heart of a great number of business problems that you may face. Put this methodology into practice within your business and expect to start solving the root cause of many problems in the very near future.

Key Points

- Five Whys Analysis is a technique used to explore the cause-and-effect relationships underlying a particular problem.
- The goal is to determine the root cause of a defect or problem by repeating the question 'Why?'
- Each answer forms the basis of the next question.
- There is anecdotal evidence that five iterations are usually needed to get to the root of the problem.
- It is important that investigators do not stop at symptoms, but rather go on to identify the lower-level root causes.
- The technique cannot be used to find causes that the investigators cannot imagine. In other words, it is dependent on their knowledge and experience.
- There is no guarantee that the investigators will ask the 'right' questions and that a different team would not reach an alternative conclusion.

Cause and Effect Analysis (Fishbone Chart)

It is easy to let your mind 'wander' when you are working on solving some form of business problem. All businesses face problems, and you could even say that most businesses face them on a regular basis. If you own or manage a relatively large business, you likely have a problem of some kind popping up somewhere in the company regularly.



It isn't necessarily an issue to have these problems come up – as long as you are able to quickly and effectively track down solutions. It is the businesses that are able to solve their problems as efficiently as possible that will usually rise to the top at the end of the day.

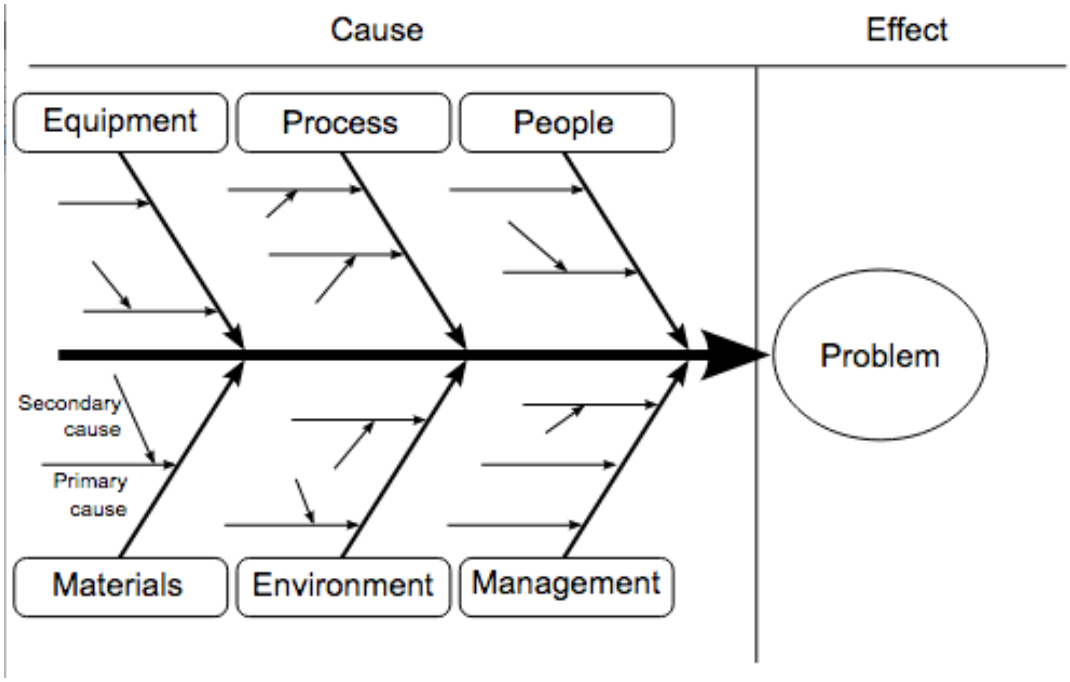
Unfortunately, far too many people wind up just sitting around the office brainstorming solutions to their problems, rather than really getting down to work on finding the right fix. In order to effectively solve problems in a timely and consistent manner, you need to have a methodology in place that can help you work through the process.

Once such methodology is Cause and Effect Analysis, also known as a Fishbone Chart. By using this method, and having your team use it as well, you should be able to improve your performance as an organization when it comes to problem solving.

The Skeleton of a Fish

This method of problem solving is often known as a Fishbone Chart because it may look like the skeleton of a fish when you are finished. To get started, you are going to want to write down your ultimate problem on the left side of a piece of paper.

