

## MODULE 2 - APPROACH TO PROBLEM-SOLVING



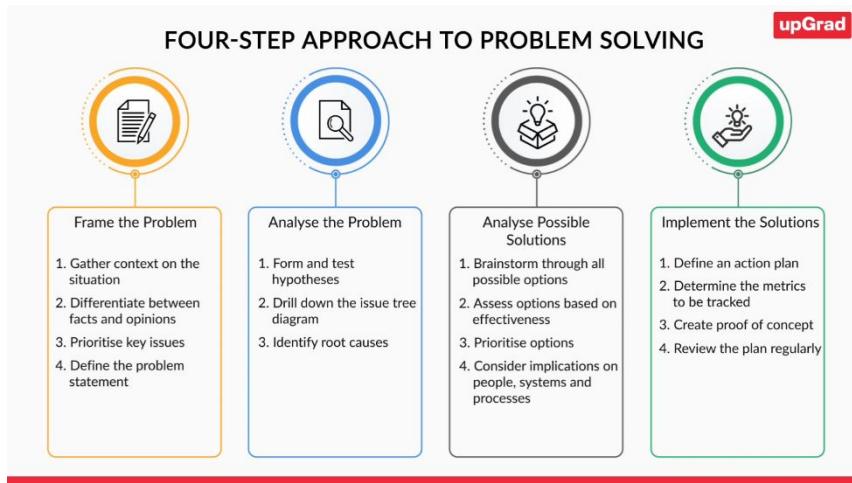
Congratulations, you are through the first module in our problem-solving course, introduction to ç. And now you must be wondering what is the best way to solve these problems? Are there techniques that can be used to solve these problems? You're about to find answers to all these questions in this next module, approach to problem-solving.

**MODULE OVERVIEW**

- 01** End-to-end approach to problem solving
- 02** Framing and effectively analysing the problem
- 03** Identifying the right solutions
- 04** Factors to consider while implementing solutions

In this module, we will understand the end to end approach that masters take when it comes to problem-solving. We will also learn how to successfully frame the problem, effectively analyse the problem, think through and identify the right solutions, and finally appreciate the considerations that one needs to keep in mind when it comes to implementing these solutions.

So, in this module, the prime focus will be to help you build the right approach to problem-solving. What we will discuss in detail is a four-step approach, which can help you arrive at solutions in a very structured and simple way for any given problem.



1. The first step in the approach is to frame the problem, and it involves gathering context on the situation, differentiating between facts and opinions related to the problem, prioritising key issues, and finally defining the exact problem statement, which will determine the approach that you will take through the onward steps.
2. The second step is to analyse the problem, which is all about forming and testing the hypothesis, drilling down the issue tree diagram and identifying the root causes.
3. After you have performed an in-depth analysis of the problem, the next step is to analyse possible solutions. While doing so, you will have to brainstorm through all the possible solutions, assess them on effectiveness, and then prioritise them to arrive at the optimal solution. You also need to consider the implications on people, systems and processes.
4. Finally, you will implement the solution. This step would involve defining a concrete action plan, agreeing on some initial metrics that you would like to measure success with, creating proof of concept and finally reviewing the implementation regularly to make required course corrections.

The image shows a man in a suit pointing upwards, likely a speaker or instructor. To his right is a diagram titled 'CONTINUOUS ENABLEMENT' which consists of four interconnected arrows forming a cycle. The top arrow is yellow and labeled 'Conduct unbiased research'. The left arrow is blue and labeled 'Manage the change to drive results'. The bottom arrow is green and labeled 'Proactively plan for risks'. The right arrow is grey and labeled 'Communicate with a purpose'.

As you do all of these, you also need to focus on continuous enablement. Here, you need to focus on conducting research while avoiding any sort of biases, managing the change to successfully realise results, communicating with purpose and proactively planning for risks.

So, this is largely a bird's-eye overview of the four-step approach to problem-solving. We will discuss each one of these four steps and their elements in greater detail through this module.

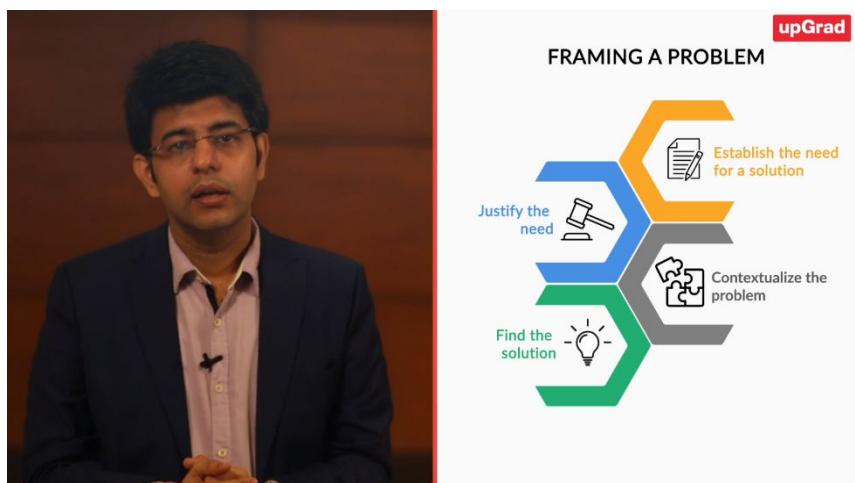
The image is a colorful illustration of a modern restaurant interior. It shows a bar area with stools, a counter with staff, and a dining area with tables and chairs where people are eating. The restaurant has a rustic feel with exposed brick walls and hanging pendant lights. A staircase is visible in the background.

The first activity here is the most important activity in this approach, and that is to frame the problem with precision. Let's understand the importance of this activity with the help of an example. Suppose you are the owner of the largest restaurant chain in India. Your restaurants are loved by people across all age groups, due to the wide variety of food options that you serve while ensuring the highest hygiene levels.

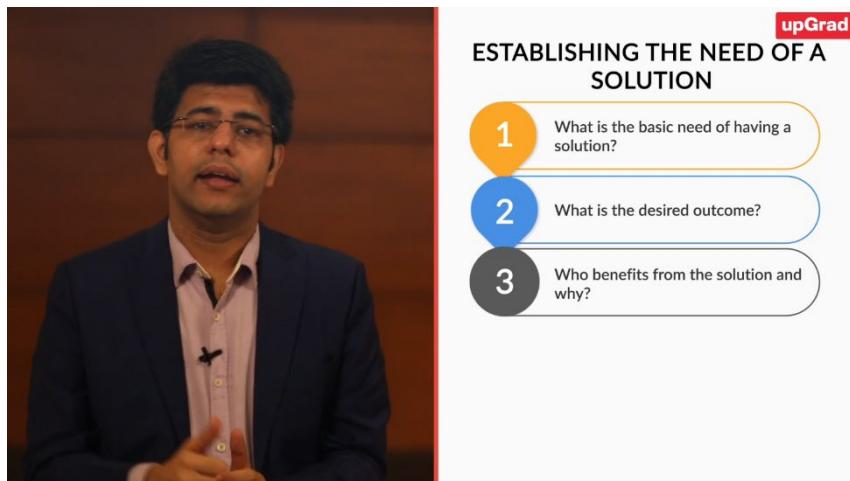
However, you have recently observed a sharp decline in the sales of your restaurants across the Northern part of the country. What should you do to address this issue? Should you just immediately offer some discounts to increase sales or is there any better way to solve this problem? There is a better way.



The first thing you should do is not to jump to solutions immediately. Instead, before proceeding any further in solving this problem, you and your team should be clear that you are working on the right problem and understand enough about the problem itself. So, in the first activity of this problem-solving approach, what you do is to get answers to these questions and frame the problem statement with precision.



So, how do you do that? You can frame the problem statement precisely by carrying out a few key activities. First, you must establish the need for a solution. Once you identified this need, you must justify the need. Further, you must contextualise the problem to understand it fully before you frame the problem, and then find the solution.



ESTABLISHING THE NEED OF A SOLUTION

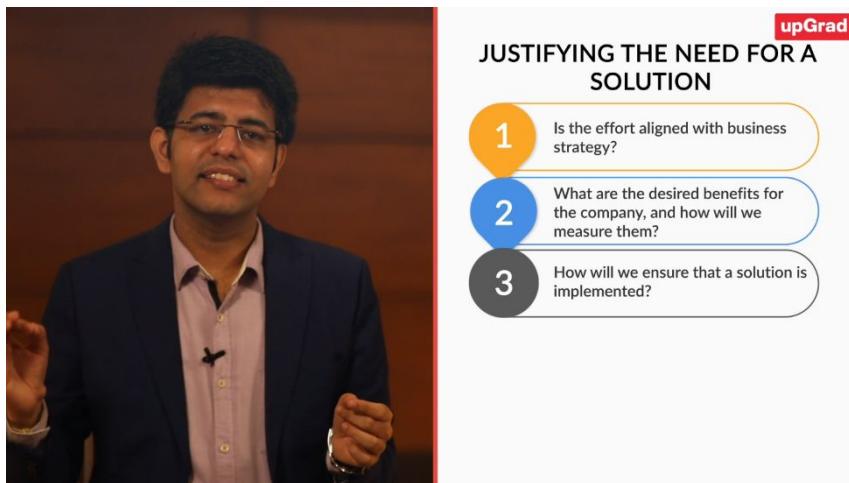
- 1 What is the basic need of having a solution?
- 2 What is the desired outcome?
- 3 Who benefits from the solution and why?

Let's consider establishing the need for a solution. Here, you will have to address questions such as, what is the basic need of having a solution? What is the desired outcome? And one of the most important questions of all, who stands to benefit from this solution and why?



So, in our example, the problem is to arrest this decline in sales in the restaurants of the North. Now someone could have jumped the gun and said, let's pull out some discounts and fix this issue of sales. However, a sharp restaurant employee like you decided to do a little bit of digging around and realised that the basic need or the gap that we have is that our customer satisfaction levels in the restaurants have been dipping. And as a result, customers do not seem to be returning.

Do you see why understanding the basic need is important? Given it is now apparent that the dip in sales was not so much of an issue of price, but more an issue of customer satisfaction, you may realise that rolling out these customer discounts may not necessarily help. This leads us to the desired outcome that we will need to focus on, which will be to drive higher customer satisfaction that can immediately turn around the sales. The key stakeholder to keep in mind is the customer. So, everything that we do needs to serve them.



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JUSTIFYING THE NEED FOR A SOLUTION

- 1 Is the effort aligned with business strategy?
- 2 What are the desired benefits for the company, and how will we measure them?
- 3 How will we ensure that a solution is implemented?

Now, the next important activity is to justify the need for the solution. While finding reasons to justify the need, you will have to address questions such as, is the effort aligned with our business strategy? What are the desired benefits for the company and how would we measure them? How will we ensure that the solution is implemented?



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Customer loyalty, driven by customer satisfaction is key to a restaurant's business strategy

For example, for anyone who has run a restaurant before, you will know a large share of revenues comes from patrons, that is, people who are loyal to eating at your restaurant. Therefore, customer loyalty driven by customer satisfaction is at the heart of a restaurant's business strategy. So, this validates our effort to drive customer satisfaction.



## upGrad JUSTIFYING THE NEED FOR A SOLUTION



We may also say that the desired benefits that we are looking for are, A, increased customer satisfaction, and B, sales in the restaurants of the North. You must agree on using a fully aligned and well-understood implementation plan to ensure the realisation of your solution.

Now that you have justified the need for a solution, it's extremely important for you to know all the little details about the problem that you are looking to solve. Having a complete context to the problem can make your problem-solving journey easier by several folds.



## upGrad CONTEXTUALISE THE PROBLEM

- 1 What approaches have we tried?
- 2 What approaches have others tried?
- 3 What are the internal and external constraints on implementing a solution?

While contextualising the problem, you will have to address questions such as, what approaches have we tried? What approaches have others tried? What are the internal and external constraints on implementing a solution? For example, you might have already put out an offer of discounts before, and that might not have worked. So, no point trying that out again, right. Hence, knowing that helps save time, effort, and money.

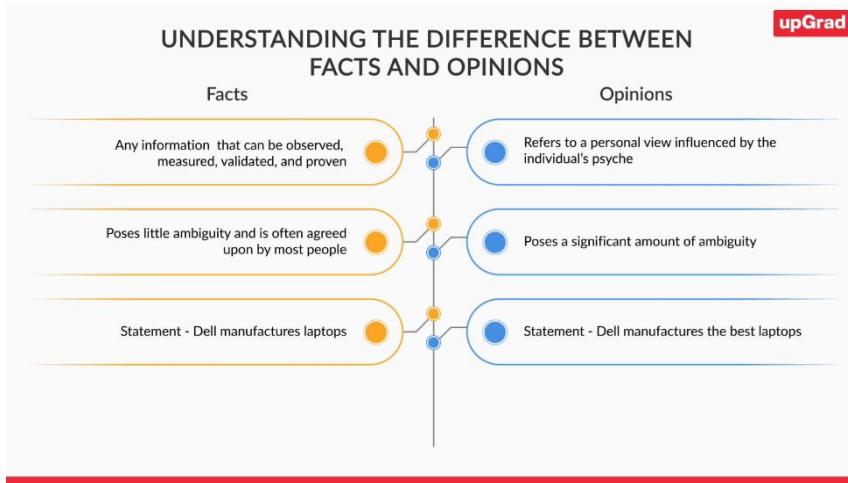


**FINDING THE SOLUTION**

- 1 Is the problem the sum of many problems?
- 2 What requirements must the solution meet?
- 3 Which problem solvers should we engage?

Finally, while framing the final problem statement, you must find answers to a few questions again. Some of these questions are, is the problem a sum of many problems, what requirements must the solution meet? Which problem solvers should we engage? And many other such important questions.

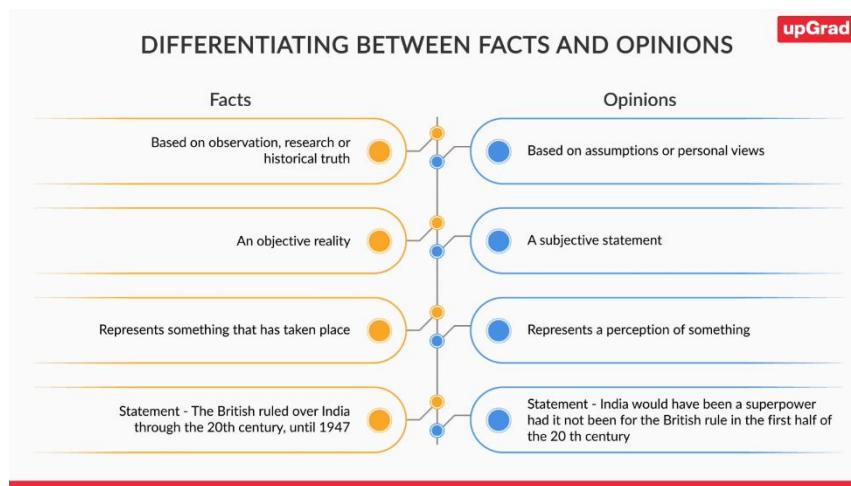
Now, as you have gathered enough context about the problem, it is also important for you to distinguish between facts and opinions about the problem. Therefore, it is extremely important for you to understand the basic difference between the two, which will be the topic that we will discuss next.



If I have to explain the concept of facts to you in the simplest terms, I would say facts refers to something that has actually taken place, has existed. Something that is true, can be measured, observed, and validated, and proven, poses little ambiguity, and almost everyone agrees upon. For example, the statement that the earth revolves around the sun is a fact because it is true and has been validated several times.

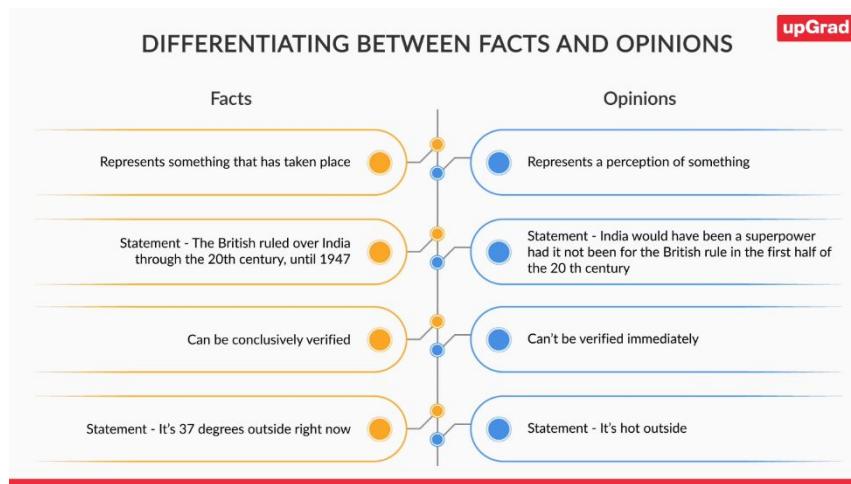
On the other hand, if you look at the definition of opinions, it is more of a personal view influenced by a person's own psyche, which may or may not be substantiated by any facts. These hence pose a significant level of ambiguity.

For example, the statement, Dell manufactures laptops is a fact, while the statement Dell manufactures the best laptops is an opinion because it is influenced by a person's own perception, and thus, is inconclusive.

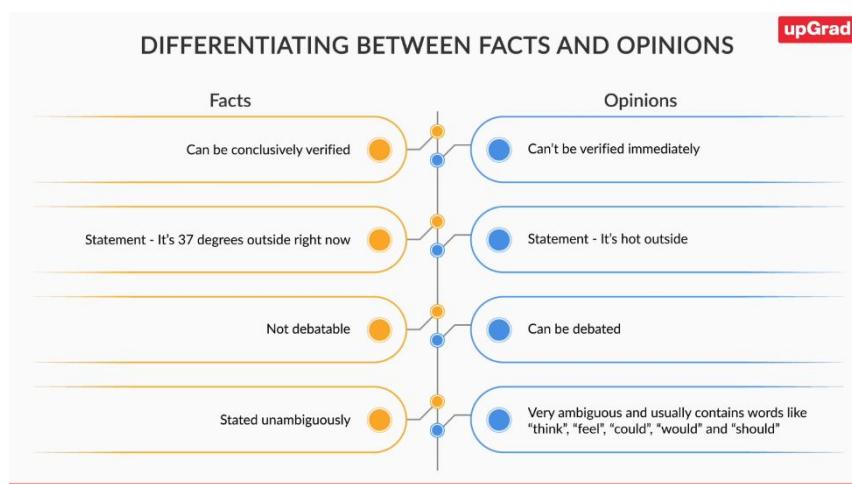


The facts and opinions are different. Let me further elaborate. There are several bases for differentiating between the two, aside from the meaning or the definition, of course. A fact is founded on actual observation or research or historical truth, whereas a statement, which is based on assumptions or personal views is an opinion. Therefore, a fact is an objective reality, nothing can change it. An opinion on the other hand is a subjective statement which can generate different levels of agreement or interpretation.

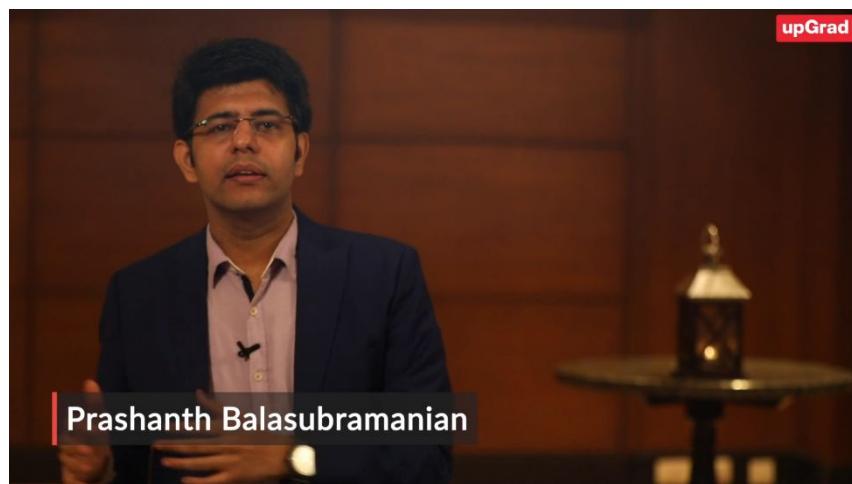
From a representation stand, a fact refers to something that has happened or was recorded. An opinion on the other hand is a perception of something. For example, if someone says the British ruled over India through the 20th century until 1947, that is a fact because that actually happened and was recorded. If someone, however, says India would have been a superpower, had it not been for the British rule in the first half of the 20th century, that is an opinion because it is someone's perception of something.



From a verifiability stand, a fact can be conclusively verified, an opinion cannot be, at least immediately. For example, if someone says it's 37 degrees outside right now, that is a fact because it is precise and can be verified. However, if someone says it's hot outside, that is an opinion because it is imprecise and cannot be verified as such.



Because they are verifiable facts, they are not debatable. And because opinions are not verifiable, they are up for debate. The words used can also indicate a lot. Facts are typically stated unambiguously while opinion are stated with subjective words like I think, I feel, I could, I would, and I should. However, oftentimes, you are likely to hear in, on inputs being posited as facts for any number of reasons. Could be because of personal agenda, could be because of carelessness, and could be because of ignorance. But as a problem solver, that is something that you should be extremely sure about.

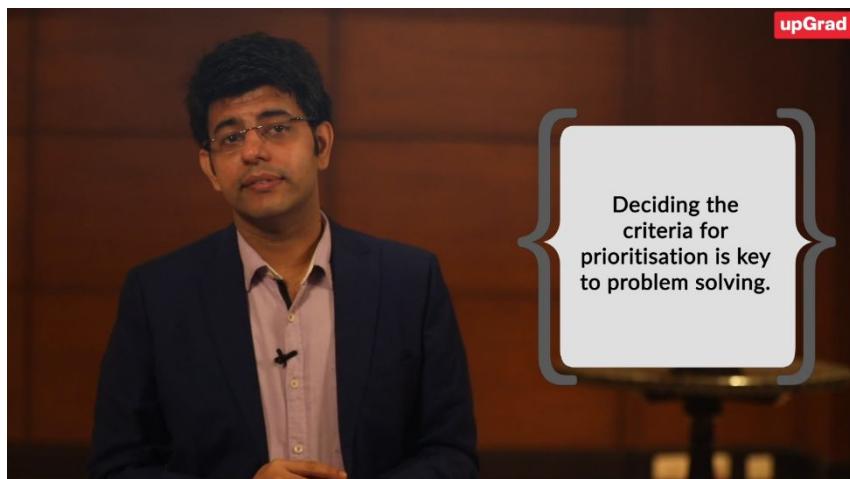


Now as you gather all the context and separate fact from opinion, sometimes you'll be flooded with many issues competing for your attention as a problem solver. Not all of these are even real issues. Some of these could be issues, but merely symptoms. Others could be issues, but not the most important ones to solve for. So, you must prioritise the key issues.



Let's recall the situation where you are the owner of the largest restaurant chain in India. Now there might be multiple issues which could have resulted in a decline of revenues of the restaurants in the North. There was the brief holiday period that certainly led to a decline. There was your master chef who suddenly had to return home briefly for personal reasons. There was that sale at a local McDonald's had put up a few blocks away that attracted some of your crowd, could be all of these.

However, you know that the biggest issue of them all was that customer satisfaction levels of your restaurants that you once enjoyed are now declining. That is the most pressing issue. And that is what you need to prioritise.