If this process is going to be successful, one of the first things you need to do is make sure the problem is clearly defined and specific. For example, 'low revenue' is not a good problem to use as the start of your chart. Sure, having low revenue in your business is a problem, but something like that is far too broad in scope to use in this application.



www.wikipedia.org/wiki/Ishikawa_diagram

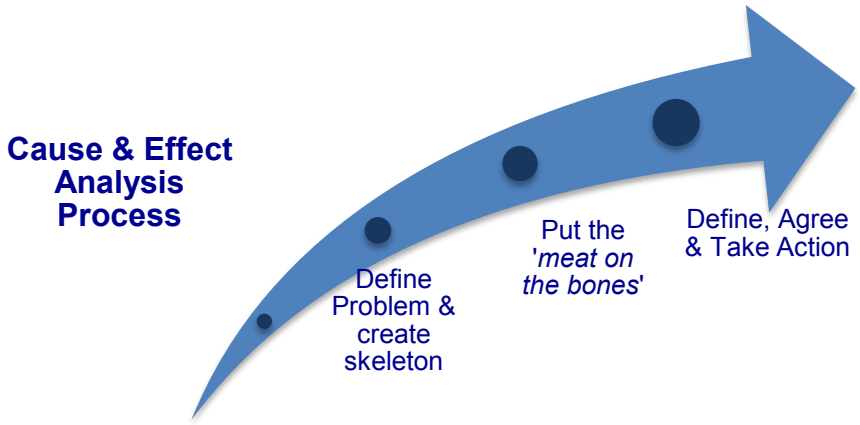
Rather, problems that land at the head of a Fishbone Chart should be in the vein of 'the specific piece of equipment continues to break down', or 'shipments from one specific supplier keep arriving behind schedule'. In these cases, you could go right to those problems and start to develop solutions based on the underlying causes that you determine in your analysis and research.

When the problem at the head of your chart is defined specifically and is narrow in scope, the whole exercise will have a much higher likelihood of success.

Expanding the Chart

Once you have the problem listed on the left side of your page, you can then move on to adding various factors that play a role in the issue. For instance, if we were to continue with the 'equipment breaking down' example from above, you could add the numerous factors that may come together to influence the reliability of your machinery.

Ongoing maintenance would likely be a factor on the chart, as would the workers who use the machine, as well as the parts that make up that machine. Think of as many factors as possible, and add all of them to your chart.



To finish the chart, you are going to branch off of these factors with potential causes that may be leading to your ultimate problem. This is where you start to get specific in drilling down toward the heart of the issue that is being faced. In this example, you might list 'inconsistent maintenance schedule' as a cause under the 'maintenance' factor that you added earlier.

It would stand to reason, of course, that an inconsistent maintenance schedule could potentially lead to problems with a piece of equipment. By fixing the schedule and providing your equipment with the ongoing care it needs, you may find that the problem of breakdowns suddenly goes away.

Don't be surprised if your Fishbone Chart becomes quite large as you continue to add potential causes to the various branches of the chart. Business problems tend to be rather complex, and there are many angles to consider when you are trying to figure out where things are getting off track.

By taking the time to go through the process of building out a complete Cause and Effect Analysis, potential causes of the problem may come to light that you would not have thought of otherwise.

Taking Action

A chart such as this is only going to be helpful to your business if you actually take action on the results of your work. Once the chart is complete and you have a long list of causes to examine, the job then switches to looking through those issues one by one until you decide what it is that needs to change.

Sometimes, you will have no trouble picking out which changes should be made, while other times you may have to debate back and forth on how you should attempt to first rectify the problem. Obviously, the sooner you are able to make the right correction, the better off the business will be in the long run.

You might find it helpful at this point to take your causes off of the chart and put them into an ordered list. Write out the numbers one through ten (or however many you need for this particular problem) on a piece of paper and then list the causes from your chart from top to bottom in order of importance (as you see it).

This list will give you something to work from as you attempt to solve the matter one fix at a time. As you go down the list, you will hopefully only need to check off a few points before things are back on track.

Using a Cause and Effect Analysis, also known as a Fishbone Chart, is a great way to solve business problems. You don't want to waste too much time or too many resources trying to solve important problems, so use this

system right up front to organize your thoughts and then get down to work on finding the perfect solution.

Key Points

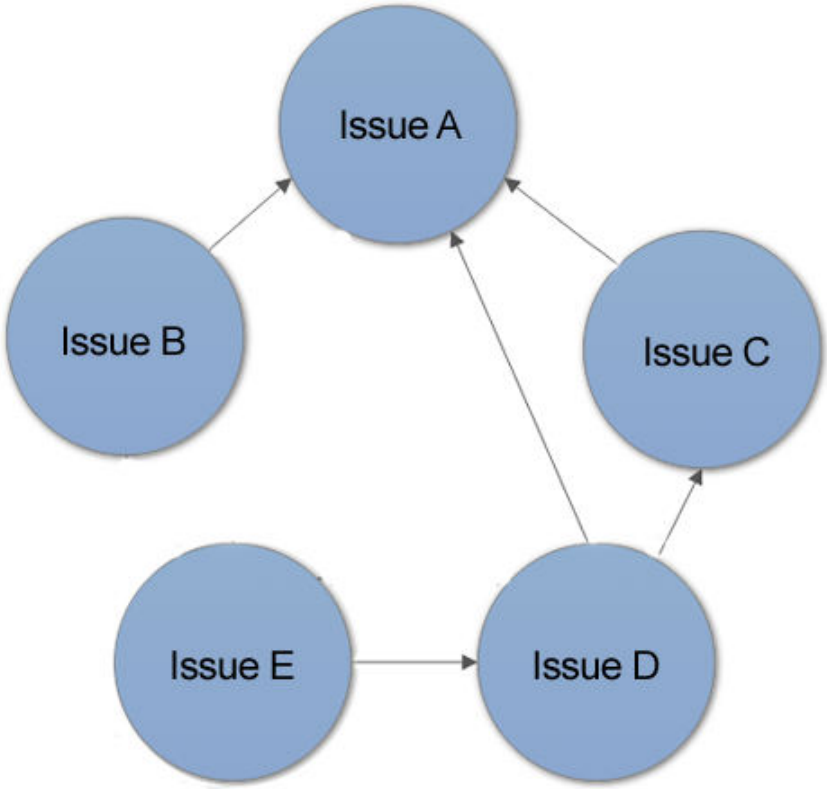
- A cause and effect diagram, often called a 'fishbone' diagram, can help in brainstorming to identify possible causes of a problem and in sorting ideas into useful categories.
- They are commonly used in product design and quality defect prevention to identify potential factors causing an overall effect.
- Each cause or reason for imperfection is a source of variation.
- Causes are usually grouped into major categories to identify these sources of variation.
- The 5 Ms used in manufacturing industry are: machine, method, material, man Power, and measurement.
- The 8 Ps used in marketing industry are: product/service, price, place, promotion, people/personnel, process, physical evidence, and packaging.
- The 4 Ss used in service industry are: surroundings, suppliers, systems, and standard documentation skills.

Interrelationship Diagrams

You probably think you already understand your organization and your business. And, on many levels, you probably do. But, do you understand it well enough to make meaningful decisions and changes when necessary?

Organizations are endlessly complicated, especially when they grow to be large businesses with many different divisions and numerous employees. It is hard to keep everything straight in your head, even if you have been with the organization since day one.

So, in order to straighten things out mentally and provide yourself with a chance to solve problems in an effective manner, you may want to consider using interrelationship diagrams.



An interrelationship diagram, or ID, is a chart that can help you to visualize exactly how a number of issues relate to one another within your organization. When used properly, these diagrams are highly useful and they can help you make intelligent strategy decisions about the future of the company in question.

Fortunately, interrelationship diagrams are easy to use, they are easy to learn, and they can be employed in a great number of situations.