Whenever you have identified a set of issues and you want to prioritise them, you should first identify and shortlist the criteria based on which you will decide the priority of these different issues. There are several different prioritisation criteria, which you can consider.



It's intuitive actually. The higher the probability that a problem may occur, the more frequently that a problem occurs, the greater the cost or the damage a problem can do. The greater the importance of problem that has to several stakeholders, the more important it is for you to immediately consider that.



You would also need to duly consider the cost, the effort, the resources, and the time that it will take to rectify this issue when it occurs or to pre-empt it. You could consider the feasibility as well. In general, you prioritise issues that are easy to fix and readily feasible. Finally, you will also need to consider the payoff from solving the issue. Greater the benefits, the better it is to solve them.

Criteria	Members		
	A	B	C
Feasibility	0.3	0.1	0
Frequency	0.2	0.3	0
Benefits	0.2	0.3	0.2
Time	0.1	0.2	0.3
Cost	0.2	0.1	0.5
Total	1	1	1

Every member is given 1 point, of which they are to assign points based on what criteria is the most important for the current problem at hand

Now the harder bit is agreeing on the shortlist of criteria that you really need to consider. Basically, if more people call out that a criterion is important to them, you should consider it.

Issues	Criteria			
	Frequency	Benefits	Time	Cost
	0.6	0.8	0.5	0.9
Issue 1	5 x 0.6	5 x 0.8	3 x 0.5	10
Issue 2	3 x 0.6	5 x 0.8	6 x 0.5	2
Issue 3	4 x 0.6	6 x 0.8	7 x 0.5	3
Issue 4	2 x 0.6	4 x 0.8	5 x 0.5	7
Issue 5	1 x 0.6	3 x 0.8	9 x 0.5	8

All shortlisted criterias are rated on a scale of 1-10 for every issue.  
1 indicates - very easy to solve  
10 indicates - very hard to solve

Finally, using these shortlisted criteria that we have just agreed on, we assign points for each issue against each of the shortlisted criteria, and then multiply the points with the composite weights and sum across to get to the total points.

PRIORITISATION MATRIX						upGrad
Priority Level Based on Scores	Issues	Criteria				Total
		Frequency	Benefits	Time	Cost	
		0.6	0.8	0.5	0.9	
1	Issue 1	5 x 0.6	5 x 0.8	3 x 0.5	10 x 0.9	17.5
5	Issue 2	3 x 0.6	5 x 0.8	6 x 0.5	2 x 0.9	10.6
4	Issue 3	4 x 0.6	6 x 0.8	7 x 0.5	3 x 0.9	12.6
3	Issue 4	2 x 0.6	4 x 0.8	5 x 0.5	7 x 0.9	13.3
2	Issue 5	1 x 0.6	3 x 0.8	9 x 0.5	8 x 0.9	14.7

Therefore, issue 1 is prioritised and can be solved at the earliest

One simple check to keep in mind, in general, is all issues that are irreversible cannot be further delegated or delayed and are important to the leadership of the company are critical issues for you to consider.



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### WHAT WE HAVE LEARNT SO FAR

- 1** Gathering context on the situation
- 2** Differentiating between facts and opinions
- 3** Prioritising the key issues

So far, you picked up a fair understanding of how you need to gather enough context on the situation, differentiate between facts and opinions, and prioritise the key issues. Now, once you have prioritised the key issues, it is critical to clearly define the problem statement.



And if you don't want to hear it from me, perhaps this quote from Albert Einstein, one of the greatest problem solvers of all times neatly says so. He once said, if I had one hour to solve a problem, I'd spend 55 minutes thinking about the problem, and only five minutes thinking about the solutions. That cannot be truer than it is today.

So, let's now look at defining the problem or framing the problem as we will call it. So, how do we frame the problem? You must be wondering, is there a technique which I can use, or is it just hit and trial? The answer thankfully is the former.



Here is a framework or an aid that you can use while defining the problem, and it is the SMART framework. You may have heard of this in the context of setting goals. If so, it is essentially the same where the word smart, SMART stands for specific, measurable, actionable, relevant, and timed. Let's try and understand how this framework helps by taking it one letter at a time.



## DEFINING THE PROBLEM STATEMENT

### S Specific

- a. Keep away from general statements
  - b. Focus and narrow down to problem
- For eg. Poor quality food and not service could be hurting the restaurant

The letter S in the word stands for specific, which means that the problem statement you define should be very specific, and you should avoid generic formulation. After getting enough context of the situation, you must ensure that you focus and narrow down to a very specific problem statement. In our restaurant example, maybe it's not the customer satisfaction with the service that is the problem, it is perhaps customer satisfaction with the food that is the problem.



## DEFINING THE PROBLEM STATEMENT

### S Specific

### M Measurable

- a. Quantify the problem statement
  - b. Define the metrics associated with the success of the solution
- For eg. Measuring the customer satisfaction scores out of 10 for the restaurant

The next important thing you must ensure is that the problem statement you defined must be measurable, which means you must try to quantify the problem as much as possible. This will help you in defining the various metrics associated with the success of the solution so that you are able to track the progress on solving the problem.

In our restaurant example, perhaps you already measure the customer satisfaction scores out of 10. Through online surveys of your guests, through surveys, as they walk out of the restaurant. So, you could say that we would like to increase the average customer satisfaction score on your food, at least by two points.



## DEFINING THE PROBLEM STATEMENT

S Specific

M Measurable

A Actionable

- a. Clearly define the nature of actions  
For e.g. Quality of food at your restaurant

You should also ensure that your problem statement is actionable. By actionable, what I mean is that it should clearly define the nature of actions that need to be taken. In our restaurant example, maybe you could say that the actions you would take are in the quality of the ingredients and in the cooking.



## DEFINING THE PROBLEM STATEMENT

S Specific

M Measurable

A Actionable

R Relevant

- a. Exclude everything that is irrelevant or lacks materiality  
For e.g. Look and feel of the menu at the restaurant

It is also very important that your problem statement is relevant. You should exclude anything that is not relevant or lacks the key reality. In our restaurant example, let's say someone wanted you to also look at the menu. It's looking for you, and you realise that it is not so important. You should cast that away and into the parking lot.



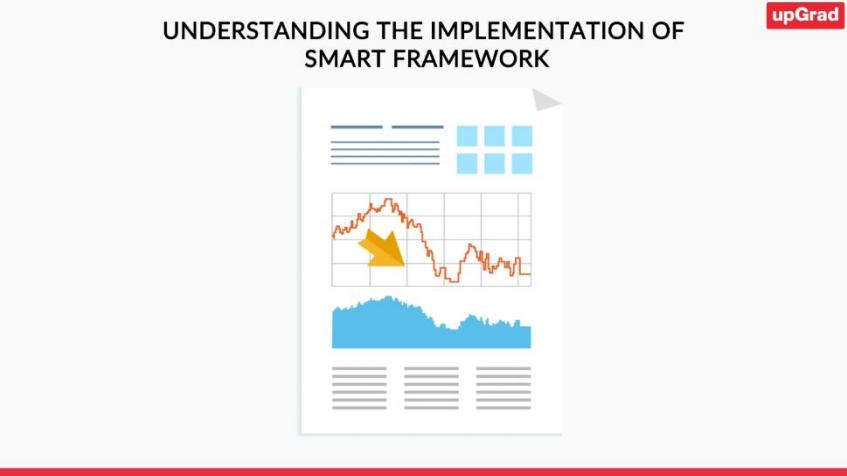
DEFINING THE PROBLEM STATEMENT

A	Actionable
R	Relevant
T	Timed

a. Should have clearly stated deadlines  
b. Define a timeline for getting the solution  
For e.g. Set a deadline of 5 months to address the low footfall at the restaurant

Finally, T and that stands for time, which means that your problem statement should clearly define and state deadlines by which the solution you implement should produce desired outcomes. In our restaurant example, given it is time-critical, you may say that you need to get this done inside five months.

### UNDERSTANDING THE IMPLEMENTATION OF SMART FRAMEWORK



A lot of questions in your mind about the implementation of the smart framework while actually solving for problems. So, let's take an example which will help you understand its application. Imagine a situation where Aman and Raj work in one of the largest telecom companies in India. The quarterly report of the company clearly shows a rapid decline in the company's revenue over the last quarter. Both Aman and Raj have been asked to analyse this report carefully and define a good problem statement, which the company can then act upon.

## PROBLEM STATEMENT - AMAN

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**What measures can be taken to drive up profitability and brand recognition for the company?**

Aman's first pass at this problem statement reads something like this, what measures can be taken to drive up profitability and brand recognition for the company.

## PROBLEM STATEMENT - AMAN

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Clearly, this has some shortcomings. So, he walks up to Raj to help him who decides to apply the smart framework that we just discussed to better formulate the problem. Before you look at what Raj came up with, give it a thought, what all would you have considered making this problem statement smarter?

## PROBLEM STATEMENT

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**What measures can be taken to drive up profitability by 5% in the enterprise business by reducing the infrastructure costs and driving up ARPUs in the next 1 year?**

Raj therefore worked a bit more on the problem statement and came up with, what measures can be taken to drive up profitability by 5% in the enterprise business, by reducing the infrastructure costs and driving up ARPUs inside the next one year. Even on first look, this statement does look richer.

## PROBLEM STATEMENT

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**Raj**

Problem Statement: What measures can be taken to drive up profitability by 5% in the enterprise business by reducing the infra costs and driving up ARPUs inside the next 1 year?

- Very specific
- Measurable
- Clear actionable plan

**Aman**

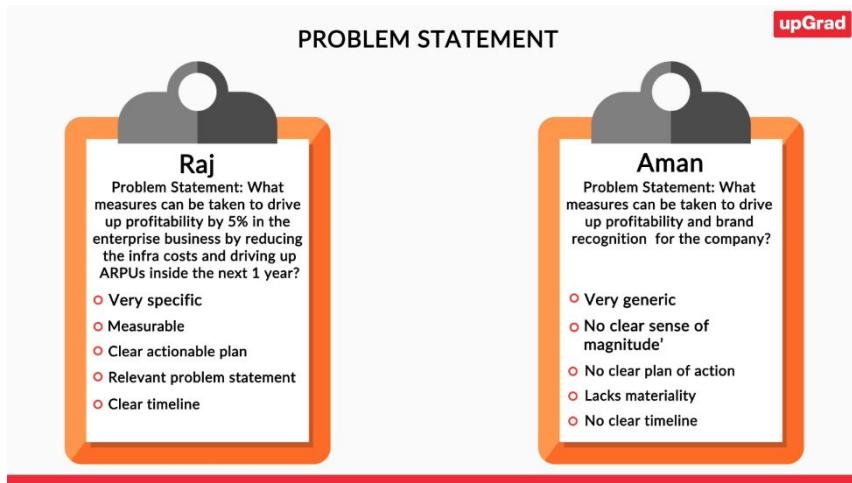
Problem Statement: What measures can be taken to drive up profitability and brand recognition for the company?

- Very generic
- No clear sense of magnitude
- No clear plan of action

But can you see smart at work here? First, while Aman's statement is more generic in nature, Raj made it very specific by mentioning the word enterprise. Second, whereas Aman's statement does not give any sense of magnitude or measure, Raj's statement is measurable because he specified the target has to be to drive up profitability by 5%.

While Aman's statement has no mention whatsoever of how the company should increase profitability, Raj defines a clear, actionable plan for the same by calling out infra costs and ARPUs.

Infra costs or infrastructure costs, by the way, are the costs of the towers that you sometimes see that transmit signals, aside from other things. An ARPU stands for average revenue per use, A metric most used in the telecom world, you'd say how much revenue the telecoms generate from every user.

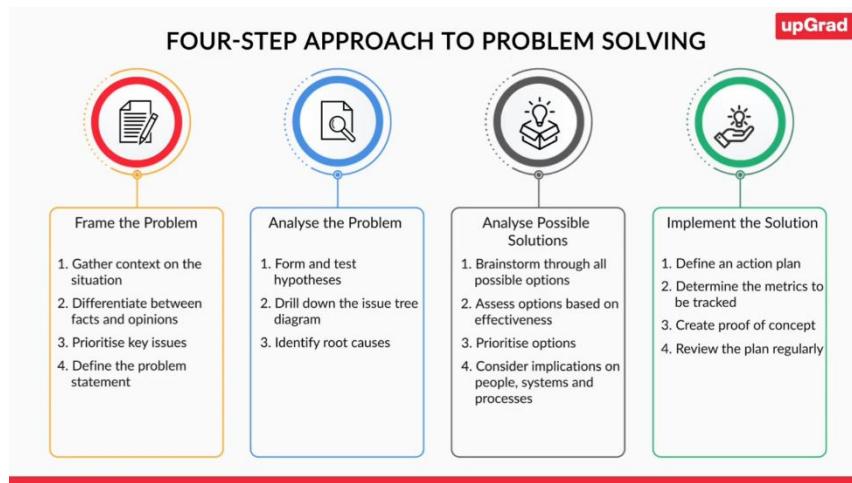


Another important thing that you should learn from this comparison is that your problem statement has to be relevant like Raj's statement is. He has removed the word brand recognition, which Aman mentioned because it sorts of lacks materiality.

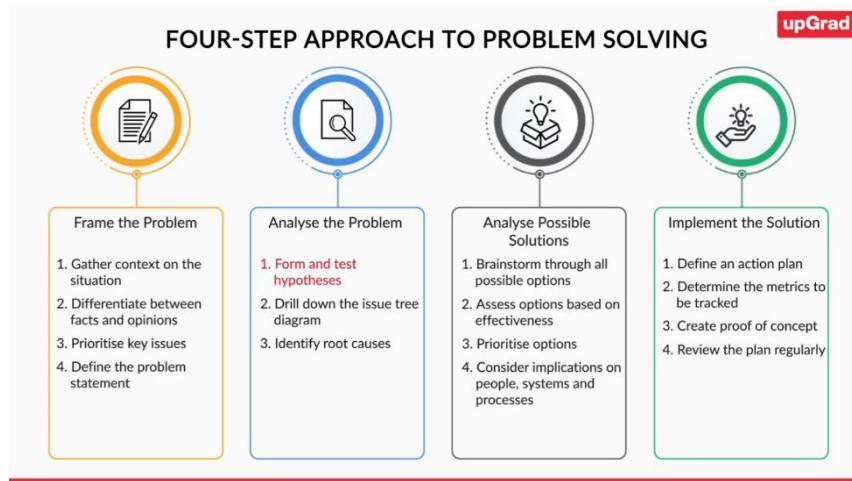
And finally, while Aman's statement makes no mention of the timeframe that he is looking to address the problem, Raj's statement has clearly specified that the company should keep a one-year timeline to achieve the desired outcomes. So, that's how SMART is applied to more tightly defined powers. It is indeed is a smart choice to apply it.



In the last few sessions, we reviewed the activities that you must carry out in the first step of the problem-solving approach to successfully frame the problem that started with gathering the context and ended with defining the exact problem.



Having now defined the exact problem, we shall now focus on the next step, that is, to analyse the problem. This will cover a few very specific activities and concepts, starting with laying out the hypotheses, laying out issue trees and testing them. All the while staying me see, we will finally end with a clear picture of the underlying and most important root causes. So, with that picture in mind, let's get started.



The journey to better analysing the problem and the solution starts by forming and testing the humble hypothesis. But what are these hypotheses? How are they useful? You must already be intrigued by such questions. So, let's first try and understand what a hypothesis is.

## HYPOTHESIS

A hypothesis is an assertion or a supposition that can be tested. Simply put, it is an assumption you think is right and would like to validate.



A hypothesis, by definition, is an assertion or a supposition that can be tested. Simply put, it is merely an assumption, you think is right and you would like to validate.

STRUCTURE OF HYPOTHESIS

I THINK \_\_\_\_\_  
I BELIEVE \_\_\_\_\_  
I FEEL \_\_\_\_\_

A video frame featuring a man in a dark suit and pink shirt, sitting at a desk. He is speaking. To his right is a white box containing text. The upGrad logo is in the top right corner of the video frame.

There are many ways in which hypotheses are worded. One format is if this happens, then this will happen. Another format is one where you would see phrases like, I think, I believe, I feel, etc.

STRUCTURE OF HYPOTHESIS

Change to the independent variable and its effect on the dependent variable

A video frame featuring the same man in a dark suit and pink shirt, sitting at a desk. He is speaking. To his right is a white box containing text. The upGrad logo is in the top right corner of the video frame.

You will typically find the interplay of an independent variable and a dependent variable or a cause, and an effect. A very commonly used method to structure hypothesis is describing what will happen to the dependent variable when you make changes to the independent variable. If this sounds very similar to an opinion, you're right, a hypothesis can be understood as an opinion you hold but would like to test. Let's look at a few everyday examples of hypotheses for a better understanding.

## RELATION OF VARIABLES IN A HYPOTHESIS

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If you gain more experience, you will become a better leader

Here's one. If you gain more experience, you will become a better leader. Clearly, this hypothesis follows the if, then format, the dependent variable is becoming a better leader, while the independent is gaining more experience.

## RELATION OF VARIABLES IN A HYPOTHESIS

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The more you diversify your investments,  
the more money you will make

Another one could be the more you diversify your investments, I think the more likely you are to make money. Even this hypothesis is in the structure we described earlier. Here, the dependent variable is making more money, while the independent variable is diversifying your investments.

The diagram shows a smartphone displaying a mobile application interface for a furniture store. The app's home screen features a large 'BUY' button at the top, followed by a grid of furniture items like a sofa, chair, and desk. To the left of the phone is a small blue lamp, and to the right is a small icon of a room interior labeled 'Furniture Shop'. In the top right corner of the slide is the 'upGrad' logo.

**POSSIBLE HYPOTHESIS**

1. People will switch from a store to shopping on the app only if there are discounts
2. People will opt for the app instead of the shop if the app has a refund feature

Let's take a real-world business problem to understand this better. Let's say you are building an app, which will enable people to buy furniture online. There are, of course, a few assumptions or hypotheses you would want to validate.

Here's one, people would switch from the traditional touch and feel process of buying furniture to online buying only if we offer them considerable discounts. Here's another, people would switch to the traditional touch and feel process of buying furniture to online buying only if we offer them a refund feature.

The diagram is similar to the one above, showing a smartphone displaying a mobile application interface for a furniture store. The app's home screen features a large 'BUY' button at the top, followed by a grid of furniture items. To the left of the phone is a small blue lamp, and to the right is a small icon of a room interior labeled 'Furniture Shop'. In the top right corner of the slide is the 'upGrad' logo.

**POSSIBLE HYPOTHESIS**

**NEGATIVE HYPOTHESIS**

2. People will not switch from traditional shopping to online shopping if there is lack of choice

Equally relevant could be a negative hypothesis such as people would not switch from the traditional touch and feel process to online buying if they don't find greater choice. So, these are the kinds of hypotheses you would want to test before building out your app or your website.



Next up, I'd like us to do a quick exercise. Let's take another real-world business problem to apply this better. Why not consider the familiar example of our restaurants in the north that are facing a loss of sales due to dipping customer satisfaction? Why are the patrons not feeling satisfied anymore?

If you are asked to solve for this problem, what kind of hypothesis would you want to validate. As a hint, think about all the reasons pertaining to food and beverage, test service, ambiance and pricing that could impact this. Write out, the many reasons you think could be driving the fall in customer satisfaction, and let's review them jointly.

So, we were looking to write out the reasons driving the fall in customer satisfaction levels. You could have written several hypotheses here that you would like to test. Here's a few examples of hypotheses you would like to perhaps test. Do note that these are not exhaustive.



From a food perspective, you could test, I think the fall in customer satisfaction is because the quality of food has actually fallen in the last six months. From a food perspective, you could also test, I think the fall in customer satisfaction is because the range of beverages that we serve is limited compared to the restaurant next door.



Similarly, from a guest service perspective, you could test, I think the fall in customer satisfaction is because our service of food and beverage is slow and error-ridden.



Finally, from an ambiance perspective, you could also test, I think the fall in customer satisfaction is because our lighting is seen as dull and not vibrant enough.



And let me add one more. From a pricing perspective, you could test, I think the fall in customer satisfaction is because we do not have common discount policies like happy hours. You see there are so many hypotheses that can be written out and many more, and each of these is valuable because it points you to what can be tested.

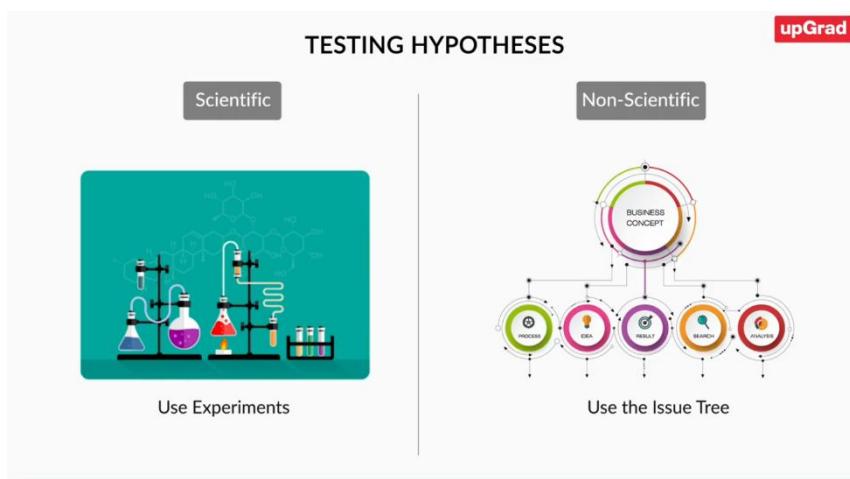
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POINTS TO REMEMBER

- 01 Correctness
- 02 Specificity

At this point, there are two things I want you to be very clear about.

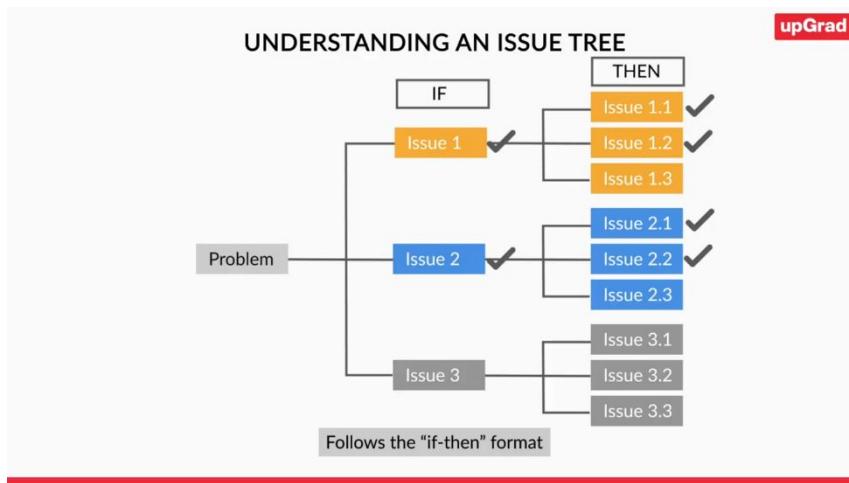
1. One, the hypothesis you define do not always have to be true or correct. While forming a hypothesis, you might consider the several factors which are contributing to the problem. However, in the end, you might realise that only a handful of them actually contribute to the problem, or perhaps none at all. In that case, some of your hypotheses will get disproved, and that is perfectly fine identifying what does not explain the problem is as important as identifying what does.
2. Two, the best hypotheses are written in a manner that are very specific. The more specific they are, the more precise your testing can be, and the more precise actions that you can have following up.