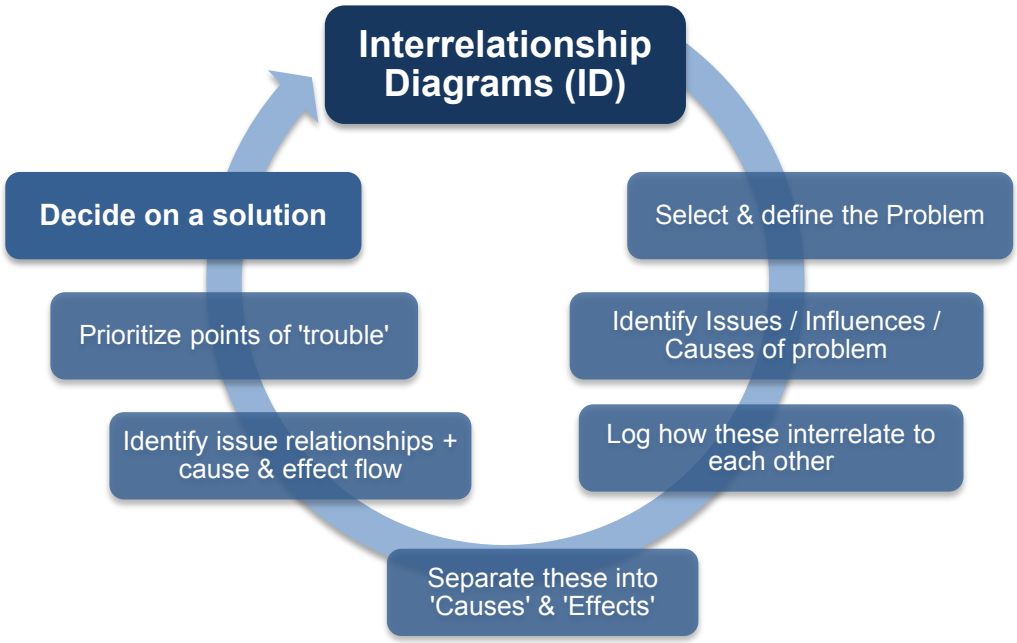
Getting Started

To get started with an ID, the first thing you need to have is a problem to solve. Unfortunately, you probably won't have to look too far to find a problem within your organization. Every organization has a long list of problems that they need to solve, as it is the nature of business to go through a regular cycle of problems and solutions. Even the best businesses have problems – in fact, it is really the ability to find good solutions that separates the top performing organizations from the rest.

So, to start your first ID chart, you will need to pick out a problem that needs to be solved. Once you have that problem in mind, it is going to be written down at the top of the page you are using for the diagram. From there, the next step is to identify a number of various issues that could be impacting that problem.

At this stage, you are simply brainstorming, so think of any issues within the organization that might be related to the problem in question, and write them down around the page. They don't need to take any specific form at this point – they should just be logged clearly on the page so they can be dealt with later.

Depending on the type of problem at hand, and the number of influences that relate to that problem throughout the business, you might find that you only need to write down a few potential issues – or you may need to fill up the entire page and then some. Whatever the case, be sure to do a thorough job of exploring potential causes of the problem before moving on.



Making Sense of the Mess

When you are done writing out all of the potential issues and causes that could be impacting this problem, the page you are left with will likely be a bit of a mess. That is okay – you are going to start sorting it out in this next step. At this point, your task is to determine exactly how all of the various notes on your page impact one another. For example,

> *Some of the potential issues that you identified impact each other before you even get to the problem in question?*

Most likely, the answer is yes. The whole point of this interrelationship diagram exercise is to determine how things work together in the organization, and this portion of the process is the most important step of all.

At the heart of the process, it is really all about cause and effect. You need to work through the process of determining which issues on your sheet are causes, and which are effects. It is very likely that many of the points you have written down will fall into both categories, depending on their place in the timeline of events.

You are going to draw arrows from one issue to another in order to indicate relationships and cause and effect flow. As the diagram begins to come together, you will notice a flow begin to develop on the chart, and you will soon begin to gain a picture of how you end up with the problem that was at the root of the whole diagram.

Look for Troublemakers

Are there any points on your sheet that seem to have a great number of 'out' arrows while having very few, if any, arrows pointing inward? If so, those issues just might be at the heart of your problems.

It is common to have just one or more points leading to a variety of trouble spots in an organization, which means you may be able to take great steps forward if you are only able to correct those basic issues. Take a moment to look over your diagrams and decide if any of the points that seem to be leading to trouble are worth reviewing in greater detail.

In the end, your ultimate goal is obviously to solve the problem that you started with at the top of the page. To do so, you need to read the diagram carefully and choose exactly how you are going to proceed in order to come to a successful conclusion.

Which points should you address first?

Which do you think are most likely to solve the problem in the least amount of time, or with the greatest effect?

Use your critical thinking skills, along with the perspective that you have gained from creating the diagram, and you should be a big step closer to a satisfactory outcome.

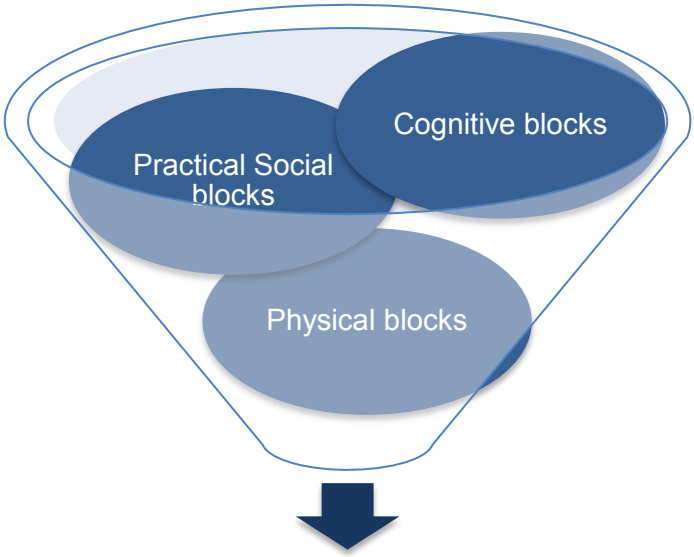
Interrelationship diagrams are only one way to solve problems within an organization, but they have been proven to be effective time and time again in real world applications. Once you get the hang of using this tool in the workplace, it just may become your preferred option for solving problems and keeping your organization as a whole on track.

Key Points

- Interrelationship diagrams (ID) show how different issues are related to one another and help identify which issues are causing problems and which are a result of other issues.
- A diagram consists of a set of circles representing each issue to be considered organized in a radial pattern on the page.
- Connecting lines between the boxes indicate relationship with arrows showing the direction of the relationship.
- There are 5 steps involved in an interrelationship diagram analysis: Identify the problem, identify the issues, connect the issues, analyse the relationships, solve the problem.
- Although they do not identify detailed reasons for the problem, interrelationship diagrams allow causes and effects to be clearly seen.

Barriers to Problem Solving

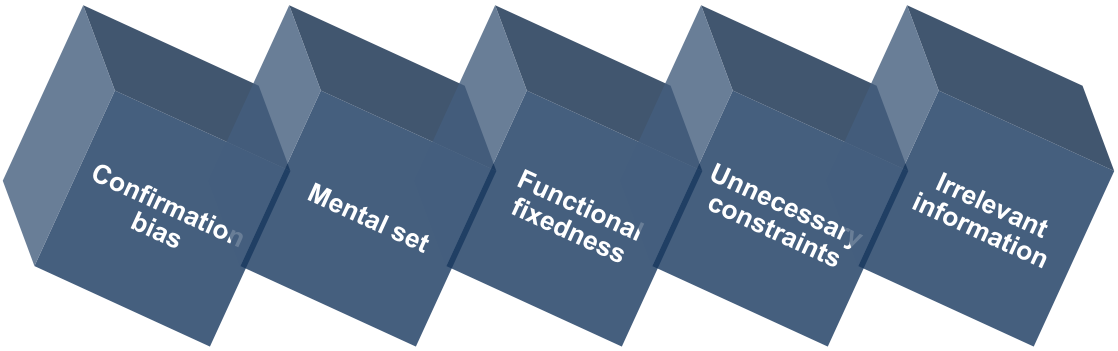
A problem-solving barrier is something that stops people finding a successful solution to a problem. These barriers are often caused by cognitive blocks – how we think and feel – as well as by practical social and physical blocks.



Everybody has cognitive blocks, and each person will have different types and at different intensities. This will influence which barriers we encounter. It is important that people are aware of the range of barriers, and that the impact they have on problem solving. In this way the barriers can be overcome.

Key Barriers are:

- Confirmation bias
- Mental set
- Functional fixedness
- Unnecessary constraints
- Irrelevant information



What causes these barriers?

Perspective

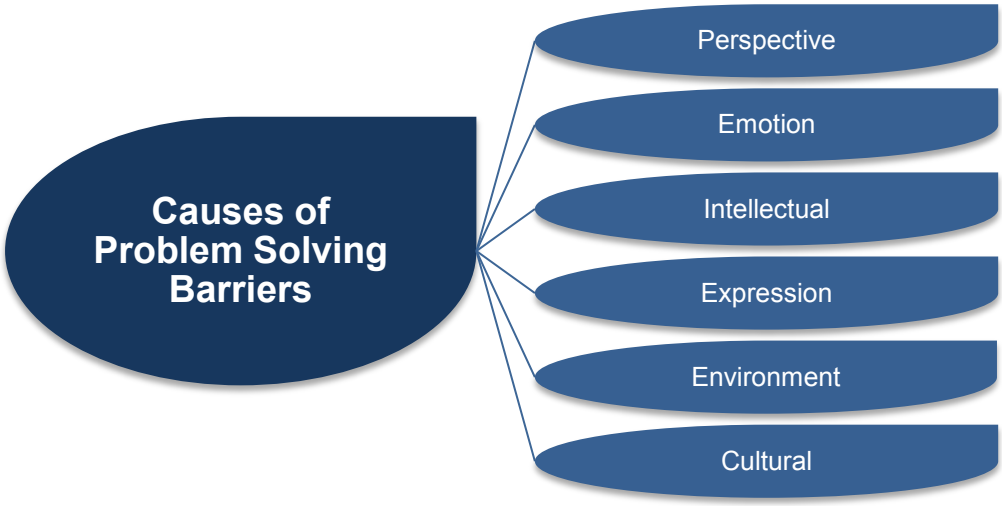
Perspective causes us to see the world in different ways, and from different viewpoints. A marketing officer is likely to see a problem in a different way to a service manager.

> *Perspective can cause potential solutions to be missed or ignored as unworkable based on our beliefs, attitudes and opinions.*

Emotion

Emotional blocks are the things that we feel that stop us to problem solve accurately. This could be not suggesting an idea because it may sound stupid, and make us appear silly.