Now, that you have a good understanding of what a hypothesis is, let's try and understand the method that can be used to test these hypotheses. When scientists write out their hypotheses, they use experiments to elaborate on

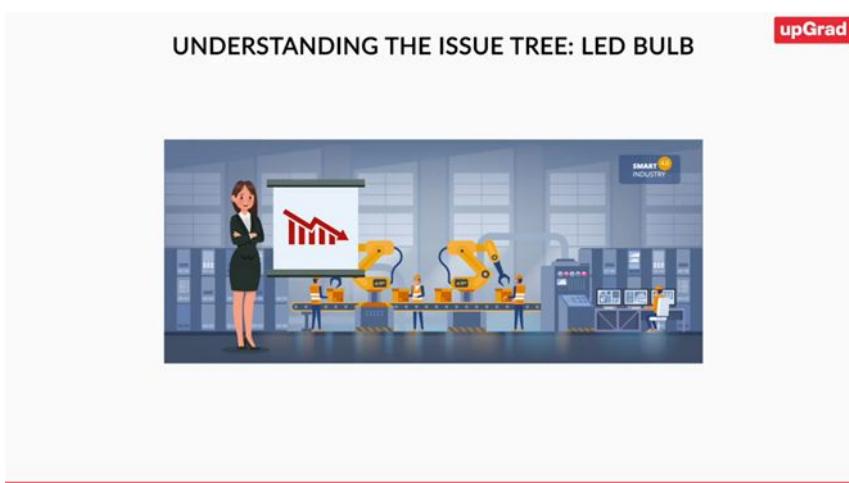
them and test them. Similarly, when consultant's strategy professionals, business professionals write out their hypotheses, they use the issue tree to elaborate on them and test them.

With all that, you must already be wondering how an issue tree can help you improving or disproving your hypothesis, and how do you build an issue tree? So, let's now discuss the issue tree. What an issue tree does is that it lays out a set of logical conditions and sub-conditions which, if proven correct, prove the hypothesis correct.

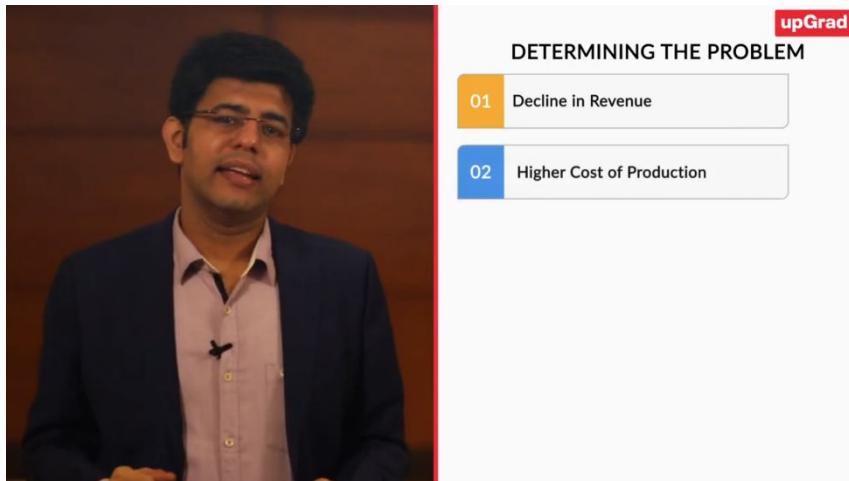


If you look at the structure of an issue tree, you will easily understand why it is named so. It has a tree-like structure where the conditions and sub-conditions are like the branches and the sub-branches. For the hypothesis to be true at least one of the two conditions and the sub-conditions associated with it must be true.

Clearly, the issue tree also follows the if then format, where the different conditions you identify act as the if statements, whereas the hypothesis, you are evaluating acts as the then statement.



Let's now take a real example of an issue tree, something you are bound to come across. To illustrate the concept of an issue tree, let's imagine a situation where you are the owner of an LED bulb manufacturing company, and in the last few months, your profits have declined significantly.



DETERMINING THE PROBLEM

01 Decline in Revenue

02 Higher Cost of Production

After analysing the context of the situation, you have come to the conclusion that profitability can decline only under one of two conditions, which are A, a decline in the revenues you are earning, and B, an increase in the cost of production of the bulbs.

Now, the decline in the revenues can be attributed to one of two reasons: A, there is a decline in the volumes. And/or B, a decline in the average selling price of the bulbs. On the other hand, an increase in costs can be attributed to an, A, increase in the fixed cost, and/or B, an increase in the variable cost.



**Fixed Costs**

The costs that are constant and are not based on the amount of goods you produce

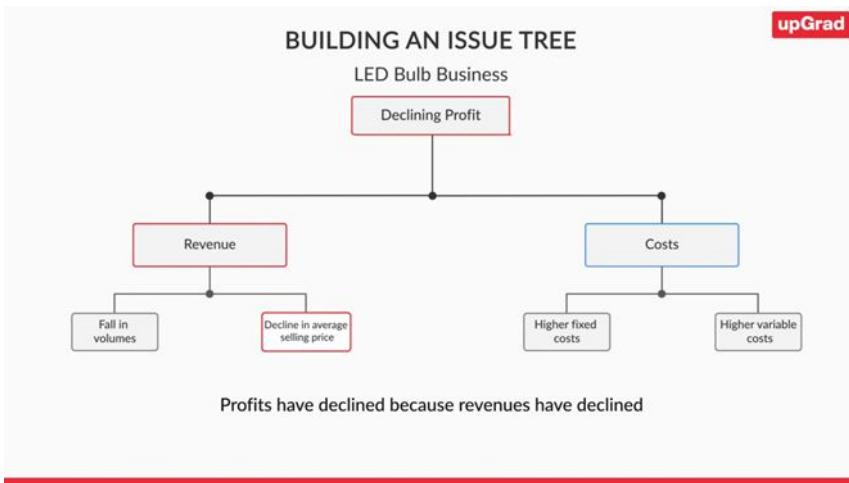


Just as a quick sidebar, fixed costs are costs that are going to be constant, no matter the amount of goods you produce, in this case the bulbs.

**DETERMINING THE PROBLEM**

- 01 Decline in revenue
- 02 Higher cost of production
  - a. Fixed costs
  - b. Variable costs
    - Example: As LED bulb production increases, the LED chip requirement increases

For example, this could be the rent that you pay for your corporate office. Variable costs, on the other hand, are costs that vary with the level of output. For example, the more LED bulbs you produce, the more LED chips you need. So, the cost of the LED chip is indeed a variable cost.



Now, after that, brief excursion back to the discussion on the hypothesis. So, how do you prove, which of your four hypotheses are correct? So, let's start building the issue tree based on the situation we have considered. That is, you want to check why the profits have declined. So, that goes to the top of the issue tree.

Next, we had two conditions, which we would want to evaluate as possible reasons. The first condition is the profits have declined because the revenues are declined and the second condition is the profits have declined because the costs have increased. These become the primary branches.

Similarly, we also know the different sub-conditions for each condition. So, let's add them to this issue tree as sub-branches, and there you have your issue tree, complete with its branches and sub-branches. What you do now is to evaluate these branches, and therefore, the sub branches to prove or disprove the hypothesis.

Perhaps, after a thorough analysis, you conclude that the fall in profits is a result of a decline in revenues, which was caused by a decline in the selling price of the LED bulb. So, the first condition and its second sub-condition have been proven true, thereby proving the hypothesis that profits have declined because revenues have declined.



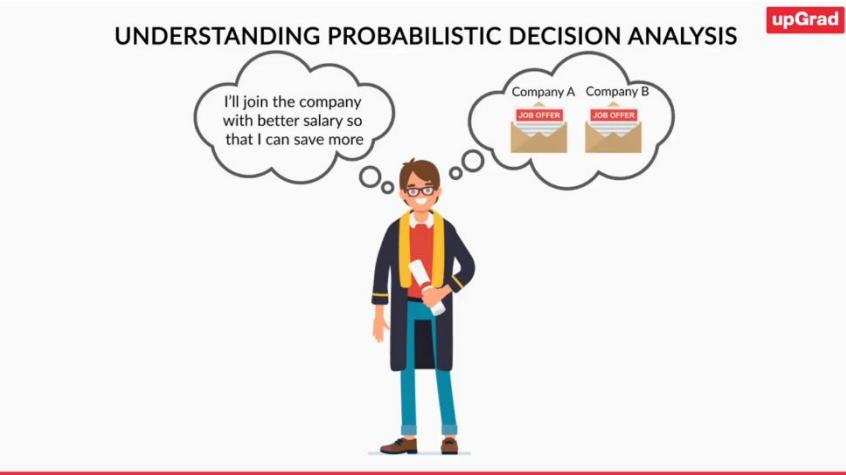
VARIANTS OF THE ISSUE TREE

01 Probabilistic Decision Analysis

- a. Involves probabilities of occurrences of all the outcomes that are being evaluated
- b. Includes payoffs and costs associated with outcomes
- c. Identifies the most appropriate option to choose

Now, there are two other variants of the issue tree, which are commonly used in problem-solving. The first variant we are going to discuss is the probabilistic decision analysis. As the name suggests, this method involves probabilities of occurrences of all the outcomes that we are evaluating.

It also includes payoffs and costs associated with these outcomes, sometimes, themselves uncertain, and the prime objective of using this method is to identify the most appropriate option or choice to make given the probabilistic outcomes and uncertain payoffs and costs associated with them.



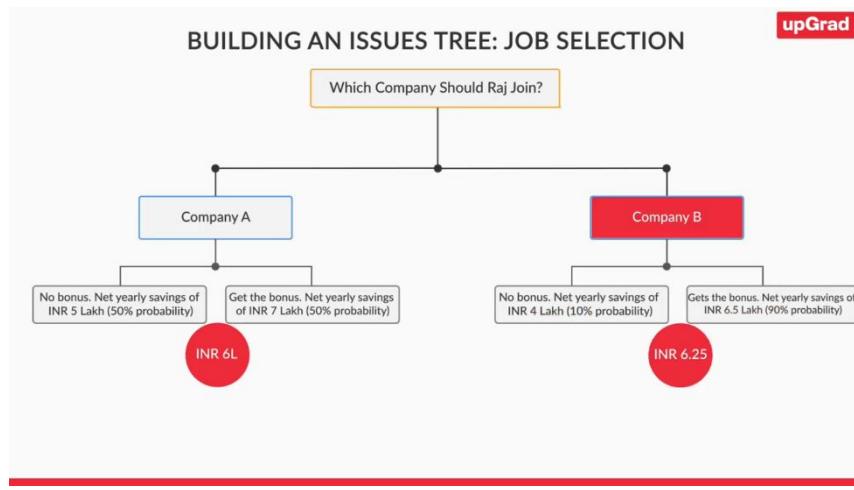
UNDERSTANDING PROBABILISTIC DECISION ANALYSIS

I'll join the company with better salary so that I can save more

Company A Company B

JOB OFFER

Let's take an example to understand how this tool can help you in solving a problem. Let's imagine a situation where Raj is looking for a job as a sales representative. He just graduated from college and has received offers from two companies, company A and company B. You would say good for Raj, but Raj is confused and is wondering, which company should he join? He already has decided that he would prefer to join the company where he can save more.



So, the two options available to him are company A and company B, and the events of joining company A and joining company B will form the two branches in this issue tree that we are building.

Now, there are two outcomes associated with joining company A. The first outcome is that Raj will not make the bonus and will have net yearly savings of 5 lakh rupees with a probability of 50%, while the other outcome could be that Raj hits the bonus and then makes a net yearly savings of 7 lakh rupees, again with the probability of 50%.

So, if we multiply 0.5 by 5 lakhs for outcome 1 and 0.5 by 5, lakhs for outcome 2 and then add both these numbers, we will get a probability weighted yearly savings of 6 lakh rupees.

Similarly, there are two outcomes associated with joining company B. The first outcome is that Raj will not make the bonus and will have net yearly savings of only 4 lakh rupees, but that event is likely going to be improbable with a probability of only 10%.

While the other more likely outcome could be that Raj hits the bonus and then makes a net yearly savings of 6.5 lakh rupees, this time with a probability of 90%.

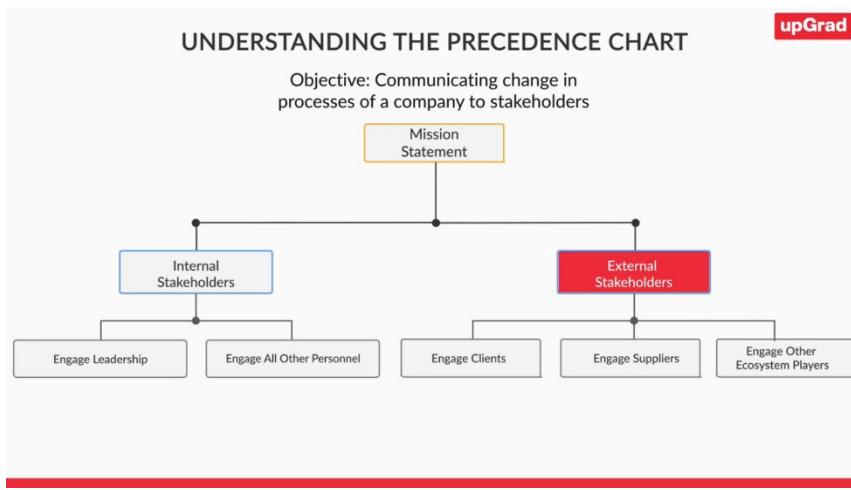
So, if we multiply 0.1 by 4 lakhs for outcome 1 and 0.9 by 6.5, lakhs for outcome 2 and then add both of these numbers, you will get a probability weighted yearly savings of 6.25 lakh rupees. This clearly suggests that joining company B will be a better option if Raj is looking for more savings.



Do note, why people say probabilities are all important? While the payoffs are lower in both the with bonus and without bonus cases at company B, the relative assurance around hitting that bonus makes choosing company B the wiser decision.

A video frame featuring the same man in a suit. To his right is a white sidebar with the title "VARIANTS OF THE ISSUE TREE". Below the title are two numbered items: "01 Probabilistic Decision Analysis" and "02 Precedence Chart". Under "Precedence Chart", there is a sub-point "a. Used to determine the steps required to achieve a goal". The upGrad logo is in the top right corner of the sidebar.

Let's now move on to the second method, which is the precedence chart. This method is used when the prime objective is to determine the series of steps that needs to be taken to achieve a set goal. Let's understand this with the help of a real-world example. As best practice, we tend to write these charts out such that the actions that are most important or needs to be taken first, are generally written left most.



Imagine a situation where a company wants to communicate a key change in its processes to all stakeholders. The company would want to keep both internal and external stakeholders informed about the change. Therefore, they will have to ensure that they communicate the change both internally and externally.

However, first, the internal stakeholders should be informed, so we will add it to the left side of the proceedings chart, and the external stakeholders will come after and hence on the right.

Next, we'll define the different internal and external stakeholders that must be informed about the change. So, the most important internal stakeholders will be the members of the leadership team, so they will be engaged first, and after this, all the other personnel other than the leadership can be engaged.

Now coming to the external stakeholders, you will ideally start by engaging your clients. Then, you will engage your suppliers and finally, all other partners in the entire ecosystem. So, you can see that this precedence chart can help you chalk out a clear plan to send out your communication. You can define a series of steps that you should take to accomplish the desired outcome.

Further, another best practice I have seen is to have a dotted line between boxes that sit on parallel branches, in case you realise one of these has an implication or a dependency on another



You have learned what a hypothesis and an issue tree are, and the good practices that you should follow while framing them, but is that enough to frame the right approaches to hypothesis and issue trees, or is there any other technique which can further help you? Well, there actually is what I'm about to teach you is one of the most important aspects of forming a hypothesis and widely attributed to McKinsey called the MECE principle.

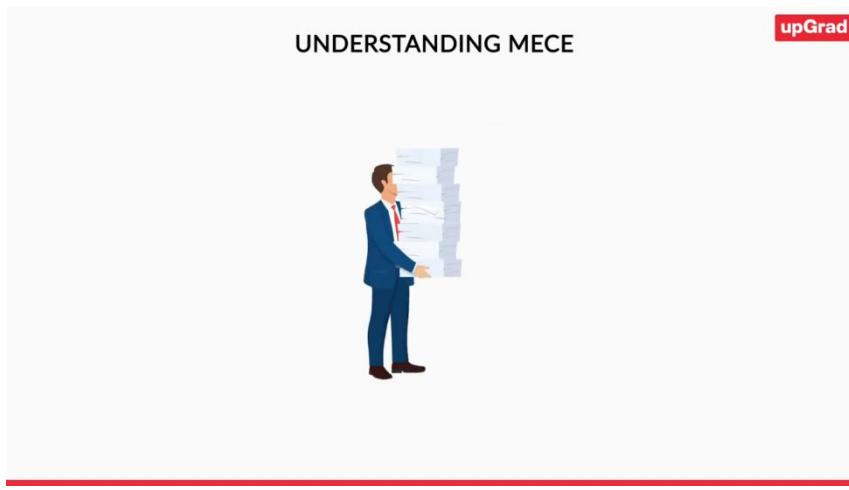
UNDERSTANDING MECE				upGrad
Mutually	Exclusive	Collectively	Exhaustive	
An idea/object can belong to only one of the said categories		An idea/object has to belong to one of the categories		

MECE stands for mutually exclusive and collectively exhaustive. It is a method of grouping information into elements that are mutually exclusive and collectively exhaustive. Now, this might just seem a tad too overwhelming. So, let's simplify this further.

Essentially, mutually exclusive means you design a set of categories or buckets such that any idea considered will never fit into more than one of these categories or buckets. Further, collectively, exhaustive means you design a set of categories or buckets such that any idea, you consider, will fall in one of these buckets and not outside.



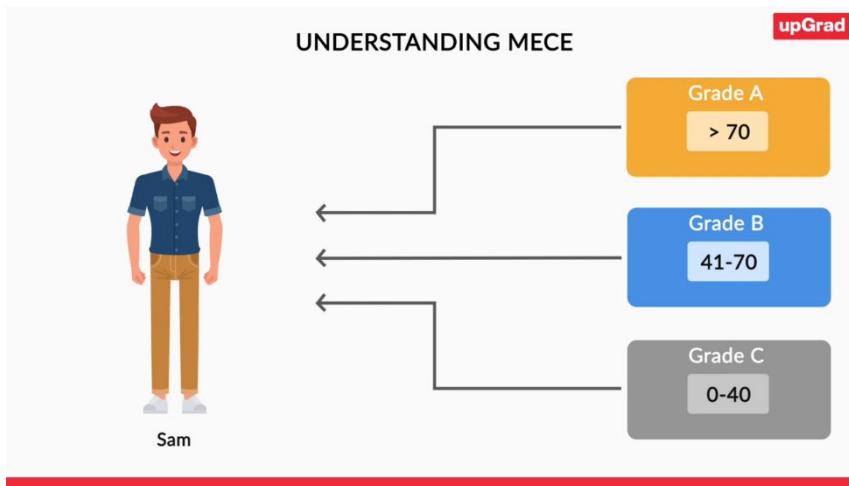
Let's visualise, this concept of MECE with the help of a real-world example. Sam, Neil and Phil are students of a renowned MBA college. The professors in the college appointed them as the representatives of the batch.



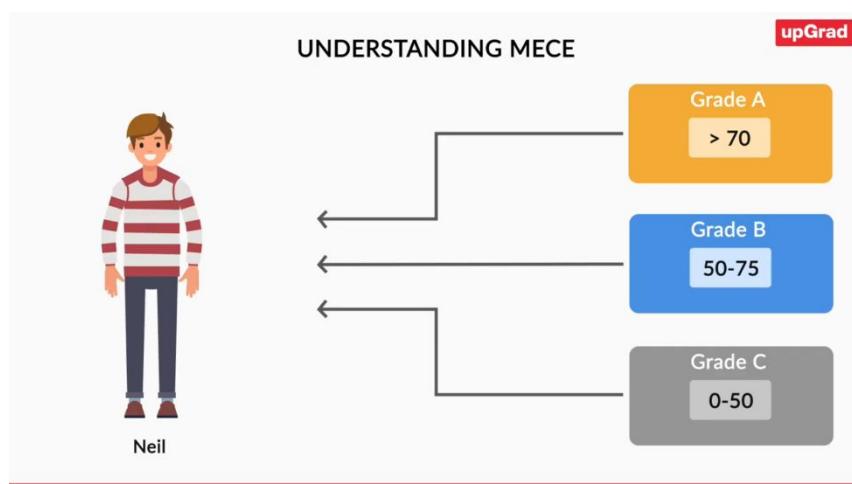
## UNDERSTANDING MECE

upGrad

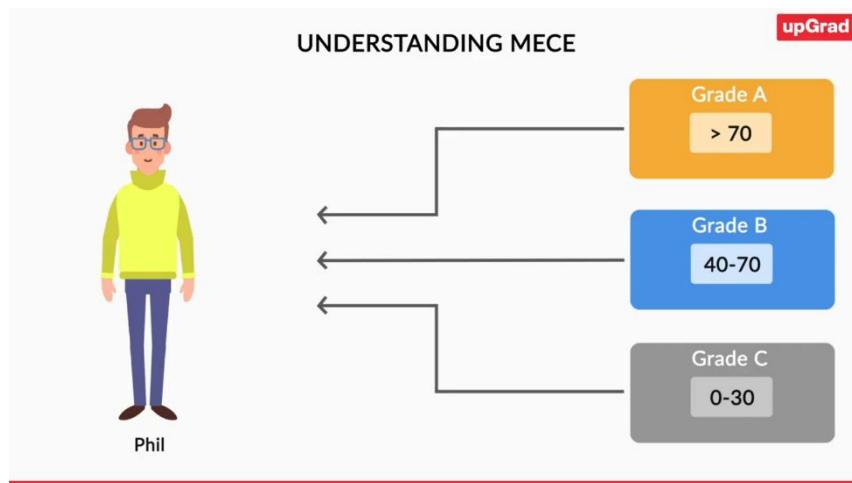
The economics professor conducted a surprise exam to check how well his students understand his lectures. Once he checked all the answer sheets, he handed them over to Sam, Neil and Phil, and asked them to classify the students into three buckets, grade A, grade B and grade C based on their marks out of 100.



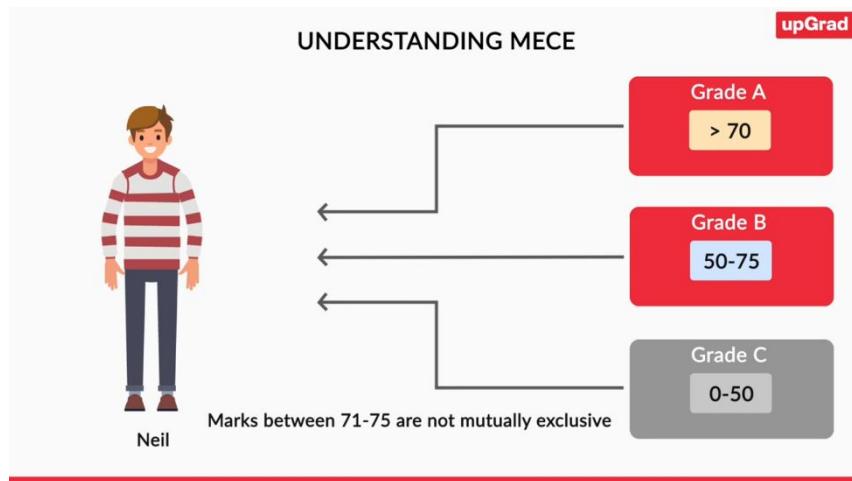
Sam classified the students who scored marks between 0 and 40 into grade C, students with marks between 41 and 70 into grade B and the students scoring marks greater than 70 were allotted grade A.



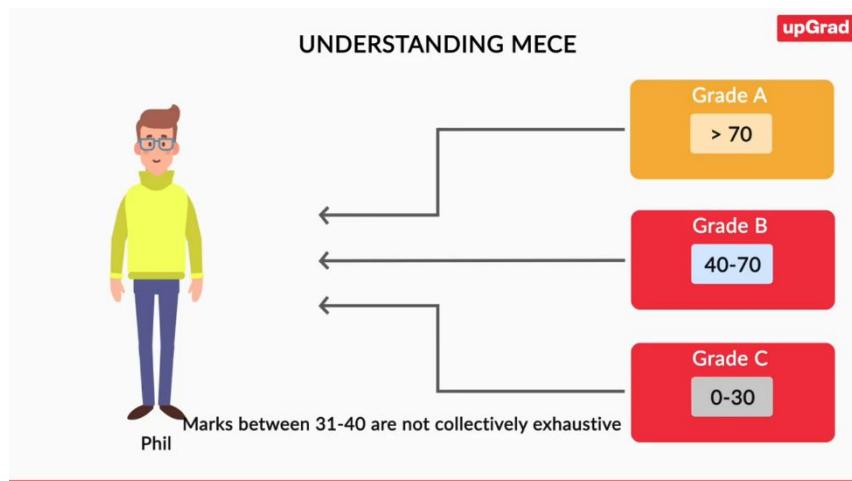
On the other hand, Neil graded the learners differently. He awarded the C grade to students who scored anywhere between 0 to 50, gave a B grade to students scoring between 50 and 75, and the students scoring marks above 70 were awarded an A grade.



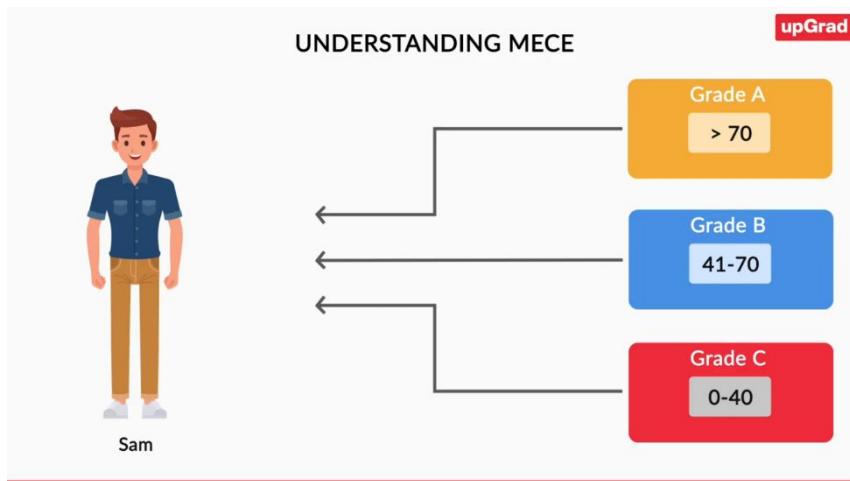
Meanwhile, Phil graded the learners in another way. He awarded the C grade to the students who scored anywhere between 0 and 30, gave a B grade to students scoring anywhere between 40 and 70, and the students scoring marks above 70 were awarded an A grade. They each proposed their classification to the economics professor. Which classification do you think the professor went with?



Clearly, Neil made a glaring mistake while deciding the buckets. All the students who scored marks between 71 and 75 will fall not into one but two buckets grade A and grade B. Therefore, these grading buckets were not mutually exclusive.



Likewise, Phil had designed a grading scheme in which anyone who scored between 31 and 40 would find himself or herself unassigned to any grade, also a glaring error, so these buckets are not collectively exhaustive.



On the other hand, the categories chosen by Sam ensure that no students fall in the range of two different grades at once and that all students are covered in the grading. So, Sam's classification of students adhered to the MECE principle and was the one the professor eventually went with.



For simple problems such as the example that we just discussed, ensuring MECE-ness is not a daunting task. However, when you look at some business problems, they are far more complex and ensuring MECE-ness is not as straightforward as it is in this particular case. Therefore, there are a few tactical approaches that come handy in ensuring all the possible options or categories or branches of an issue tree whatever you are ideating through adhere to the MECE principle. Let's try and understand these approaches.

ENSURING QUALITY ANALYSIS

01 Apply a Formula

- a. Total Profit = Total Revenue - Total Costs
- b. Ensures that all the possible solutions are considered

The first approach you can use is to apply a formula. Here's an example. Let's say the profits of your company are falling. You can easily think through the potential reasons by simply analysing the formula that profit equals revenues minus costs.

Now, after considering this formula, you know that profits can either decline due to a decline in revenues or an increase in costs. Clearly, this approach helps you ensure that you are considering all possible solutions, which are MECE in nature. Similarly, let's say you are looking to improve the net throughput adjusting for quality. To do this, you can increase the throughput and increase the yield.

**YIELD**

Yield captures the quality of production and is usually indicated by the ratio of the number of non-defective items divided by the total number of manufactured items



As a sidebar, yield is a term that often comes up in manufacturing contexts to capture the quality of production and is usually indicated by the ratio of the number of non-defective items divided by the total number of manufactured items.

## THROUGHPUT

Throughput is the rate at which a company produces or processes its products or services



Throughput, on the other hand, is the rate at which a company produces or processes its products.



### ENSURING QUALITY ANALYSIS

01 Apply a Formula

02 Follow the Value chain

- a. Useful when you want to improve the efficacy of your business

The next approach to ensuring MECE-ness is to just follow the value chain. This is useful when you are looking to improve the efficacy of your entire business that involves multiple processes.

In order to determine MECE solutions to this problem, you could just go through the value chain. Let's look at an example to understand this better. Imagine a situation where you are the business leader of an IT firm, which develops software for various purposes.

The image shows a man in a suit and glasses speaking. To his right is a slide titled "DEVELOPING A SOFTWARE" with four colored boxes: orange (Design the software), blue (Build a prototype), grey (Test the prototype), and green (Refine the software). Each box contains an icon related to the process.

Now, the four major processes of your business are designing the software, building a prototype, testing it to ensure there are no flaws in what you built, and finally, refining your software based on feedback you receive from your users.



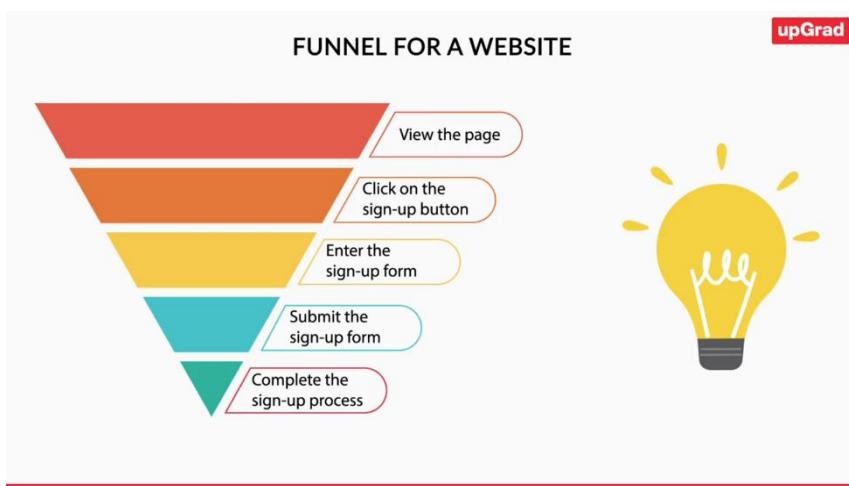
Let's say off late, you have been facing a challenge of lower efficiency, and you want to isolate the actual cost of this problem. The best way to ensure MECE-ness of probable causes to the problem would be to make four buckets, corresponding to the four major processes of your business and then ideating on potential causes across each of these buckets.



ENSURING QUALITY ANALYSIS

- 01 Apply a Formula
- 02 Follow the Value chain
- 03 Follow Known Processes

Another approach which can lead you to a set of solutions or issues that adhere to the MECE principle, is identifying the possible solutions or issues by following a set of known processes. Sometimes, visualised as a funnel.



One common example of a funnel is the signup funnel for a website. The steps in this funnel would be viewing the page, clicking on the signup button, entering the signup form and submitting the signup form, and thereby completing the signup process. Now, suppose many users are just dropping out without completing the signup process, you must identify the possible issues resulting in this.

The approach you can take to do this while staying MECE is actually very intuitive. All you need to do is ideate for all the possible issues across the outline steps in the funnel. Doing so will already allow you to ideate in a manner where all the issues you consider belong to exactly one of the steps in the funnel, and that there is always a step in the funnel to which issues shall belong.



ENSURING QUALITY ANALYSIS

- 01 Apply a formula
- 02 Follow the value chain
- 03 Follow Known Processes
- 04 Use Established List
  - a. List out your products and look for revenue increasing options around them

The last approach I shall outline is to just go with an established list. Suppose, you are looking to build an account plan that outlines the actions that you will take to increase the business that your company has with a key customer. One way to do this is to just list out all the products you have today in your kitty and see what all options you can pull across each of these products to increase the revenues with the customer.

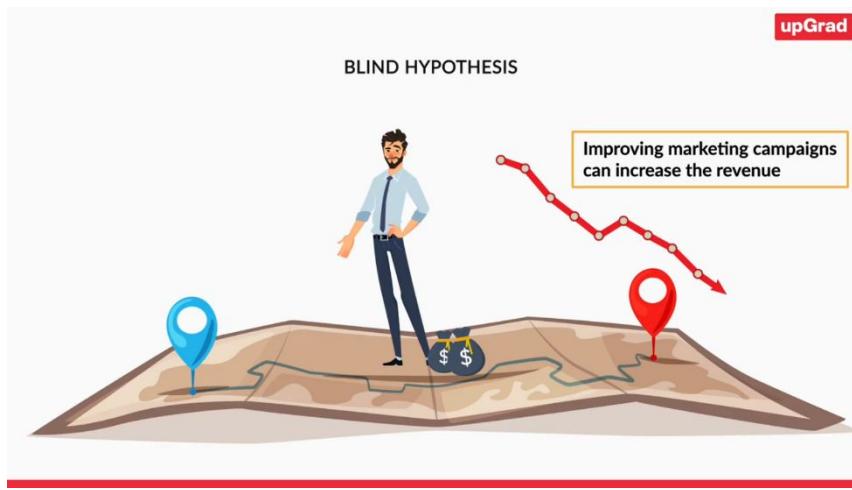
When you think through product by product, you will already ensure that you are being MECE. So, there you have it. These are some of the approaches which you can use to ensure MECE-ness of the issues that you consider and the solutions you identify.



WHAT TO KEEP IN MIND

-  Don't make a wild guess
-  Understand the problem thoroughly before forming hypothesis
-  Form hypothesis based on the available data, knowledge and gut

Other important considerations to keep in mind, as you think, about hypotheses and issue trees. Try to never make a wild or an out-there guess. You should first dig into the problem and focus on gaining enough context about the problem before jumping to form hypothesis. You should then hypothesise that which fits best with the available data, the knowledge that you have and your gut.



For example, let's say you are the CEO at a large online foot delivery company in India, and let's say your revenue numbers have dwindled in the last few months and you are trying to find out the reasons for the same. Without evaluating the entire context of the situation, you form a blind hypothesis that if we improve our marketing campaigns, we can increase the revenues, and a few months later after spending a lot of time and Moolah on new marketing campaigns, you realise your revenues continue to fall.

So, where did you go wrong? The answer is that you most likely made a wild guess hypothesis, assuming it's an ineffective marketing campaign that has caused this decline in revenues. Instead, you should have taken into consideration all the factors that could have contributed to the problem and then proved or disproved the hypotheses that you considered.

A video thumbnail showing a man in a suit speaking. To his right is a list titled "WHAT TO KEEP IN MIND" with five items, each with an icon:

- Don't make a wild guess
- Understand the problem thoroughly before forming hypothesis
- Form hypothesis based on the available data, knowledge and gut
- Involve other team members and clients
- Question the hypothesis at every step

The upGrad logo is in the top right corner.

One thing I always try to do is involve others in my team. Often, they are the ones on the front lines, speaking to the most relevant people on the ground. I also involve clients at some times. They have an extremely good working knowledge of what is happening. While the process of a consultant reaching out to a client to understand what they think the issue could be, might at first glance seem not so intuitive to you; it is something many consultants rely on quite heavily.

One of the other things that I should ask you to watch out for is not getting married to your hypotheses blindly. Question them at every step. Always remember disproving a hypothesis is equally valuable.

One example that comes to mind is a company I was advising a few years ago. This was a provider of remote IT management services. They would, for instance, help you remotely, if say, the camera on your laptop wasn't responding. In other words, like a call centre help desk.



VERIFYING A HYPOTHESIS

**Hypothesis**      **Survey Result**

Gmail is the most effective email service provider      Most people used Hotmail

**X**

They were looking to market themselves online and were considering email marketing as one of the channels. Now, the hypothesis that was going around was that Gmail would perhaps be the most effective, of course, based on our own experience.

However, when we did a survey of their customers, it turned out that they most frequently used Hotmail. Now, we could have stuck to our hypothesis, but could not have been more wrong, turns out the largest cross-section of their users happened to be the age group of 50 plus.

People who had turned to email at the time Hotmail was a big thing, and you know, what it is like. Once you've signed up for an email id that you routinely use for important correspondence, you tend not to throw it away. So, these users never moved away from Hotmail.



WHAT TO KEEP IN MIND

- Form hypothesis based on the available data, knowledge and gut
- Involve other team members and clients
- Question the hypothesis at every step
- Never change data to match it with your hypotheses
- Keep an equal balance between qualitative and quantitative analysis

Now, you see why it does not so well to blindly stick to hypothesis? Never adjust, suppress or amplify data per your convenience to fit the hypothesis. This is like force fitting an answer. If you are determined to see patterns in the cloud, I'm sure you will see one.

The other problem that I routinely see is many Rookie problem solvers heavily indexed on quantitative aspects, but forgetting the qualitative aspects conveniently. Just balance out between the two, as both are valuable.

I remember a diligence of a poultry business that we undertook. There was such paucity of organized data that is a lot of shortage, that it became very hard to establish our thesis with numbers. So much so, we would never have had an answer if we had wanted to investigate only market research reports and industry databases.

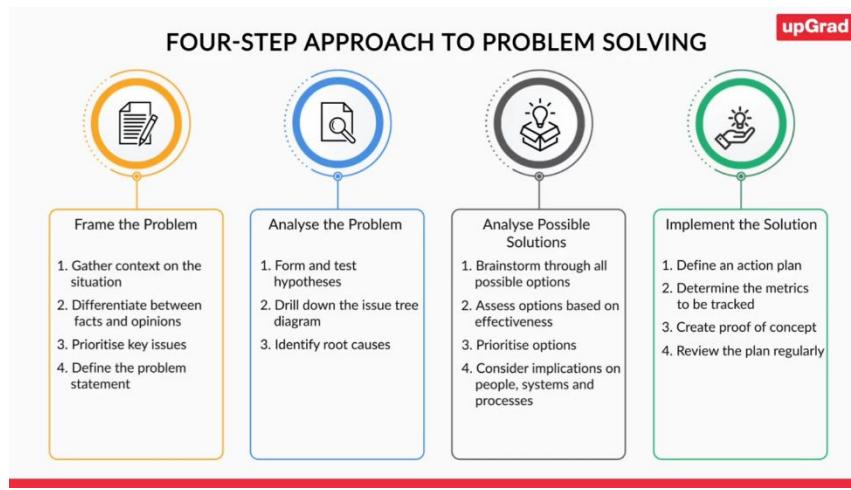
We soon realised there was so many chicken lovers out there too, and that equally amazing qualitative conversations can help us identify the problem and the solutions. So, that is what we did to successfully close out that diligence.

Now, you see why just relying on quantitative insights, especially in a country like India, where syndicated data is not so easily available, can be a death note to your problem-solving.

**WHAT TO KEEP IN MIND**

- Involve other team members and clients
- Question the hypothesis at every step
- Never change data to match it with your hypotheses
- Keep an equal balance between qualitative and quantitative analysis
- Keep adjusting your hypotheses

Finally, keep adjusting your hypotheses. Until you reach the solution, I remember one manager in my very early days telling me that my hypotheses are a living document that they will and must see change every day.



Before we proceed any further in this discussion, let me quickly recall what you have learned so far. You started this module by understanding the importance of framing the problem statement correctly, and we also discussed the various activities you must carry out to ensure that you arrive at the correct problem statement.

Next, you learned how to analyse the problem by forming hypotheses, which adhere to the MECE principle and then testing them through issue trees. The last aspect of the second step of the problem-solving approach that I want to talk about is identifying the root causes of the problem.

The video thumbnail shows a man in a dark suit and glasses speaking. To his right, there is a graphic titled "ROOT CAUSE ANALYSIS" with two numbered items:

- 01 5 Whys Approach
- 02 Fish-bone Diagram

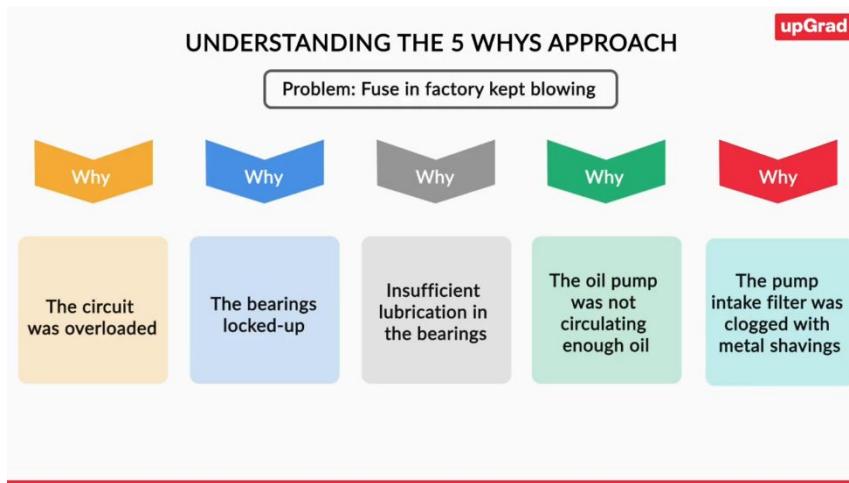
We will look at two commonly used techniques to carry out root cause analysis. The five whys approach and the Fish-bone Diagram. First, the five whys. This technique is used for identifying the most important underlying cause of a problem, as the name suggests the technique involves asking the question why five times so that you are able to drill down to the root cause of the problem, rather than focusing on the superficial causes, which are actually perhaps only effects of the root cause.

## UNDERSTANDING THE 5 WHYS APPROACH



Taiichi Ohno  
The Father of 'Toyota Production System'

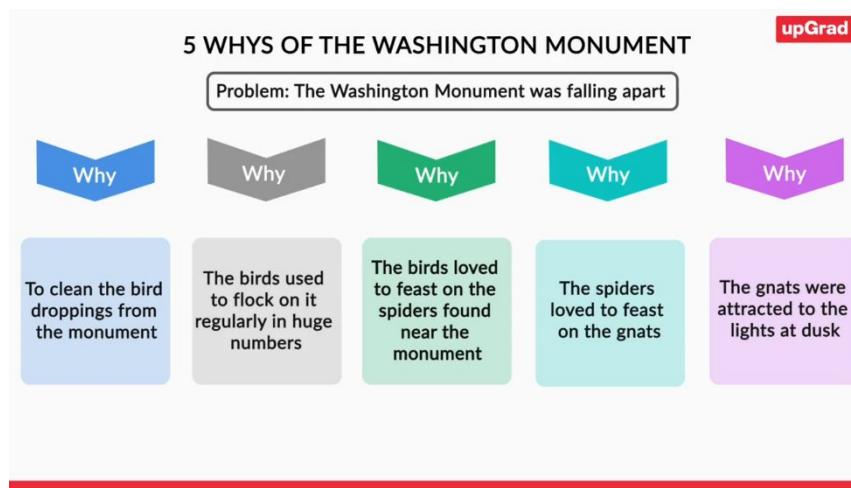
Taiichi Ohno, the main architect for Toyota's successful re-emergence in the 1950s documented the five whys process in his publication Toyota production system, and so that's how this process became an established business process re-engineering practice.



One of the earliest applications of the five whys, which is now entered folklore is where he urged his shop floor to figure out why a problematic fuse kept blowing.

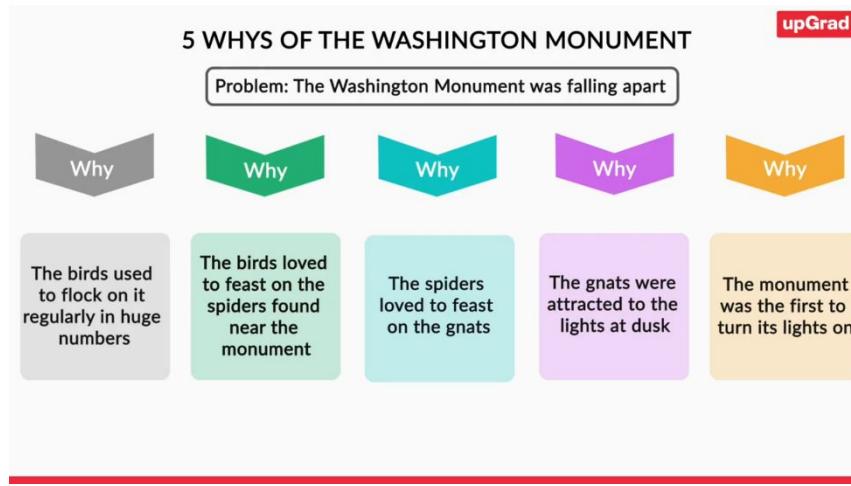
1. On asking the first why, they figured out that the circuit was overloaded.
2. On asking the second why, they realised that the bearings had locked up.
3. On asking the third why, they figured there was insufficient lubrication in the bearings.
4. On asking the fourth why, they announced that the oil pump was not circulating enough oil, thereby resulting in limited lubrication.
5. On asking a further why they realised that the pump intake filter that's our supplied oil was clogged with metal shavings.

The final why actually led to the solution. That is, there was no maintenance process for the filter. So, instead of simply replacing the problematic fuse multiple times, they realised that the simple fix to this was that you need to have a good maintenance process for the filter.



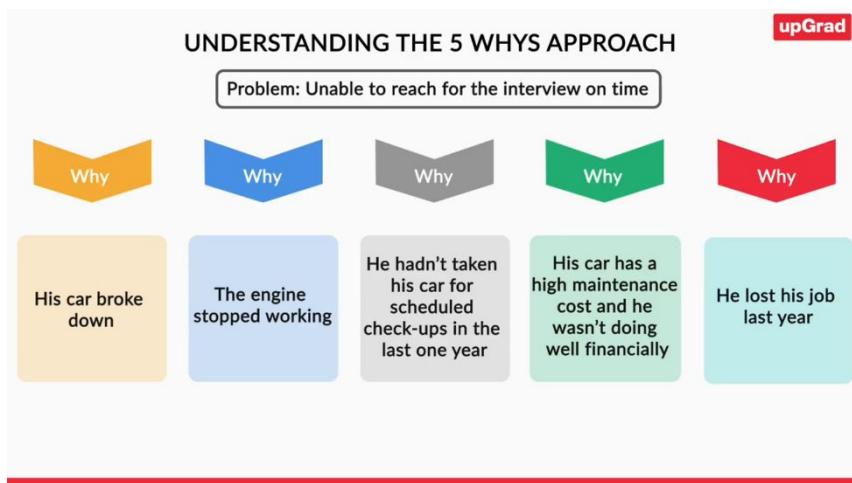
Here's another fascinating recent application of the five whys that was applied at the famous Washington Monument. The problem was the Washington Monument was falling apart. So, why was it falling apart? Because harsh chemicals that were being used to clean it were reacting with the construction material.