Another example; is fear of change, or feeling guilty that the problem occurred in the first place.



Intellectual

Intellectual barriers can be caused by not having the training, skills or knowledge to solve a problem. For example, it could be a lack of skills in evaluation or research etc.

Expression

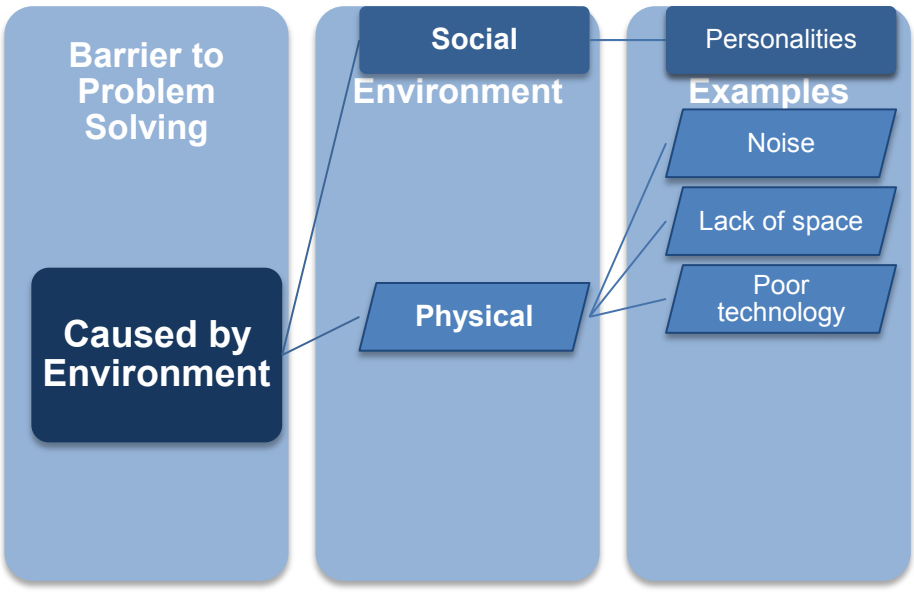
This is about how we express ourselves.

> *Poor expression of problems and solutions lead to misinterpretation and communication.*

Many problem-solving techniques often have a way to solve this directly via creating a problem definition and the use of visual techniques. But people may still struggle to come up with an accurate description – using a best fit instead.

Environment (or functional constraints)

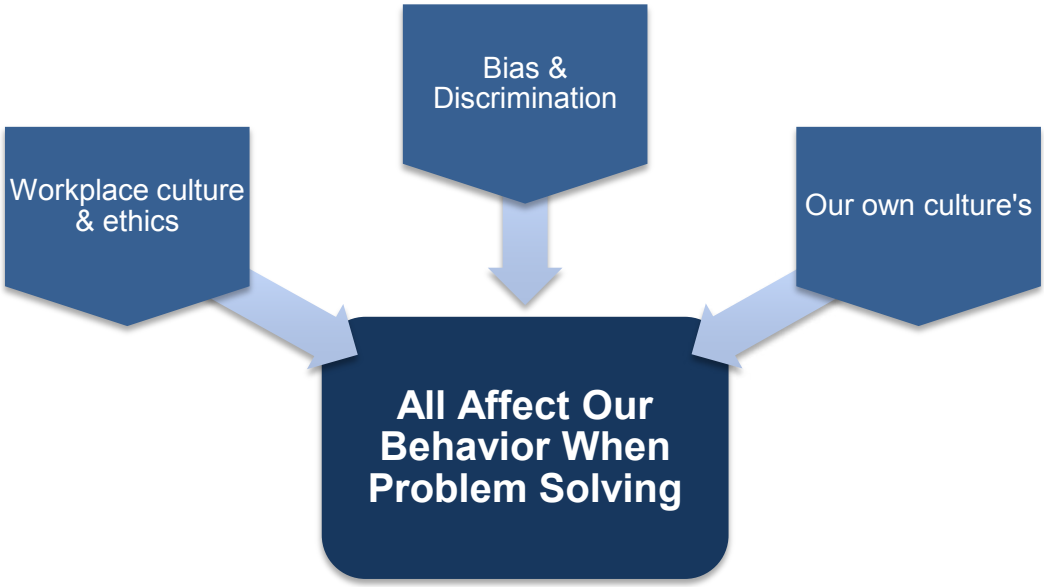
These are hindrances caused by the social or physical environment, and impact on our ability to think clearly or to perform a task. For example, a noisy office stops the problem solver being able to concentrate on the task.



However, environmental blocks can also be more practical, e.g. no access to a PC with the correct software. Environmental issues can be easy to overlook and relate directly to external experiences rather than internal thoughts and feelings.

Cultural

This works on three levels. One is about how we behave in relation to workplace culture and ethics. For example, in the workplace it may be discouraged to interrupt other employees in the work place, so you feel you can't approach people to get their input. The next is about our own cultural bias. This includes all forms of discrimination. The final one is about how our own culture expects us to behave.



If you come from a culture where it is encouraged to be reserved, you may have issues sharing your ideas. If you come from a culture where discussion is encouraged, you may diverge from the topic. This often starts with 'By the way', 'Before I forget', or 'While I remember'.

Problem Solving Barriers

Different blocks, and combinations of these result in a range of barriers to problem solving. There is no definitive way to link blocks to barriers but some suggestions are provided below.

Confirmation Bias

This is about not following the problem solving method, and so introducing bias. This can be the result of missing steps out, or not using them correctly.

> *Confirmation Bias arises when the approach taken is to confirm a preconceived solution.*

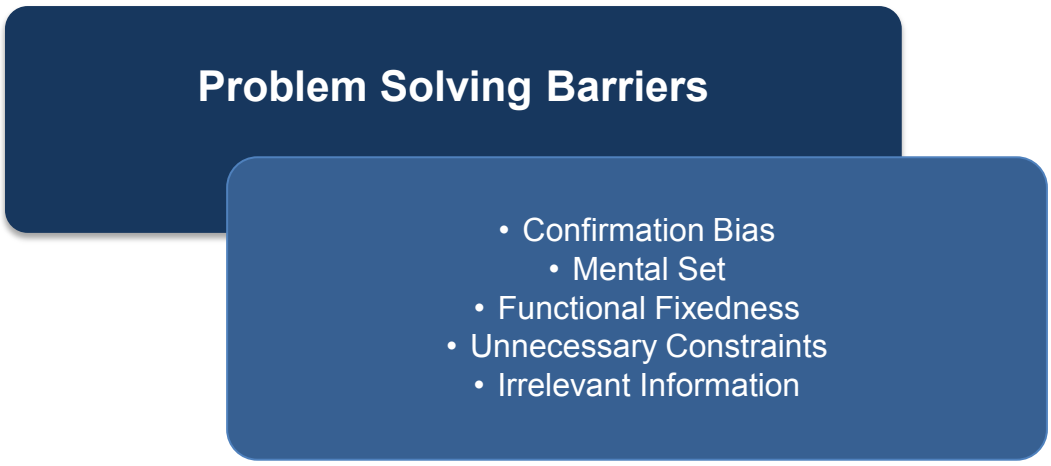
Basically, you would have found the solution before you found the problem, and perceive the problem solving method through this lens (perspective and intellectual blocks). For example, if you feel you already know everything about the problem, you won't perform research, or only research things that confirm the appropriateness of the solution you want to use.

Mental Set

This comes from relying too heavily on heuristics - the clichés of problem solving, like a 'rule of thumb' or 'common sense' as a way to solve a problem, rather than actively looking for the best or simplest solution.

> *It is about reusing what has been successful in the past, rather than assessing and evaluating the problem.*

The heuristic for mental mind set could be called 'why reinvent the wheel'. It relies on previous experiences to direct how a problem can be solved. This could be an intellectual block, as the problem solver is not prepared to learn new problem solving skills, and emotionally relies on familiarity to feel comfortable with a solution.



Functional Fixedness

This is about not thinking creatively. It is a narrow mind-set.

> *Functional Fixedness comes from people thinking that an object has only one function.*

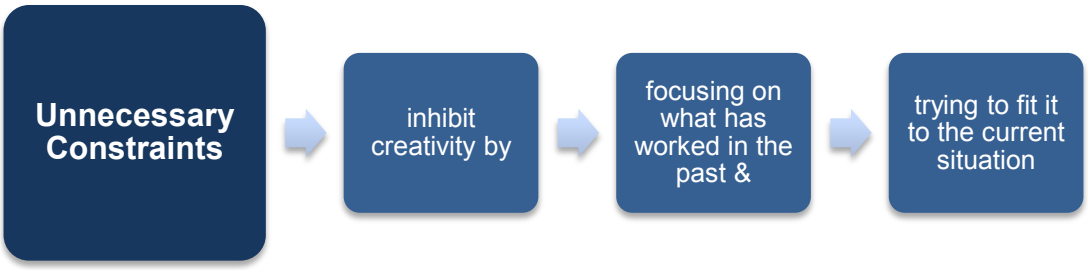
For example; a jug can only be used to pour fluids; it can't be used as a mixing bowl. It can be summarized, as '*You can't do that*'. Functional Fixedness affects the time taken to make a decision. If you don't have a mixing bowl, but won't use the jug, you waste time going to buy a new mixing bowl. Because it relates to objects, often caused by an intellectual or environmental block.