So, why were the harsh chemicals being used? Because they had to clean up all the bird droppings, and so why were there so many bird droppings, because birds flock there. Okay. So, why did the birds flock there? Because birds loved to feast on spiders that you found on the monument. And why did we have so many spiders? Because these spiders loved to feast on all the gnats and insects that got there.



And why did these insects get there? Because these insects were attracted to the lights at dusk. And why did that happen? Because the monument was the first to turn on its lights. So, the solution was as simple as, do not be the first monument to turn the lights on.

Here's one last real-world example to further establish the importance of the five whys. Let's imagine a situation where Vijay is traveling from Mumbai to Pune for an interview in his car, but is unable to reach Pune on time for the interview. This despite leaving from his home very early.



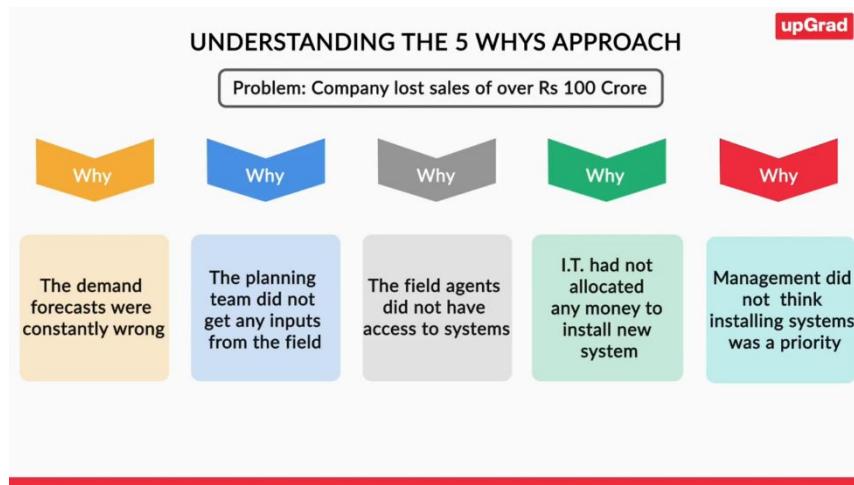
Now, the problem that you have at hand is why wasn't Vijay able to reach the interview before the allotted time? Let's apply the five whys approach and see if we can determine the root cause of this problem.

When Vijay was asked why for the first time, he answered that he got late for the interview because his car broke down, so he was asked another why for the second time to which he replied that his car broke down in the middle of the road because the engine had stopped working.

It immediately calls for another question, which is why did this engine suddenly stop working to which he answered that the engine stopped working because he hadn't taken his car for scheduled check-ups in the last one year. But there must be some reason why because of which he didn't take his car for these routine check-ups. So, he was asked that question again why for the fourth time.

To that, he answered that it was because his car was a high maintenance cost car and he had not been doing very well financially. Now there must be some reason why his financial condition was so bad, so he was asked that question why for the fifth time. This time, his reply to the question was that he lost his job last year and has not been able to get a new job since.

So, you see how we drill down to the root cause of the problem. This approach can prove to be very effective in solving business problems as well.



So, here's a business example from an early case experience I had, which was personally for me very fascinating. The management wanted us to understand a bit better why this company had lost sales of over a hundred crores last year? We tried digging around.

We realised that this had happened because the company's demand forecasts were constantly wrong, which we realised was because the planning team did not get any inputs from the field. That happened because the field agents did not have access to any systems, which itself was because IT had not allocated any money to install these systems.

And why did that happen? Because the management did not think installing these systems was such a priority. Now, one thing you will routinely see across all of these is that the underlying cause across these examples is extremely different from the surface problem that catches your eye, therefore, refrain from immediately attacking this surface problem or the symptom, but instead spend some time trying to ask yourself why.



A few reflections from years of having seen this getting used that might actually help you. The biggest advantage is that this method involves no advanced concepts, such as statistical analysis and is therefore very easy and can be quickly learned in a very short period of time.

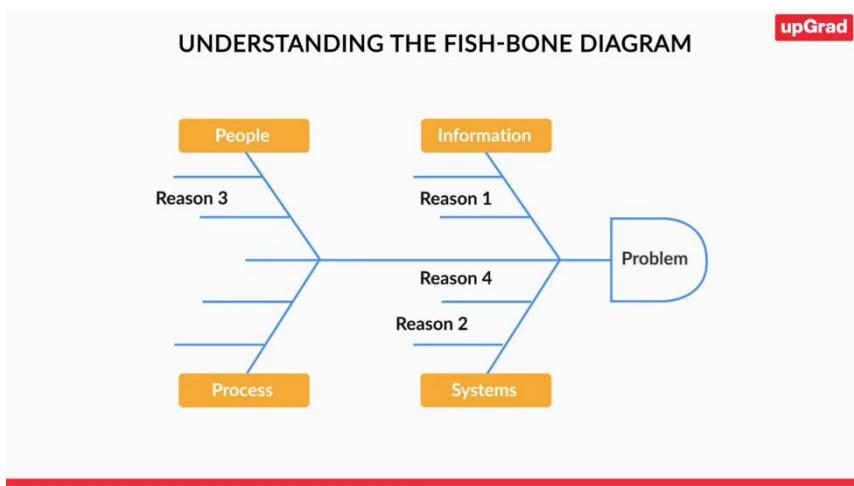
On the flip side, the five whys don't work very well when there are multiple causes and or solution chains. This could also mean that the application of the method may not always produce consistent results.

For example, I've seen three groups come up with very different answers. You could use this to your advantage however. You can have different functional groups individually in prospect on what related to their problem went wrong. Then, you can perhaps easily see that there is actually an interplay of multiple factors resulting in the problem.

You must also be aware that respondents are restricted by their own spheres of knowledge, influence and agendas, so always pressure test that answer.



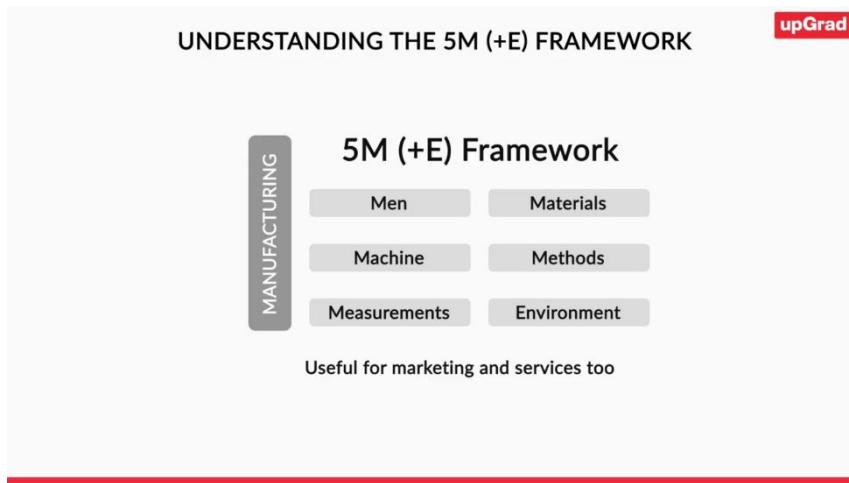
Let's now move on to another approach for determining the root cause of a problem, the Fishbone diagram. The Fishbone diagram also called the cos and the effect diagram or the Ishikawa diagram is a visualisation tool that focuses on helping you ideate and helping you categorize the potential causes of a problem in an intuitive manner. Let's try and understand how a Fishbone diagram can be used.



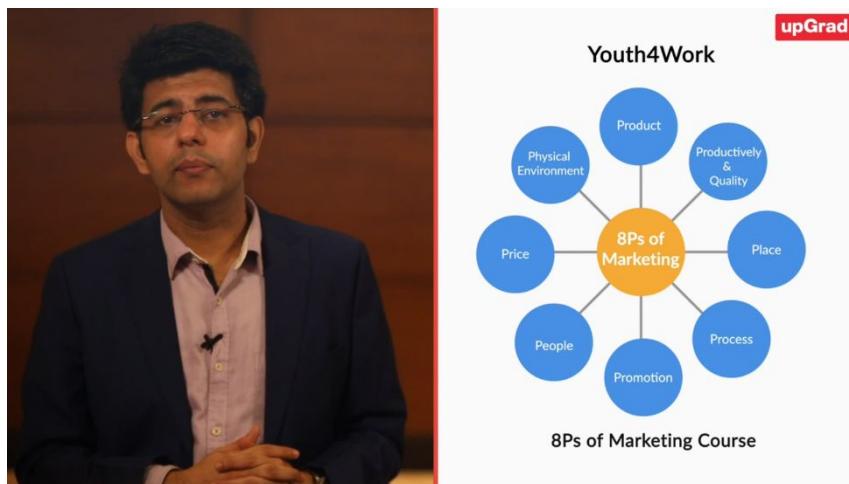
So, once you have determined the problem that needs to be solved, you have to write it in a box and this box acts as the head of the fish. Then, you got a draw a horizontal arrow pointing to the fish's head, which has a significant

resemblance to the spine of a fish. Next step is to identify all the possible causes of the problem that you have written in the box and write them around tilted arrows that are also called fins. These point away from the spine of the fish.

Now, only considering major causes is obviously not enough. There might be multiple factors contributing to these major causes. In order to sort of drill down to these root causes, you must account for these factors as well. So, you can depict these factors by drawing branches from the arrows corresponding to that particular cause, and you can continue this activity until you're able to determine the root cause of the problem.



The original technique was written, keeping in mind a sharp floor environment. In such a context, the 5M (+E) Framework becomes very useful. Here, you consider men, machines, materials methods, measurements and the environment. However, this technique is equally useful for other contexts as well, such as marketing and service.



I have personally used this in a marketing context, where we were looking to devise a holistic marketing concept for a brand where we touched upon some elements of the 8P framework that you see on the right side of the page. The 5 whys and the Fishbone techniques aside, you also have the Pareto principle, which you will come across quite often.



So, here's a super quick orientation to that one too as a bonus. The Pareto's principle popularly known as the 80-20 rule, states that 80% of the outcomes are a result of just 20% of the causes. So, you should always focus on these 20% causes to get to the desired goal in a more effective manner. However, this is not to say that you completely ignore the rest of the causes. You just plan and prioritise the 20% causes that are the most meaty first.



Do note, that this is not a hard and fast mathematical law, so you will see 90-10 in places. The idea of the rule is more important than focusing on the precise numbers. Let's understand the application of this rule with a help of an example that almost all of us can relate to.

upGrad

UNDERSTANDING THE PARETO'S PRINCIPLE

Objective: Score good marks by preparing well in the time available

Not enough time to cover the entire syllabus

Imagine a situation where you are planning for your physics exam, and you feel that you don't have enough time to cover the entire syllabus. Your objective is to score decent marks by preparing well in the limited time that you have.

So, what should you do? If you apply the Pareto's principle to this problem, you can narrow down to the 20% topics which carry the maximum weightage. Hence, focusing on these to fetch decent marks. So, that is a wrap on some of the techniques that you can use to identify the root causes of a problem.



In the last few sessions, we reviewed the activities that you must carry out in the first and second steps of the four-step problem-solving approach to both successfully frame and analyse the problem. Having now successfully framed the exact problem and analysed the problem to identify the most important underlying root causes, we shall now focus on the next step, that is, to analyse possible solutions.

The thumbnail features a man in a dark blue suit and light pink shirt speaking. To his right is a white box with the 'upGrad' logo at the top. The title 'ANALYSING PROBLEM SOLVING' is at the top of the box. Below it is a circular diagram divided into three segments: a yellow segment on top labeled 'Brainstorm/ideate potential options' with a cluster of people icons; a blue segment on the left labeled 'Prioritising options' with a checklist icon; and a grey segment on the right labeled 'Considering possible implications' with a puzzle piece icon.

This will cover a few very specific activities and concepts, starting with brainstorming through potential options, prioritising these solutions or options and considering the key implications on aspects such as people, systems and processes. So, with that picture in mind, let's get started.

Let's first look at how you can ideate or brainstorm different solutions of a problem. Now, there are several approaches that you might use to derive solutions to the problem you're facing and all these approaches have one thing in common, which is they enable you to apply divergent thinking, a thought process or method used to generate creative ideas by exploring many possible solutions.

The thumbnail features the same man in a suit speaking. To his right is a white box with the 'upGrad' logo at the top. The title 'METHODS OF IDEATION' is at the top of the box. Below it is a diagram showing three interconnected arrows: a blue arrow on the left labeled 'De Bono's Six Thinking Hats', an orange arrow in the middle labeled 'Design Thinking', and a grey arrow on the right labeled 'Storyboarding & Prototyping'. Each arrow has a small icon at its base: a thinking person for De Bono's hats, a lightbulb for Design Thinking, and a gear for Storyboarding & Prototyping.

We will today look at three methods, which are most commonly used to ideate solutions. The three methods are design thinking, De Bono's six thinking hats, storyboarding and prototyping. Aside from these, I shall also introduce you to a couple of other hacks.



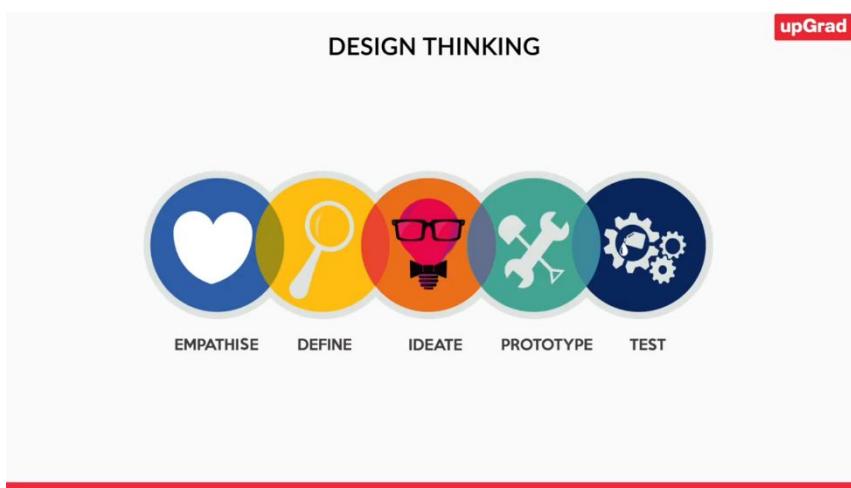
Let's first start and understand the concept of design thinking. We have already discussed this method earlier, but let me just quickly recap what we learned there. Design thinking is a phased, non-linear and iterative process.

It is phased because it can be divided into five stages:

1. Empathise
2. Define
3. Ideate
4. Prototype
5. Test



The first stage empathise focuses on gaining an empathetic understanding of the problem. Once you have a good understanding of the problem, the next step is to define the exact problem statement and then once you have the exact problem statement written down, you are ready to ideate, where you work on brainstorming and prioritising, the most innovative and impactful solutions to the problem you've defined. Then, you do prototyping, followed by testing.



When you get through these two stages, you would have figured out in a cost-effective manner the building and testing of a mini version of the solution that you intend to build.



We also mentioned the term non-linear. This is because the process itself is flexible, allows you to move from one stage to another in a flexible manner. Sometimes, you can even skip steps.

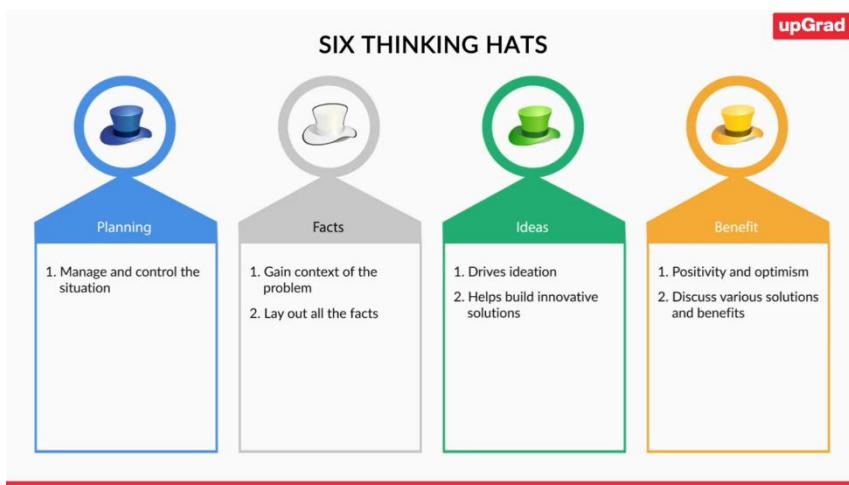


Finally, this is an iterative process. Let's say at some point you realise when you're doing the prototype, that you actually need to go back further and fine-tune your understanding of the problem, you could always go back to the define and ideate stages.



We already discussed the six thinking hats approach, but let me again recap that quickly. This is based on the theory that humans tend to closet themselves in their own world view, which can hinder thinking. Therefore, Edward de Bono came up with a method where you metaphorically wear different hats to get the group to all think in unison and in parallel.

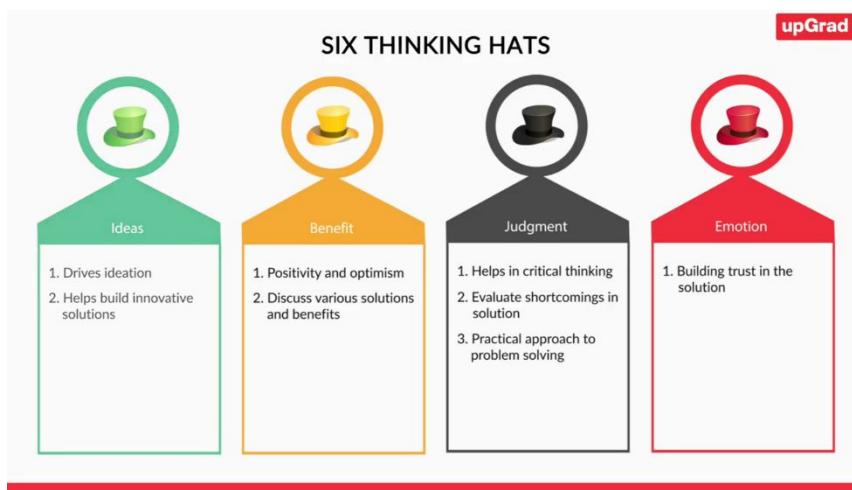
The advantage is that everyone in the group is thinking in one direction, democratically, with limited crosstalk and shouting at each other.



Here's a way that I think about organising the six different hats.

- A. First, I tend to start with asking the group to all don the blue hat. That is the planning hat. This allows everyone to manage and control the situation by defining a process to start the problem-solving.

- B. Then, I typically ask the group to all don the white hat that tends to focus on laying out all the facts that we have about the problem, helping us gain enough context.
- C. Next, I move on to asking the entire group to don the green hat, which is symbolic of creativity. This hat drives ideation and helps bring some innovative options and solutions to the table.
- D. Next, I typically ask the group to all don the sunny yellow hat, which is optimistic, positive and when you're, considering the solutions and options allows you to brainstorm on all the positives. Wearing this helps you to condition the entire group to think about all the possible benefits.



- E. Next, I move on to asking the entire group to don the black hat, which is judgmental and helps all of you play the pessimist and the devil's advocate. This helps you in evaluating all the shortcomings and the solutions that you've identified. It helps bring a touch of practicality in your thinking, thereby helping you to be a little more realistic in your problem-solving approach.
- F. Next, I bring on the raw red hat. With the red hat, you are basically asking the group to trust each other with their intuitions while evaluating a problem and its solutions and its options. Sometimes, it is your gut feeling that will appeal more to you than anything else.
- G. Finally, right at the end, I bring back the blue hat. The planner's hat to effectively conclude the module and sketch out the next steps.

With this role play of how exactly I orchestrate the hats, I hope you are getting to see how donning each of them, as a group in unison, allows you to direct multi-dimensional thinking covering all the different bases, while minimizing conflict.



**STORYBOARDING**

- Constructing a visual representation of the solution
- Allows you to illustrate and explain the solution
- Outlines the impact of the solution
- Helps garner feedback on the solution

Let's move on to the next method that is storyboarding and prototyping. Let's begin with storyboarding. It is a process of developing a visual story related to a solution that allows teams to illustrate to key stakeholders how they are likely to interact with the solution without having the solution developed or in front of them. The advantage is, it outlines the impact of the solution memorably and helps garner initial feedback.



The callout box contains three icons:

- A person standing next to a large screen displaying a grid of icons.
- A pyramid composed of several colored layers (pink, orange, teal, grey).
- A circular icon containing a camera and a landscape image.

The best way to think about how a storyboard works is to think of, say, this lecture. An easy way to have shared these learnings with you would have been to just write out bullet points, but would it have been effective enough. A better way to grasp these concepts is always to add visual elements, infographics, images, colours, etc.

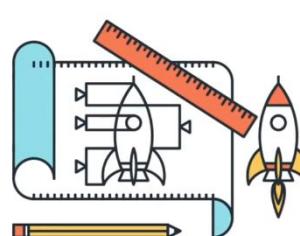


There are multiple tools out there that can help you make these storyboards. One practical place where I have personally used this to great effect is to show the discontinuities of a particular process. For example, at one client, it was critical to show the president of the company that the customers were having a poor experience at the loan application centre, and given sometimes it is so difficult to have leaders walk the halls, there was no other way to do it than to show it as a storyboard.

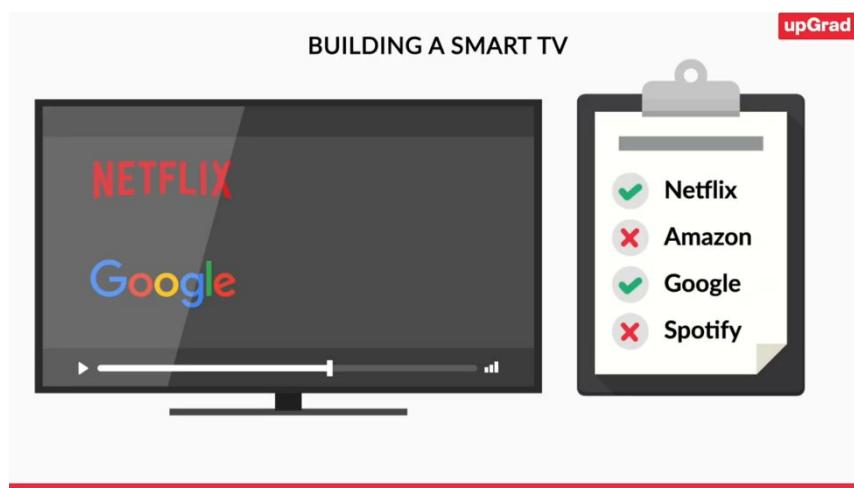
The next element I want to introduce you to is prototyping. Have you ever noticed how most of those automobile companies release prototypes of their cars well before the launch of the product? Why do they do so? Does it help them gain traction and build awareness about their cars or does building a prototype serve some other purpose as well? Let me answer all these questions.

## PROTOTYPING

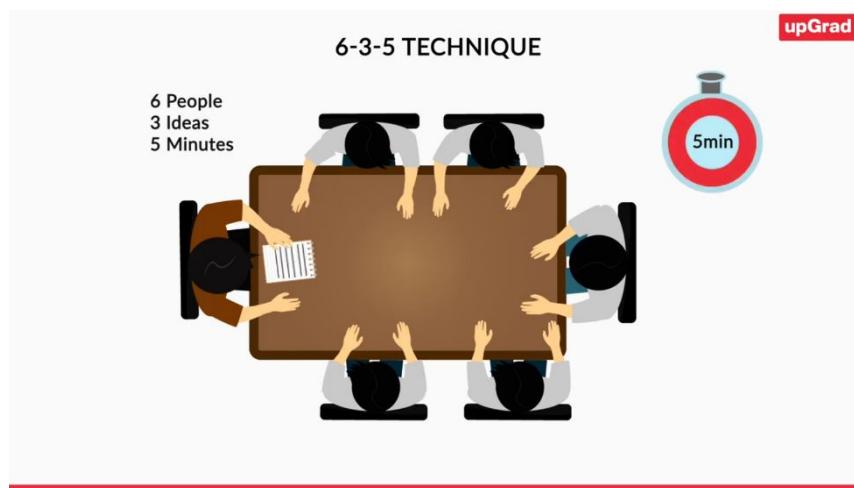
Prototyping is to craft a physical representation of your idea. Based on the feedback you receive, you can make improvements before going to the market



Prototyping is something that follows the ideation process. Suppose, there is a problem that you've trying to solve and you have spent enough time and effort trying to ideate all the possible solutions. In prototyping, what you do is create a physical representation of your idea.

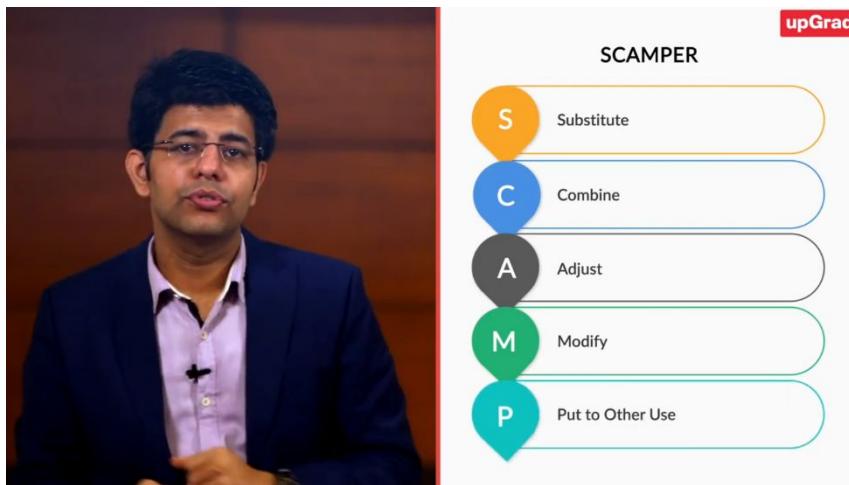


For example, if you're building a smart TV, you would want to first build an experimental model of the product so that you can determine if that's something the users need and gain that initial feedback about the product. Based on the feedback that you receive, you can make improvements to the product before launching it to the market. So, this is how prototypes are beneficial in building solutions to solve complex problems.



Now, these aside, there are so many other brainstorming hacks that allow you to expedite divergent thinking. One of the hacks I want to introduce you to is the 6-3-5 technique, which involves six people writing down three ideas in five minutes.

Once you have these ideas written out, you pass the sheet around to the next person, allowing that next person to build off the ideas that you've written and flesh them out. And you keep doing this until the person receiving these ideas last, takes them, incorporates them, and then orients the entire group to them.



Similarly, there is scamper, a technique used to improve existing products and services. Here, you take the as is of a product or service and then list out all its components. Then, you look to SCAMPER. Substitute, combine, adjust, modify, put to other use, eliminate and rearrange those components. And by doing that, you can help improve the existing product or service.

Let's take the example of McDonald's and see how it used SCAMPER to create effect. Well, without perhaps applying the concept consciously, they built McDonald's to be what it is today.



- First substitute. They substituted the well-known full-service restaurant concept, a restaurant where we get premium service with a quick service restaurant concept, a restaurant where we need to self-serve and be fast.

SCAMPER CASE STUDY: McDONALD'S

Combined add ons like ice creams and happy meals with regular burger

- Second combine. They combined ice creams as useful takeaways that people might want to have after eating burgers. They combined toys with food as they served out their happy meals.

SCAMPER CASE STUDY: McDONALD'S

Adapted and adjusted their marketing to include the Ronald McDonald mascot

- Three adjust. They adjusted and adapted the popular concept of having a mascot, that is Ronald McDonald. In fact, they are one of the very few consumer brands out there that sports and own mascot.

SCAMPER CASE STUDY: McDONALD'S

Magnify: McDonald's exploited the franchisee concept for fast business growth and expansion

- Fourth, magnify. They found franchising as the perfect way to magnify the impact. They were amongst the most popular exponents of this franchising concept with stores rising 3x in just the first year after the decision to go, we are franchisees.



- Fifth, put to other users. They replace their drive-ins with McDonald's restaurants that you see today.



- Six, eliminate. They let go all their expensive waiters. Instead, they just focused on self-service.



- And seven finally, rearrange. Instead of having customers pay as they conventionally do after they eat, they made them pay before they eat. This also reduces the amount of time customers spend in the restaurant allowing tables to turn quickly. So, you see how powerful this concept can be when it comes to ideating.



Now, that you have diverged to a set of solutions or options after the ideation phase, it is important to converge the most effective solutions to the problem. But the biggest challenge here is how do you prioritise them? So, let me introduce you to two of the most common ways of prioritising solutions that is funnels and the famed two by two prioritisation matrix.

Whenever you have a very long list of solutions, you tend to narrow them down to a shorter list of solutions that you want to consider more deeply. The process of narrowing down solutions is typically done using the funnel. Now, from this narrow list of solutions, if you want to further prioritise, that is when you have your two by two prioritization matrix.

## Funnel

Process of narrowing down solutions identified by using hard constraints to determine whether an option can be further considered or not



Let us now try and understand how funnels or filters work in greater detail. So, like we discussed funnels are nothing but a way of narrowing down some solutions out of all the solutions that you have identified. Funnels or filters typically use hard constraints at each of the layers to determine whether an option can be further considered or not.

Hard constraints are constraints that are not negotiable. Such constraints can be both qualitative as well as quantitative in nature. Let's look at some of the qualitative and quantitative filters that you can use to immediately narrow down your solutions.



Some of the qualitative filters could be, does the solution aligned with the business objectives of the company, is the solution sustainable from a long-term perspective, will the implementation of the solution have adverse effects on people, systems and processes.



You could also consider some quantitative at this. For example, you can say that you will implement the solution only if it offers profitability greater than 5%, or you can say you will consider a country to enter as a business into only if its population is greater than a hundred million.

After doing the shortlist based on hard constraints, let's look at another approach, which is famous amongst consultants, which is a 2X2. It is an effective a method for prioritising solutions using soft factors.



To illustrate this basic concept behind the method of prioritisation, let us consider an example. You just realise that it is your friend's birthday and you're already late into the evening. You'll wish to surprise him with a cake in one hour's time, you consult your sister and she's got three options for you to choose from.

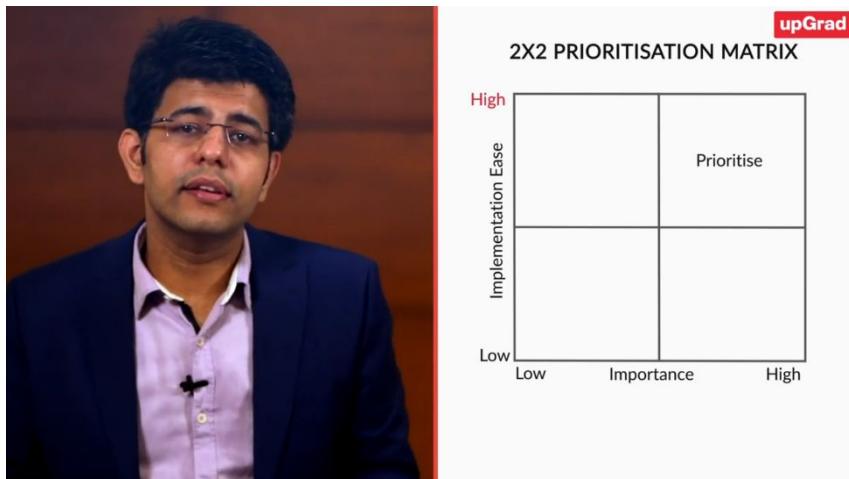
1. One, pick a cake from the cakeshop that sells very basic variety of cakes, which is situated right next to your friend's place.
2. Two, pick a cake from a very highly rated and fancy pastry at the other end of the city about 15 kilometres away.

- Three, pick a cake from a boutique that you've heard sells decent cakes, a shot day 2 on the way to your friend's house.

Which option would you go with? Option one would probably not provide you with a good range of cakes, plus we don't know how good the cakeshop is. However, it's still the most convenient.

Option 2 would perhaps give you the best cake options in the city, however, that might not work when you want it to be in your friend's place in just another one hour. Option 3 should give you a decent set of cake options backed by recommendation. It does involve a little bit of work; however, it can be managed.

So, what option would you go with? Option 3, perhaps, you would say. Yes, that's right and that's because it gives you reasonably attractive cake options and it's easy enough to execute.



Guess what? You actually just intuitively applied a 2X2 prioritisation matrix. How you may ask? Let me explain. While evaluating your solutions using this method, you plot your solutions on depositions on 2 axes.

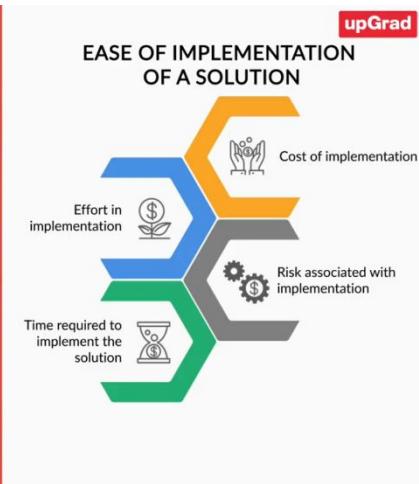
On the x-axis, usually you have the importance of this option, attractiveness of this option, or the benefits from the option. On the y-axis, usually you have ease of implementation, intensity or effort costs, etc. In other words, think of x-axis as what will you get and y axis as what you need to give or give up.

Now, when you plot these options on such a 2X2 matrix, these options are likely to fall into one of the four quadrants and the options that fall into the top right quadrant, which are both high on importance and high on ease of implementation are the ones that you need to prioritise.

Now, you may ask how do I judge the importance of the solution or for that matter ease of implementation? Great question. Let's first look at some of the factors that can help you judge importance of the solution.



1. The overall value of the opportunity. For example, if you're a sales representative, you will watch to go after the larger deals.
2. The profit margins. As a businessman, given two opportunities, one more profitable than the other, all things kept equal, you will want to go after the more profitable opportunity.
3. Growth rate. As an investor looking at two stocks equally priced today, but forecast to grow at different rates, it is obvious that you will go after the higher growth stock. Note, this is actually a little bit of a simplification for this illustration.
4. Time to drive impact. Let's say there are two opportunities at hand: The first one guarantees you a payoff tomorrow and another one guarantees you the same payoff, but after a year. Would you not agree that the first option is more attractive?



You know, there are so many more of these factors and I could keep going, but let's switch now to ease of implementation. There are multiple factors here to.

- I. One, cost of implementation. Let's say you are looking to find a permanent solution to your commute problem to and from office. You have options of buying, let's say a basic 2-wheeler or a car. What would you prefer especially, if you read crunched for money? You would, of course, go with the 2-wheeler.

- II. Two, effort and implementation. Here, you give preference to solutions that are easy to use that you have all the capabilities readily available and you understand what exactly needs to be done.
- III. Three, risks associated with implementation. In general, people are risk averse. Therefore, all other things get the same, you would like to go with the option that presents the lowest risk or by corollary the highest chance of success.
- IV. Fourth, time required to implement the solution. Let's say you have 2 solution options. The first one can be executed within one month, and let's say another one that produces similar results can be executed only in six months, or do you not agree that the first one is more attractive and so on? There are so many other factors too.

In case you did not already notice unlike the method of applying filters, this method allows you to deal with multiple soft considerations and it does not directly paint a go versus a no-go picture for the options or solutions.



So, in the past few sessions, we have learned how you can go about ideating the solutions and then prioritising them based on several factors. However, you cannot implement a solution without evaluating its implications on your people, systems and your processes while you are in a business setup. Let's try and understand with a few specifics.

**IMPLICATIONS OF PROBLEM SOLVING**

- Organisation Structure**  
Change departments, roles and team
- Leadership**  
Hire industry leaders  
Swap personnel  
Upskill existing personnel
- Partnerships**  
Outsourcing when in-house capabilities are not enough
- Talent**  
Hire new talent  
Retain top talent within the company

Let's first look at the implications on people that one should consider.

1. The first and foremost is the organisation structure. The organisation structure refers to how an organisation functions, how tasks are allocated, how they are coordinated and how they are supervised. Oftentimes, you may need to change the organisation structure or you may need to create a new department or role, you may need to change your reporting relationships. As an example, say you are looking at to focus on sales in North America, you will be well advised to set up as part of your organisation structure, a division that just focuses on North America.
2. The second implication might be around the leadership. You might need to hire entirely new leadership from outside, you might need to swap people, you might need your leaders to showcase different characteristics.
3. The third implication could be around partnerships. For example, you might realise that not all capabilities required to implement a solution can be found in-house, then you need to consider skills, you can source from partners outside. As an example, let's say you are a retail bookstore, but now are considering having an online presence. Then, you may need to partner with the likes of say, a TCS or a CTS in order to have a web application built.
4. The fourth implication is on talent. You will need to hire new people perhaps find ways to retain the right sort of people. As an example, let us take the same bookstore we previously spoke about. Let's say, the bookstore realises that partnering with an external IT services vendor is proving too expensive and they want to do the maintenance of the web application in-house. You then need to hire developers, a new kind of talent for a bookstore.

**IMPLICATIONS OF PROBLEM SOLVING**

- Leadership**
  - Hire industry leaders
  - Swap personnel
  - Upskill existing personnel
- Partnerships**
  - Outsourcing when in-house capabilities are not enough
- Talent**
  - Hire new talent
  - Retain top talent within the company
- Culture**
  - Change in the collective values, behaviours and ideals of the company

5. The fifth application is on culture. Culture refers to all the collective values, behaviours, ideals that your company's employees hold. You may need to make some changes to the culture. As an example, say you're an Indian company looking to port clients in the Middle East, you will need to certainly re-look at your culture.

The image shows a man in a dark blue suit and light purple shirt speaking. To his right is a white slide titled 'TECHNOLOGY STACK' with the upGrad logo at the top. The slide features a central gear icon connected by lines to various icons representing different technologies: clouds, documents, a smartphone, a laptop, and a mail icon.

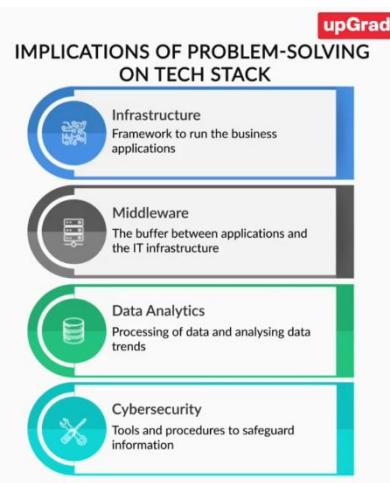
Let's next look at the implications on systems that one should consider. Here, you need to perhaps take a re-look at the entire tech stack. A tech stack is nothing but a set of IT tools, IT technologies, software, applications and languages that our company uses to provide system capabilities for both internal users and external users. So, what you see here are really various parts of the tech stack.

The image shows the same man in a suit speaking. To his right is a white slide titled 'IMPLICATIONS OF PROBLEM-SOLVING ON TECH STACK' with the upGrad logo at the top. The slide lists four components with corresponding icons: 'Application Landscape' (orange circle, application icon), 'Infrastructure' (blue circle, server icon), 'Middleware' (grey circle, database icon), and 'Data Analytics' (green circle, cylinder icon).

You will certainly have to look at the applications landscape. Applications typically refer to the business and system software that needs to be deployed and run to serve a business's needs. You will also need to look at infrastructure, which is all the storage, all the processing capabilities, etc., that you need to run these applications that we just discussed.

You will also need to look at a middleware which sits somewhere between the applications on the top and the infrastructure below. Think of it like a glue that lets applications run smoothly on the infrastructure.

All these systems exchange a lot of data and information, and it is extremely important that this data and information can be analysed through analytics for insights. You will therefore need to re-look at the data and analytics piece.



Now, all these systems also need to be kept safe. Just like a lock ensures your house is safe, so do you need a set of tools, procedures, systems to keep your tech stack safe? This is where cyber security comes in. You will therefore also need to look at the cyber security piece.

The implication for you as a firm, which is looking to let's say, implement some new solution is that you need to consider carefully the changes the solution is likely to bring across the tech stack. Do note that this description was a quick and dirty description, but makes the point reasonably well, and that is all you need to know.



Finally, let's look at the implications on the processes that one should consider.

- A. The first and foremost is on ways of working. Ways of working refers to the methods and the processes that an organisation adopts to ensure that tasks are allocated, coordinated, supervised and completed.

Oftentimes, you may need to change your ways of working as an example say you've just gotten the promotion and your responsibility is now increased twofold, good for you. You will be well advised, however, to re-look at how you work too. Perhaps you need to prioritise more, perhaps you need to collaborate more, perhaps you need to be more comfortable, taking decisions rapidly, and perhaps you need to delegate more. All of these refer to ways of working.

- B. The second implication might be around accountabilities. You might need to define clear accountabilities or you might need to shuffle them around. As an example, let's say you are employed at a food caterer, delivering food to large corporates.

In a recent exercise, the management has decided that you have to improve the overall customer satisfaction with the catering service. You will then need to have someone pull for these scores, aggregate these scores, baseline them and understand why they are, where they are, what initiatives therefore needs to be taken at every corporate? All of these are clear accountabilities.

- C. The third implication could be around governance. For example, you might realise you need specific processes to ensure that the change you are driving or the solution that you're implementing is implemented on time and in full. The steps you need to take to monitor performance provide guidance and report the progress made is governance.
- D. The fourth implication is on metrics and SLAs. For now, just think of these as the parameters you need to measure to understand your progress. We will discuss this at length very soon. As an example, say you are the food caterer looking to improve the overall customer satisfaction to make this tangible and measurable, you could ask the customers to provide a customer satisfaction score on a total of 10.

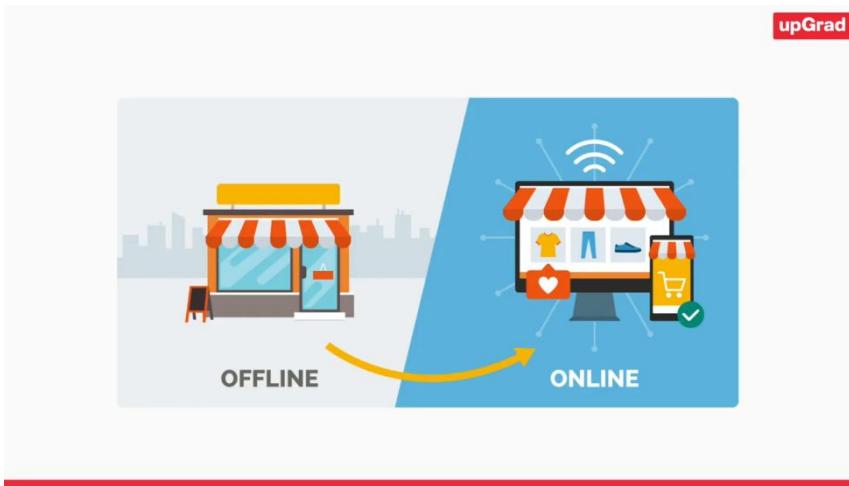
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**IMPLICATIONS OF PROBLEM SOLVING ON PROCESSES**

- Accountabilities**  
Clearly defined or multiple responsibilities towards a particular task or goal
- Governance**  
Steps taken to monitor performance, provide guidance and report the progress being made
- Metrics & SLAs**  
Parameters needed to measure the progress of the solution
- Interfacing the Ecosystem**  
Working with partners and improving communication

- E. The fifth implication is on interfacing with the ecosystem. Here, you may realise that you need to work with a new set of partners. You will also need to rethink on the model of interacting with them.

For example, we discussed earlier of having TCS support us in building a bookstore's web application. We may need to have a formal contract and an agreement with them. You may also need to schedule weekly catch-ups. So yeah, that's all the implications you need to think about. Of course, do not forget that this can cost money. So, please always consider that.



Let's say a company which has several physical retail outlets spread across the country is now looking to enter the e-commerce industry as well. What are the implications for this company, should they consider building their own e-commerce business?

Think through the structure we just discussed on the previous page, perhaps pause the lecture for a bit and let's see how many of these you can get.

## IMPLICATIONS OF PROBLEM SOLVING

On People

An illustration depicting a group of diverse people in professional attire working together around a large, central yellow folder. The folder is open, suggesting it contains important documents or data. The scene is set outdoors with a blue sky, clouds, and small green plants in the background.

1. New Organisational Structure

- Better focus
- Diversified business

Okay, so, let's begin as laid out before, let's start with the implications on the people that we need to consider. The first and foremost will be re-evaluating the organisation structure. The company might have to add a completely new e-commerce division to the current org structure, to give the business, better focus and to also let it track the performance of the e-commerce entity separately.



**IMPLICATIONS OF PROBLEM SOLVING**  
On People

2. Change In Leadership  
o New leaders with industry experience

The second implication might be associated with a requisite change in the leadership team. The company might need new leaders who have had prior experience in the e-commerce industry.



**IMPLICATIONS OF PROBLEM SOLVING**  
On People

3. Talent Management  
o Hiring talent with specific skill sets

The third implication will be on getting new talent. This company will surely need more engineering talent to build the website and mobile applications for the e-commerce business. For this, the talent acquisition team and the hiring team need to focus on hiring such candidates.

## IMPLICATIONS OF PROBLEM SOLVING

### On People



4. Differentiated Work Culture

- Not a traditional work culture
- Avoid culture clash with parent firm

The fourth implication would be on the cultural side. The retail business is a very traditional business and hence extremely different from how an online or e-commerce business operates, best to have a different culture in the e-commerce business. Another reason why we should consider having a separate division so that we don't have a clash of cultures.

So, these are the kinds of implications that implementing a new solution might have on the people. Let's see the implications on systems.

## IMPLICATIONS OF PROBLEM SOLVING

### On Systems



1. Building New Applications

- Improve competitiveness

The first and foremost, consideration will be to build new applications, a mobile app or a web app, so that the company can compete with existing e-commerce players.

## IMPLICATIONS OF PROBLEM SOLVING On Systems



2. Building a Robust IT Infrastructure

- Greater server capacity
- Cloud capabilities

The second implication is an upgradation required in the existing infrastructure. Given, we will now have so many possible millions of people around the world accessing these systems, we need a robust website that can handle such traffic. For this, we require a greater server capacity. You might also want to consider going to the cloud in order to help us do this.