Unnecessary Constraints

This barrier causes unwarranted boundaries to be placed on a problem. It links to trying to solve a problem using previous experience of what has worked in a situation and trying to force it to work in the current situation, rather than looking for a new solution –

> *'Trying to fit a square peg in a round hole'.*

This inhibits creativity. The barrier can be removed by insight. Most problem solving methods focus on developing insight into a problem - through information gathering, evaluation and assessment.



Unnecessary Constraints could be caused by an intellectual block, or an emotional one causing an over reliance on the known. An example would be trying to improve a service using current procedures and processes, rather than find a solution and design new procedures and processes.

Irrelevant Information

This is information that is not needed to solve the problem, often caused by people diverging from the problem itself, onto other topics they feel are related or presenting too much information.

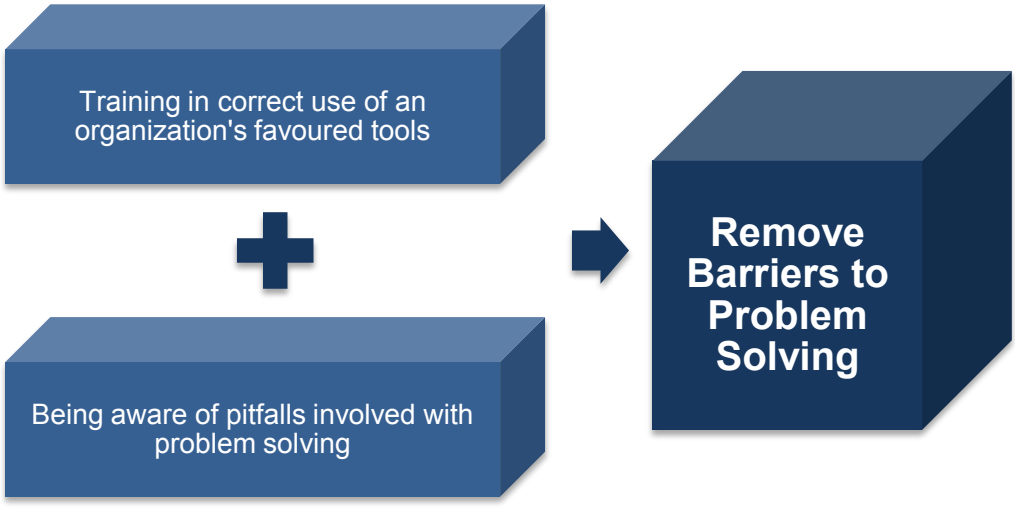
> *Irrelevant information hinders problem solving as it slows the process down, can cause confusion or misunderstandings.*

A brainstorming session can be impaired because people want to go off topic. This is why many brainstorming sessions have a facilitator to get things back on track. When gathering information, it can be getting distracted and looking at something that is interesting but not useful. It can result in too much information being collected, and people having trouble absorbing it.

> *For example, giving the problem-solving group full copies of all the information found, rather than summarising it as headlines, a graph or a mind map.*

This could be an expression block – people struggle to summarise the information, an emotional one – people fear they won't have enough information, or even a cultural one – full papers are always presented in meetings.

There are a range of barriers to problem solving based on cognitive blocks and practical social and physical jobs. These can be perceptual, emotional, intellectual, expressive, environmental, and cultural.



Cognitive blocks are our ways of thinking and feeling. These contribute to how we approach and carry out problem solving, leading to barriers. They usually introduce bias, errors, and result in imperfect solutions. These barriers can be removed by awareness of the pitfalls in problem solving, and training in how to use a problem solving method correctly.

Key Points

- Common barriers to problem solving are cognitive blocks that impede the ability to correctly solve problems.
- These can be perceptual, emotional, intellectual, expressive, environmental, and cultural.
- Everybody has cognitive blocks, and each person will have different types and at different intensities.
- Five of the most common are: confirmation bias, mental set, functional fixedness, unnecessary constraints, and irrelevant information.
- Confirmation Bias arises when the approach taken is to confirm a preconceived solution.
- Mental Set results from reusing what has been successful in the past, rather than assessing and evaluating the problem.
- Functional Fixedness comes from people thinking that an object has only one function.
- Unnecessary Constraints links to trying to solve a problem using previous experience of what has worked in a situation and trying to force it to work in the current situation, rather than looking for a new solution.
- Irrelevant Information is often caused by people diverging from the problem itself, onto other topics they feel are related or presenting too much information.
- These barriers can be removed by awareness of the pitfalls in problem solving, and training in how to use a problem solving method correctly.

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