## IMPLICATIONS OF PROBLEM SOLVING On Systems



3. Data Analysis

- Help segregate online traffic
- Invest in data analytics
- All decisions are backed by data

Now, if you're frequent users of online shopping, you may be aware of just how much data is being collected and analysed. This is how e-commerce companies get to recommend you that product, you absolutely loved. So too, will our company need to invest in in-house data capabilities for ensuring that all their decisions are backed by data.

## IMPLICATIONS OF PROBLEM SOLVING On Systems



4. Cybersecurity

- Build security infrastructure
- Data protection is paramount

Finally, given this is now going to become an online business, one big implication is to ensure that they have a cybersecurity infrastructure to safeguard the data of the business and the customers.

Now, you have seen some implications on people and systems which leaves us with processes. Let's look at the implications on processes that this company will face.

## IMPLICATIONS OF PROBLEM SOLVING On Processes



1. Unorthodox Working Style

First, the company will have to drop its traditional working style and adopt a faster way of working just like startups.

## IMPLICATIONS OF PROBLEM SOLVING

### On Processes



2. Increased Accountability

- New team with added responsibility and goals

Second, the company will need to waste the responsibility of handling the entire e-commerce business to a core team led by a business head for e-commerce. This will ensure absolute accountability of the business lies with them.

## IMPLICATIONS OF PROBLEM SOLVING

### On Processes



3. Proper Governance

- SOPs are followed
- All decisions are reviewed

Third, the company will need a proper governance mechanism to ensure that all the SOPs are followed and that all the activities are properly reviewed.

## IMPLICATIONS OF PROBLEM SOLVING

### On Processes



4. Track Data Metrics

- Ensure objectives are being met
- Measure impact of business decisions

Fourth, the company will need to track certain metrics to ensure that their operations are in line with the larger business objectives of the organisation. In the case of our e-commerce company, you could begin with looking at the number of users who have signed up their revenues you are making through e-commerce, etc.

So, this is how you evaluate the implications on people, systems and processes for a specific solution.



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**Implementing the Solution**

- Define the action plan
- Determine the right KPIs and metrics
- Create POCs
- Monitor and review the progress

In the last few sessions, we reviewed the activities that you must carry out in the first, the second and the third steps of the four-step problem-solving approach to successfully frame the problem, analyse the problem and analyse the solutions. Having done so, we should now focus on the next step that is to implement the solution. This will cover a few very specific activities and concepts, starting with defining the action plan, determining the right KPIs and metrics, creating the POCs, monitoring and reviewing the progress, etc. So, with that picture in mind, let's start.

So, we're now down to the last step of the four-step problem-solving process, which involves implementing the solution. This is where the rubber hits the road. Let's now begin with the first activity that you typically need in order to undertake an implementation of a solution, that is, you have to write out a concrete action plan.



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**THE ACTION PLAN**

- Layout the tasks and sub-tasks
- Delegate responsibilities to people
- Assess the committed timelines
- The KPIs and metrics to be examined
- The risks & their mitigation strategy

A great action plan enables you to lay out the various tasks and the various sub-tasks, their owners and the committed timelines. These will answer four basic questions. What, how, by whom and by when.

Aside from this, capturing current statuses versus commitment, the KPIs and metrics being looked at the different risks that you might face and their mitigation strategies and finally, what you will need help from the management team on is all pretty useful. Do note that we shall cover what KPIs and metrics risks and mitigation measures are shortly, so hold your horses there.

The attached template is reasonably good practice, which I have now used on many occasions to have my teams and client teams lay out their actions.

Defining the plan alone is insufficient to ensure that you obtain the desired implementation outcomes. You also must focus on tracking some key performance indicators or KPIs and metrics. These are both very closely related, but have several differences between them. So, let's understand what KPIs and metrics are and understand how they differ from each other.

Let's start with the definitions. KPIs are measurements that assess how effective you are in achieving the business goal that you have defined. On the other hand, metrics are measurements that track the status of a specific business process.



For example, a key metric that Netflix might be tracking is the number of new sign-ups every month, whereas the number of users who buy a subscription plan after sign up also called subscribers, might be an important KPI for them.

KPIs Vs METRICS

KPIs are of strategic relevance for the organisation

Metrics are only relevant to a specific department directly impacted by it

KPIs have a first-degree link to business outcomes, while metrics have a second or a third-degree link to business outcomes. As a result, KPIs are considered high level and strategic and of relevance to the entire organisation. Metrics, on the other hand, are low level and tactical of relevance to a particular department and of interest to a small group of individuals who work for or are directly impacted by that department.

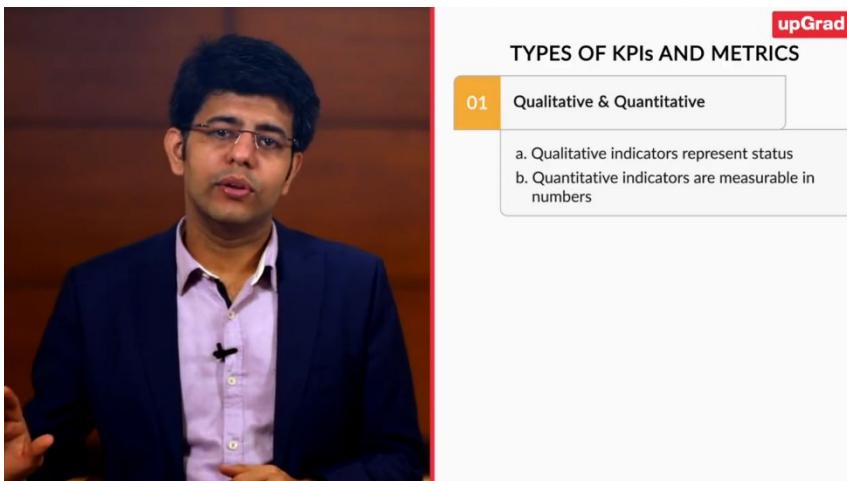
Finally, one could argue that all KPIs are metrics, but not all metrics are KPIs. Surely, at the process level, you will have hundreds of metrics that you are going to be tracking, but not all of them can be key performance indicators.

But all marketing costs are a KPI. However, cost per click defined as the marketing cost a company incurs every time an online viewer clicks on a search link that redirects their webpage is not. While yes, it could be an important metric, it is not a KPI, given what we just discussed do you see why.

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Use S.M.A.R.T framework to ensure relying on the right KPIs and metrics to track the progress of your solution

One last note, while defining KPIs and metrics, keep in mind the smart framework that we discussed earlier. This will ensure that you are relying on the right KPIs and metrics to track the progress of your solution.



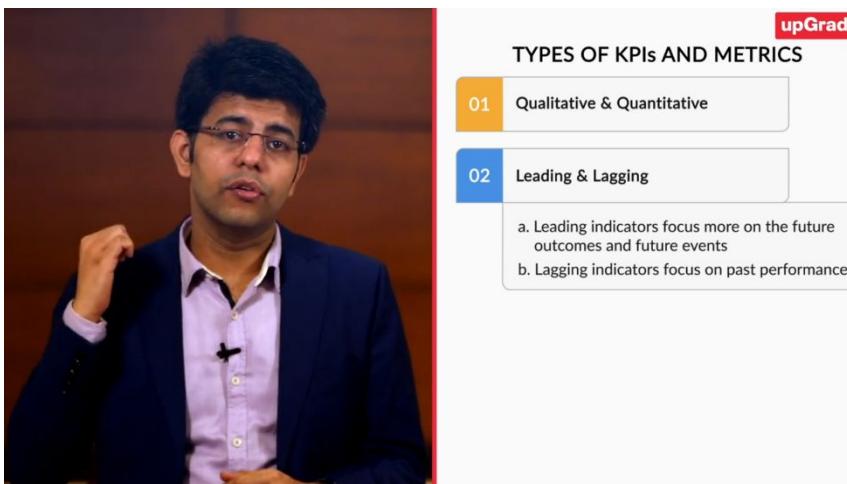
**TYPES OF KPIs AND METRICS**

**01** Qualitative & Quantitative

- a. Qualitative indicators represent status
- b. Quantitative indicators are measurable in numbers

Now, KPIs and metrics can be classified into different types based on several factors:

1. Qualitative versus quantitative. Let's try and understand the difference between them. So, a qualitative indicator is something which represents typically a status, whereas a quantitative indicator is measurable and involves numbers. Here, are two examples of qualitative indicators. The status of completion of a task that can be classified as green, yellow or red, depending on the progress of the risk levels, is a qualitative indicator. The difference readiness conditions typically called DEF CON, defined especially during times of war, is also a qualitative indicator. Now, here are two examples of quantitative KPIs, revenues and costs, both of which can be unambiguously measured.



**TYPES OF KPIs AND METRICS**

**01** Qualitative & Quantitative

**02** Leading & Lagging

- a. Leading indicators focus more on the future outcomes and future events
- b. Lagging indicators focus on past performance

2. Leading versus lagging. Leading indicators as the name suggests, focus more on future outcomes, future events and help predict them. Lagging indicators, on the other hand, focus on what has already happened. For example, if you're tracking the NPS or the net promoter score, which is a measure of customer satisfaction and advocacy levels, you are relying on a leading indicator because happy customers can bring in more business, and so this is an indicator of future business outcomes. On the other hand, if you're looking at the revenue of your company in let's say the last quarter, you are looking at a lagging indicator because it is measuring something that has already happened.



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## TYPES OF KPIs AND METRICS

- 01 Qualitative & Quantitative
- 02 Leading & Lagging
- 03 External & Internal
  - a. External indicators are linked to something outside the organisation
  - b. Internal indicators are associated with something within the organisation

3. External versus internal. External indicators are linked to something which is outside of the organisation. Internal indicators, on the other hand, are associated with something within the organisation. For example, a country's population is an external indicator, whereas the number of employees of a company is an internal indicator.

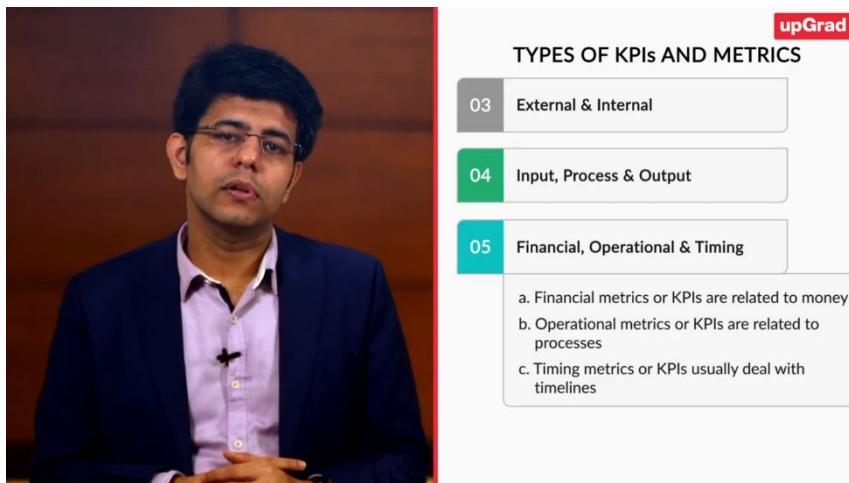


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## TYPES OF KPIs AND METRICS

- 01 Qualitative & Quantitative
- 02 Leading & Lagging
- 03 External & Internal
- 04 Input, Process & Output
  - a. Input metrics are associated with the different inputs into your business
  - b. Process metrics measure the performance of intermediate steps
  - c. Output metrics measure final outcomes

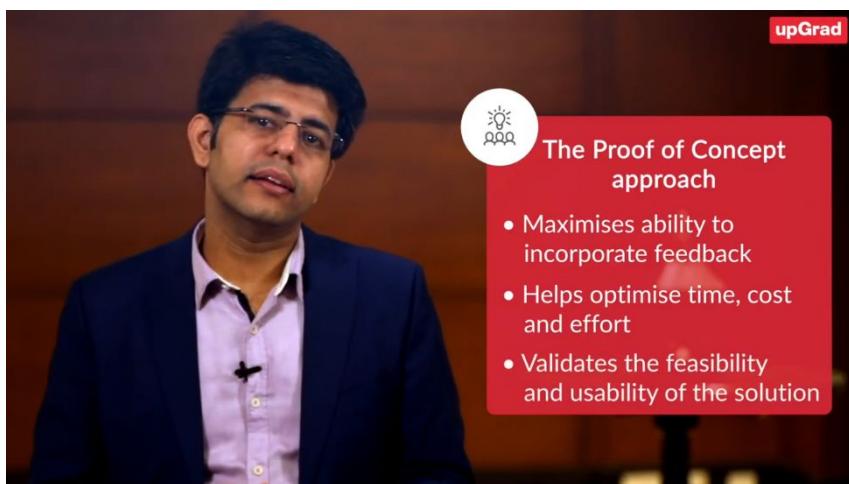
4. Input versus process versus output. Input metrics are associated with different inputs into your business. For example, if you own a steel manufacturing plant, the cost of raw materials that you procure will be an input metric. Process metrics pertain to the performance of intermediate steps. For example, you might be interested in tracking the efficiency of the entire manufacturing process, which is a process metric. Output metrics measure final outcomes, final results. For example, you might be tracking the amount of steel you are producing every month. This will be an output metric.



**TYPES OF KPIs AND METRICS**

- 03 External & Internal
- 04 Input, Process & Output
- 05 Financial, Operational & Timing
  - a. Financial metrics or KPIs are related to money
  - b. Operational metrics or KPIs are related to processes
  - c. Timing metrics or KPIs usually deal with timelines

5. Fifth, you can classify indicators as financial, operational and timing. Financial metrics or KPIs are related to money, whereas operational metrics are related to processes and timing metrics or KPIs usually deal with timelines. A ready list of examples of such financial, operational and timing metrics, I often come across is provided in the additional reading material.



**The Proof of Concept approach**

- Maximises ability to incorporate feedback
- Helps optimise time, cost and effort
- Validates the feasibility and usability of the solution

Now, let's assume that you're solving a business problem and you already have identified the solution, you have an action plan too to implement the solution. Now, is there a recommended approach, which you can use to implement the solution? The answer is yes, the approach that you should adopt involves building what we call a proof of concept as you go from idea or storyboard to full implementation and rollout.

Such an approach allows you to do three things.

1. It maximizes the ability to incorporate feedback and learn.
2. It helps you reduce wasted time, cost and effort.
3. It validates the feasibility and the usability in the most effective manner.

This faced approach allows you to check the effectiveness and the practicality of the solution that you've identified prior to doing a full-blown implementation of it. What you essentially do is a small exercise to test the concepts functioning. Let's understand this with the help of an example.

Let's say you are facing a problem with the food that is being served in the cafeteria of your workplace and you want to change the vendor who supplies the food. So, to solve for this problem, you have already shortlisted three good vendors who you think can offer great food at the desired quality.

The thumbnail shows a man in a dark blue suit and glasses speaking. To his right is a white callout box with the title "RANDOM SELECTION" in bold capital letters. The box contains four numbered steps with icons:

- 01 Select one of the three vendors at random to serve food for a month
- 02 Take feedback from employees
- 03 Hire a different vendor until you get the desired quality of food
- 04 Results in loss of time

One approach would be to select one of the three vendors at random, onboard that vendor and let them serve food for an entire month and then you can take feedback from your employees and ask them if the food was fine or not. If you don't like the food, you can onboard a different vendor and this process can keep going on until you get to the desired quality of food.

There are several disadvantages, however, with this approach. You cannot be sure, which vendor really works best and you're going to be going in blind, which is not good. You lose a lot of time in the process a month at minimum, you may also lose a lot of goodwill of the employees who might, in the worst-case scenario, not like the food at all. Clearly, this seems like a suboptimal approach.

The thumbnail shows the same man in a suit speaking. To his right is a white callout box with the title "THE PILOT PROJECT" in bold capital letters. The box contains five numbered steps with icons:

- 01 Three vendors serve food for a week
- 02 Test the menus on different days
- 03 Take feedback from employees
- 04 Provide feedback to vendors for improvement
- 05 Process helps preserve employee goodwill

A better approach would be to run a pilot, also called a proof of concept where all three vendors can supply food for a week. That will allow you to.

- A. You can test the menus on different days. This gives you several data points to be sure of the answer. You let your employees compare which vendor is offering the best food and based on that feedback, you can finalise the right vendor.
- B. You can refine the food on offer better by passing on specific feedback about the vendor's perception with your employees if you pull them for that.
- C. You can preserve the employees' goodwill because you don't subject them to suboptimal quality of food for a period of one month or longer, and if a caterer is bad, you will already see that employees start using other caterer options on offer.

**THE PILOT PROJECT**

- 02 Test the menus on different days
- 03 Take feedback from employees
- 04 Provide feedback to vendors for improvement
- 05 Process helps preserve employee goodwill
- 06 Saves time taken to come to a decision

- D. You can also get to the answer very quickly, unlike in the first scenario where you might end up with a suboptimal answer, even at the end of a month, here you get to the right answer at the end of just one week.

So, this pilot project we just discussed here is nothing but a proof of concept where you validate your solution to the problem before implementing the solution, and you can see all the advantages that you get from it.

Having learned this, how can you apply it in your professional life? Say you've just completed your first month on your new job and say your manager, who's extremely happy with you has asked you to pull together a presentation that can give everyone an orientation to what you and your department do and that's due in 10 days.

The video player interface features a man in a suit and glasses speaking on the left. On the right, there is a title "TWO SCENARIOS" and two callout boxes. The first scenario, outlined in orange, says "The first scenario" and "Spend an entire week to make a powerpoint presentation of 20 slides". The second scenario, outlined in blue, says "The second scenario" and "Spend a day thinking through the main messages and the insights and making a simple bullet point list".

Let's consider two scenarios how you could respond. The first scenario, you spend an entire week and do a PowerPoint presentation lasting 20 slides. The second scenario you spend just one day thinking through all of what you would like to say just the main messages, just the main insights and express them in simple bullet point list on a piece of paper, and you take that to your manager and discuss.

Which one looks like a smarter approach? Obviously, number 2, right? Because it allows you to invest the least amount of time and effort, but lets you still have a discussion that can engage your manager. And should you be off track, you still have nine days to get it right. Unlike the first scenario where you might spend more time and more effort, and then you might get it entirely wrong at the end of seven days with just three more days to go.

Across the two examples, we spoke about as we discussed with the POC, we referred to the process of getting and incorporating feedback. In fact, it is so central to problem-solving that we wanted to devote an entire session to it.

Oftentimes, what early problem solvers forget is your seldom operating in a vacuum, and you sell them therefore expected to come up with a perfect solution with no feedback being picked up or incorporated.

The video player interface features a man in a suit and glasses speaking on the left. On the right, there is a title "Two Types of Feedback" with a speech bubble icon. Below it is a red box containing the text "• Qualitative feedback" and "• Quantitative feedback".

There are two types of feedback you can take once you've deployed the solution or a proof of concept. You can get qualitative feedback or you can get quantitative feedback. While we will revisit these topics in greater detail onwards, let me give you a quick overview here.



Let's first talk about qualitative feedback often lens colour and supporting arguments, as you gather evidence to make some refinements. Here, you typically do it through interviews of the users, surveys of the users, etc. Think of the feedback calls that you've received from your mobile network provider, the qualitative comments that you were asked to fill out on the online food delivery apps.

Let's now talk about the quantitative feedback. Such feedback often lends specificity and irrefutability through the evidence that you gather in order to help you make some refinements. Here, you typically do it through continuous measurements of the KPIs and metrics, and sometimes also through surveys. Think of the feedback on the approval rating that you would provide to products after you purchase them on Amazon. That's a great example of quantitative feedback.

Based on both these types of feedback that you've just collected, you as a problem solver, can judge how well your solution is working and where it is not working make those refinements, as required.

Let's revisit our examples of the restaurants in the north. Say you had identified that the real root cause of all the dip in sales was reduced customer satisfaction because of quality of food. So, you decide to source your ingredients from a new supplier and use that to cook the food that you supply in the restaurant. You want to now monitor and test if it's working, what do you do.



At the end of a meal, you can pick customers at random and have the restaurant manager ask them about their satisfaction with the quality of food. This is an example of qualitative feedback that you could pick. You can also take quantitative feedback. You could ask your customers to fill a form and provide customer satisfaction scores when they leave the restaurant or do so online. This can get you valuable quantitative feedback.

Suppose, the quality of say the meat that the vendor is getting you is not up to the mark, you would come to know about it when your customers share the feedback with you, and then you can convey this to the vendor so that they can improve the quality of the meat they are serving. So, this is how the feedback loop can refine the solution that you have implemented.

Okay, so now you have the plan in place, the metrics you're looking to track, and you completely understand that you need to monitor and test and refine continuously, but there could be a team that does all of this. You also need a mechanism to ensure that the whole thing is executed in a manner such that you achieve the results that you wanted to get to.

## Program Management Office

The program management office is the organisation, processes and routines that ensure a program, or a group of projects, are successfully implemented



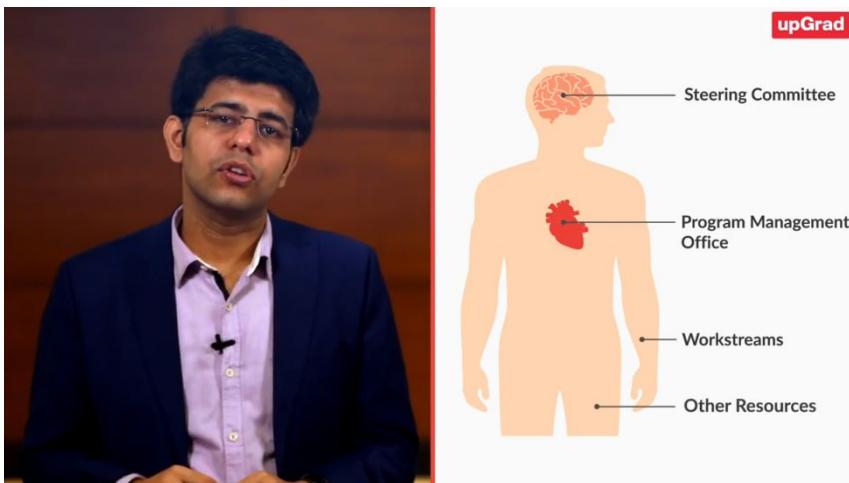
And that mechanism is the program management office also called the PMO. Think of it, like the insurance that you would add, on top of your programs, to ensure that you reach success. The program management office is the

organisation, the processes, the routines that will ensure that a program or a group of projects are successfully implemented.



There are four parts to a program management office:

- A. Steering committee. Think of this, as mostly the leadership that shall define, approve and steer the project. If you need those additional team members or some more money to achieve your results, that decision will likely be approved by the steering committee.
- B. The program management office itself, the core part of the construct. They are the people who are operationally on point for delivery of the project. They also ensure that there is alignment across the board, they review the progress and they escalate things if they go off the rails. If you are part of the PMO, one skill that you need to bring and have is to be able to effectively drive meetings, expect a ton of them.
- C. Workstreams. They are operationally on point for their specific packages of work. They drive a lot of the day-to-day working on the project. Often, they need to coordinate between themselves or across the organisation in order to get things done.
- D. Other resources. They are largely allocated on minimal allocation, say less than 10%. They could be on call to provide some expert inputs on specific topics and perhaps to get you some specialist work done.



Here's one easy way to make this memorable for you, think of the steering committee as the head of the program, because they direct the entire thing. Think of the PMO as the beating heart of the program, given they are the central part of the program, think of the workstreams as the hands that do all the work and think of the resources on call as the legs, they prop you up whenever you need them.

So, that's it. That's the program management office. You are sure to come across this term at some point in time, in your corporate career. And so, the next time you come across this, you already know what it is you.



In the last few sessions, we reviewed the activities that you must carry out in the first, the second, the third and the fourth steps of the four-step problem-solving approach to successfully frame the problem, analyse the problem, analyse the solution and implement the solution. Having done so, we should now focus on a set of things that you will need to consider to continuously enable these solutions.

The image shows a man in a suit and glasses speaking. To his right is a white callout box with rounded corners. The title "PROBLEM SOLVING: THE WAY FORWARD" is at the top, followed by the upGrad logo. Below the title are four numbered steps: 1. Conducting research without any bias (orange circle), 2. Managing change to realize results (blue circle), 3. Communicating with purpose (grey circle), and 4. Proactively planning for risks (green circle).

So, with that picture in mind, let's dive in. Here are critical enablers and things that are important to get right across the four steps.

1. Conducting research while avoiding any sort of biases.
2. Managing change to realise results.
3. Communicating with purpose.
4. Proactively planning for risks.

Correspondingly, in this section of the module, you will understand:

- One, the different types of research that we do as generalist problem solvers and the biases that we need to recognise and avoid.
- Why change management is important especially when it is a complex problem that you're dealing with and involves a truly transformative solution. What you need to ensure that change happens and, more importantly, sticks.
- Three, the types of communications that exist and when you choose one and over the other.
- And four, how do you measure mitigate and effectively manage risks? Let's look at each of these activities one by one.



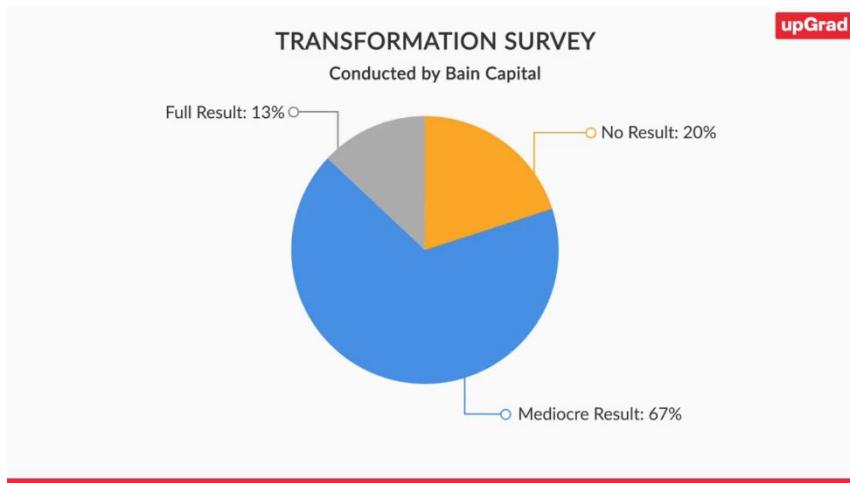
By now, you have a good understanding of the different types of research and the common biases which impact the outcomes of the research. The next important aspect I said we will touch upon, is change management. This is such a hot topic in the industry today and something that most consulting firms sell to thrive, but there is a reason for that, it is important period, so you must by now be wondering what change management is, and why is it so important for businesses? Let me answer all these questions.

So, when I say change management, what I am referring to is all the processes and the approaches that one needs to take to prepare, support and ensure that change happens smoothly.



This is because:

- Change is constant. This is especially true when you are solutioning. After all, the reason you were looking for a solution was that you could change status quo.
- Organisations don't change, more accurately said, its people that do, this is because an organisation is nothing more than a sum of its people.
- And C, unfortunately, here's the bad news, people do not want to change. Therefore, every company requires effective change management whenever a solution is implemented or whenever it undergoes some transformation, which itself is a fancy way of saying change.



A survey carried out by Bain my alma mater shows that one-fifth of the executives who undertook a large transformation to solve a fundamental problem said their efforts went completely in vain. So, they completely failed in these transformations. Almost two-thirds of these settled for mediocre value, and only a mere one-eighth of them managed to achieve full results. These facts depict the need for effective change management.

NEED FOR CHANGE MANAGEMENT

- Lack of vision  
No clear path on which to proceed
- Communication pitfalls  
Gaps in communication resulting in the message being misunderstood
- No program management office  
A PMO allows for successful execution of programs or projects
- Cultural limitations  
Gap between the company's culture and the ideal culture the organisation needs to display

The causes for these are many, but most likely lie amongst the following:

1. Lack of vision. Here you don't have a clear picture of where you want to go. That is, the ambition is not clear or scintillating enough.
2. Communication pitfalls. Here, there are gaps in between what is said and what is understood, mostly because of a lack of a clear message, suboptimal frequency, failure in identifying the right person to deliver the message, and an incorrect choice of media.
3. Lack of a dedicated PMO. You may have already seen the power of the PMO towards the close of the fourth step, but essentially, the program management office is an organisational construct that allows programs or groups of projects to be executed successfully. If you want to know more, but did not go through that session, do take a re-look.

4. Limitations in culture. Here, there are clear gaps between the culture that the company today displays and the ideal culture you want the organization to display. How often have you heard your friends say they quit a place because they did not like the culture, but what exactly is culture? It is all those soft, intangible elements like the company's values, beliefs, ideals, mottos, things like that. These cannot be quantified, but their importance cannot ever be emphasised enough.

The image shows a video player interface. On the left, a man with glasses and a dark suit jacket is speaking. On the right, there is a section titled "NEED FOR CHANGE MANAGEMENT" with four items listed:

- No program management office  
A PMO allows for successful execution of programs or projects
- Cultural limitations  
Gap between the company's culture and the ideal culture the organisation needs to display
- Lack of buy-in  
Everyone must be invested in the company's goals
- Inflexible organisation  
Having a rigid structure could prove to be an obstacle to the success of the solutions

5. Lack of buy-in. This one is important. Everyone needs to agree on the problem, the path to finding the solution, the solution itself and the path to implementing the solution. If not, you don't have buy-in and that will result in chaos.
6. An inflexible organisation. This can also prove very difficult to the success of solutions. You are looking to deploy in the company's context. We will touch on many of them in the short sessions around risk management, which is just around the corner.

But before that you may ask hang on, I understand transformation or change efforts fail. I also understand why that commonly happens, but what can I do about that? If you did, that's a great question and the topic that we're going to talk about. I think there are six elements you need to think about in order to effect change successfully. They follow some of the challenges that we laid out on the previous page, but let's look through one at a time.

The image shows a video player interface. On the left is a video frame of a man with dark hair and glasses, wearing a blue blazer over a pink shirt, speaking. On the right is a white box titled "SIX ELEMENTS OF CHANGE MANAGEMENT" with the upGrad logo at the top right. The box contains four numbered items: 01 Communication (orange), 02 Risk management (blue), 03 Structure and process (grey), and 04 Capability building (green). Below these are two additional points: a. Hiring and retention of good talent and b. Focus on talent that has the right skill sets to achieve the organisation's goal.

SIX ELEMENTS OF CHANGE MANAGEMENT	
01	Communication
02	Risk management
03	Structure and process
04	Capability building
a. Hiring and retention of good talent b. Focus on talent that has the right skill sets to achieve the organisation's goal	

1. One, communication. We spoke about communication pitfalls earlier. Therefore, we need communication that is tailored, that is customised to the audience and the purpose. We need frequent communication. More is always better than less in trying circumstances. We need the right media, sometimes online or print, but at other times live and face to face. We need messages that are suited to the audience, the situation they find themselves in and their individual positions on the change curve. For example, if in tough times like the ones that we see right now in 2020, how often do you wish you had leaders who could communicate strongly decisively, empathetically and with purpose.
2. Risk management. We need to look at risks holistically, earlier in the game, embrace them, find the right solutions proactively, stall them, and if not, find ways to prevent them from doing huge damage. On both these topics of communication and risk management given their importance, we will go a little bit deeper, but in a bit, let's circle through the rest.
3. Structure and process. We spoke about the perils of an inflexible organisation. The two things I most commonly find wrong with organisations even before I look at culture is their structure and their process and each can severely inhibit the functioning of the workplace. You therefore may need to reorganise yourself, as you have so often seen companies do. You need to work out processes that are leaner, but yet get you to outcomes effectively.
4. Capability building. No big change can happen at a company without identifying attracting and retaining great talent, such as you all, talent that possesses the right mix of capabilities required for your end state.

SIX ELEMENTS OF CHANGE MANAGEMENT

- 02 Risk management
- 03 Structure and process
- 04 Capability building
- 05 Ways of working
- 06 program management office
  - a. Drives the implementation of an initiative in the organisation

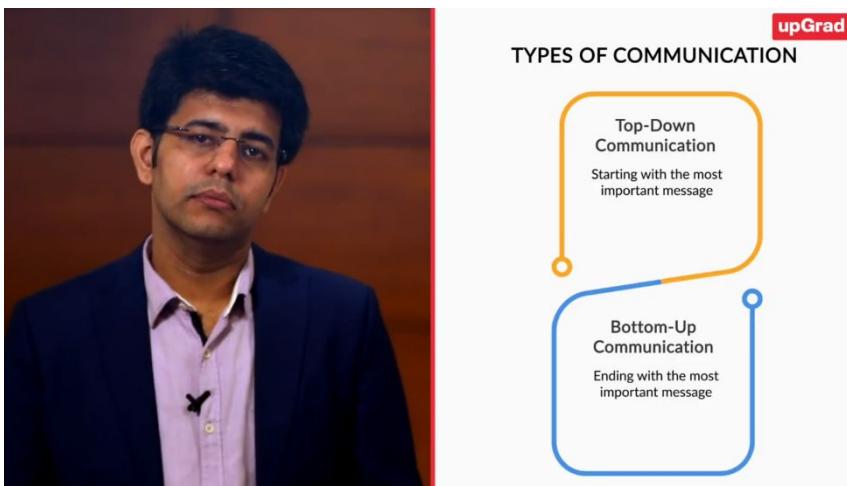
5. Ways of working. Now, we spoke about culture as a huge deal in organisations. If there is a culture of say, bureaucracy, you can never have radical fast-paced change. You need to sort out the bureaucracy before you can tackle any major change.
6. Finally, sixth, the program management office. Something, we've now mentioned twice in the course, but that is also a reflection of just how important it is in the business context. Seriously, give the program office a thought if you're looking to drive the implementation of an initiative in your company.

Now, hopefully, that gives you an overview of the elements absolutely required to get a ride before you execute on change. There could be other elements too. You need to look at around the corners and identify the gaps to ensure the change is done right. With that, let me take you deeper into communication and risk management.



Communication is extremely critical and some say devices or communications such as writing rank amongst the most important inventions humankind has ever made. So, too is communication important in any problem-solving context, you need to communicate in order to understand the context of a problem, you need to communicate when you have to frame the problem and define it, you need to communicate when you need to test the hypothesis, and you need to communicate when you're discussing possible solutions and prioritising them, you will also need to

communicate once you've agreed on the right solution and are socialising that with everyone. So, you see, communication is important right across the process.



Fundamentally, communication helps understand, inform, engage, and reinforce, and all the communication can be classified into two forms, top-down and bottom-up. Whenever you start with the most important message, which is the punchline, then you're communicating top down. When you end up with the most important message, that is your punchline last, you're communicating bottom up.

Say, you're working on building the sales forecast for the CEO of your company and say he meets you on the corridor as he is heading into his next meeting and asks you, hi, Ravi, I remember you were working on the next quarter sales forecast last week. Do you have an update?

And you say, hi, Aditya, yes of course, input so far suggests that we are likely to target 150 crores of sales next quarter, give or take 5%. The bulk of this will accrue from our large customer base where we are likely to make 100 crores of sales, while the remainder splits equally between our medium and our small customer base. This is based on conversations with all the account managers so far, and we do have conversations lined up with some of the territory managers to pressure test these, expect to have a concrete update next week.

What communication style does this fit? Yes, this is top-down as it starts with a punchline first, which is to hear the insight and then followed by the analysis and the process details. It is tailored typically for conversations with very senior leaders as with the CEO here. It is also the preferred medium when you are in a situation that's pressed for time, as is with this example, and you run into the CEO as he's just rushing into his next meeting.

Now, let's consider another example. Say your HR is talking to a large group of people about some significant changes to the performance appraisal process. The broad structure of a one-hour presentation to all of you will run something like this.

What are some of the challenges with the current system of performance appraisal? What are some of the principles that have to be kept in mind when designing the new appraisal process? What will this new process look like for appraisers? What will this new process look like for the ones getting reviewed? And what does this mean for all the employees getting affected?



So, what sort of communication style does this fit? Yes, this is bottom-up. As it starts with setting the context, talking through the need for the change, that is a problem situation and then talking about the envisioned solution, and finally, getting down to what this means for you as an audience.

It is also the preferred medium when you are in a situation where you have a significant amount of time, but there is a complex topic then you need to talk through and that you think it is important that people are taken through a journey to really understand why a certain change or a solution is being adopted.



So, now you've got into the action plan written out, you've communicated everything that you need to different people. People are busy working on their respective initiatives and the organisation has been readied in some respects for the change that is about to happen.

So that's it right. Should we already order in the champagne? No, not quite because there is this whole big thing called risks, and it is the one thing that keeps leaders like us awake at night, because everything that you do probably has an uncertainty attached to it. A downside that you might not have foreseen, and a variable that has not yet raised its ugly head.



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**IMPROVING CUSTOMER SATISFACTION**

- 1** Quality of food must improve, and source of ingredients needs to change
- 2** The interiors of the restaurant need a revamp
- 3** Putting discounts on afternoon meals

Now, let's go back to our restaurants in the northern region. Let's say you've had a consultant, consider the operations and elaborate a 3-point action plan to improve customer satisfaction.

1. The quality of food needs to improve and you need to source your ingredients from a different food supplier.
2. The ambience looks too dated and you will need to infuse new design elements via a complete interior makeover.
3. The pricing is viewed to be on the higher side, and the recommendation is that you start putting in discounts for afternoon meals.



**upGrad**

**POSSIBLE RISKS**

- 1** Will the supplier be able to source and supply large quantity and good quality of food?
- 2** Interior revamp may cause restaurant closure causing a cash crunch
- 3** Risk of profitability

Now, what are the things you need to consider and watch out for? Say, the new supplier is relatively new in the market. One risk you may need to then consider is would your supplier be able to source and supply the quantities of food that you need, especially the large quantities while still giving you better quality? Say, the interiors are going to need a good one month, one risk that you will then need to consider is a sizable number of restaurants will need to shut down for an entire month, resulting in a cash crunch on the heels of already poor sales. Aside from, of course, the fact that there will be a significant outgo.

Say, the recommendation on discounts for afternoon meals makes your afternoon meals unviable, one risk would be your profitability will go for a complete task. Would you want to consider all these risks before actioning on this plan? Yes, of course.

So, now that I have your attention, you may ask how do we then manage for these risks? If you did that's a good question. A great question will, however be, how do we foresee these risks? Because when you foresee these risks, you can stall them, you can skirt around them and you can set yourselves up to address them head-on.

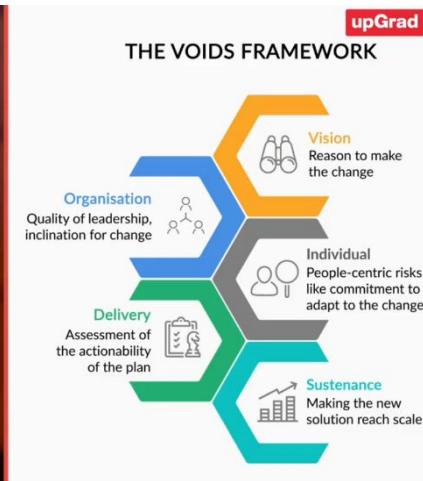
And for that, here's one tool, I recommend you familiarise yourself with. You could, of course, change up a few of these things, to tailor it to your situation and needs, but broadly speaking, if you happen to be transforming something or laying out something new, there's got to be risks and you ought to be identifying and mitigating for them.

The framework comes with a nice mnemonic that I came up with VOIDS with the detailed list of questions that it considers based on an online bane publication that you can go and check out later. VOIDS is nice because it not only rings very well, which makes it memorable, but in some ways, also refers to what the framework helps you identify and fill all the gaps in your solution.



So, what does VOIDS stand for?

“VOIDS” are the five elements, vision, organization, individual, delivery and sustenance.



- Vision refers to everything about the burning reason you want to make the change the intent, the destination and the future state that you're looking to reach and the credibility of the solution or the path you're taking to get there. So here, you look at whether the description of the success of the solution is firstly clear is every one of the top leaders aligned and rallying around it and is the solution or the path to getting there clear and credible for everybody.
- Organisation refers to everything about the quality of the leadership, the strength of sponsorship for the change throughout the firm and the willingness of early adopters. Sponsorship here refers to typically powerful influencers who are willing to back and sometimes sponsor the change in their respective circles. So here, you ask yourself if you have the right leadership to help implement the solutions who are willing to back the solution and a meaty population that is willing to be the first adopters of the solution.
- Individual refers to everything about the people, so the risks that you need to check for here are whether there is enough will that is a commitment from the people to adopt the solution and skill enough capabilities to implement and use the solution effectively. You also need your frontline staff, and frankly, every member of the impacted population to sometimes display new behaviours, so that is what we need to check for here.
- Delivery refers to whatever it takes to act out your plan. So, typically, we need to introspect here on whether we have an actionable enough plan that is achievable. Do we have the right governance to execute the plan and a clear results orientation where we know what defines and measures success?
- Finally, sustenance. Is everything about what it takes for a new solution to achieve scale and widespread adoption so that it's a change that we can make stick? To do this, ask yourself from a people's perspective. Do you have the right operating model? Do you have the right organisation structure, the right ways of working, the right culture, etc?

Further, ask yourself from a systems perspective. Do you have the right systems and the technologies that can help you leverage and bring about this change effectively? Finally, ask yourself from a process perspective, do you have the right processes and the right feedback loops built to galvanise the change?



In this alive for you now inspired by something similar that I went through. I referred to a time when we were working with a biopharmaceutical player that was looking to grow its business 4x in three years. Obviously, this was a big deal even for a fast-growing firm.

So, when we undertook a program to help build their strategy to do that, obviously we realised a lot of people were hesitant, reticent and being tentative. It told us that something was not quite right and that we needed to figure out what the risks for the firm would be, as it undertakes this massive mandate to build its own future. We, therefore, launched the risk assessment even ahead of the full conceptualisation of the vision.

RISK MANAGEMENT SURVEY FOR BIOPHARMA FIRM		
	RISKS TO EXECUTION	SURVEY 1
Vision	Burning platform	Medium Risk
	Compelling intent	High Risk
	Credible solutions	High Risk
Organisation	Aligned leadership	Medium Risk
	People commitment	Medium Risk
Individual	People capabilities	High Risk
	People behaviours	High Risk
	Achievable plan	High Risk
Delivery	Decisive governance	High Risk
	Effective op model	High Risk
Sustenance	Process enablement	Medium Risk

And when the organisation spoke, their voice was clear. The firms are big gaps or risks in terms of the old vision and their belief in their individuals, as you should see from the results of survey one. The actions here were clear to us. While we were aware of the program, it was made clear to us that the vision of the program had not trickled through to the important people and the opinion leaders in the firm. We also realised that we probably had overestimated to some extent the capabilities of the firm.

So, we undertook a few specific actions. As an example of what we did to make the vision clear to everyone, we orchestrated what we termed visioning workshops that allowed everyone to contribute their ideas on what the ambition or the vision of the company should be. This sparked great debates and made us moderate that ambition a

bit to 3x in three years. This change made a huge impact on the credibility of the solution. The workshops also allowed us to communicate the bigger picture to everyone, thereby making the change compelling to everybody.

Here's another example of what we did to address the challenges with respect to the individuals, we undertook another set of workshops to identify the biggest perceived gaps. Turned out, the organisation did not have concrete enough plans yet to build out a stronger sales force, which would be critical to build the company. Once plans for doing that were set in place, we were able to address the question around capabilities.

RISK MANAGEMENT SURVEY FOR BIOPHARMA FIRM		
	RISKS TO EXECUTION	SURVEY 1
Vision	Burning platform	Medium Risk
	Compelling intent	High Risk
	Credible solutions	High Risk
Organisation	Aligned leadership	Medium Risk
	People commitment	Medium Risk
Individual	People capabilities	High Risk
	People behaviours	High Risk
	Achievable plan	High Risk
Delivery	Decisive governance	High Risk
	Effective op model	High Risk
Sustenance	Process enablement	Medium Risk

As you can see, a subsequent revision of the assessment showed that we had indeed managed to reduce the risk perceptions around things like compelling intent, credible solutions, people capabilities, etc.

I would suggest that whenever you are solving for a problem, do an assessment of risks early and more regularly, especially in the leading days of the problem-solving and implementation process. The further down the road you go, you can go a bit easy. Always have tailored measures that immediately address the risks that you are beginning to see. That way, you can be one step ahead always.

The last comment I will make is risks is not necessarily a bad thing. They are in some ways a leading indicator of what you need to watch out for, as you tread towards success. The most important thing is being cognizant of them.

With that, we are through module 2 approach to problem-solving. In this module, you have successfully understood the four-step end-to-end process, the master's take in order to approach problem-solving.

The image shows a video frame of a man in a suit speaking. To his right is a graphic titled "APPROACH TO PROBLEM SOLVING" with four numbered steps:

- 1 Frame the problem
- 2 Analyse the problem
- 3 Analyse the solution
- 4 Implement the solution

- I. We learned how important it is to frame the problem, why you need to start with establishing context and how you need to do that, sifting the chaff from the grain, that is, opinions from facts, prioritising issues and eventually defining the problem.
- II. We also understood how to analyse the problem, starting with the hypotheses, writing out the issue trees that are messy, drilling down through them and uncovering the root cause through methods like the five whys and the Ishikawa diagrams.
- III. We also figured out how to analyse the solution, divergent brainstorming through options and convergent prioritisation of the solutions considering the actual implications of every chosen option.
- IV. We also went through the basic considerations that you need to keep in mind, as you implement the solution. Writing out a clear actionable plan, defining KPIs and metrics, building proofs of concept and building mechanisms of monitoring.

The image shows a video frame of the same man in a suit speaking. To his right is a graphic titled "IMPORTANCE OF PROBLEM SOLVING ENABLERS" with four numbered steps:

- 1 Avoiding biases during research
- 2 Managing the change effectively
- 3 Communicating compellingly
- 4 Planning and mitigating for risks

Finally, we also appreciated the importance of a few specific enablers of problem-solving. For example, avoiding biases when you do research, managing the change effectively, communicating compellingly and with purpose and planning and mitigating for risks.

In the next module, you will be introduced to some of the fancy frameworks people talk about, which are more appropriately just aids to problem-solving, so see you there.



RESEARCH METHODS

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01 Qualitative research

- a. Helps understand the context and gather initial hypotheses
- b. Methods: Survey forms with open-ended questions, experimental observation

One way to classify research is qualitative versus quantitative. Qualitative research is the type of research that is generally expressed in words. It is used to understand the context, gather and crystallize initial hypotheses. It can also support our arguments with subjective colour. Some of the common methods of qualitative research are survey forms with open-ended questions, experimental observations out in the market which are defined in words, literature reviews, etc.



RESEARCH METHODS

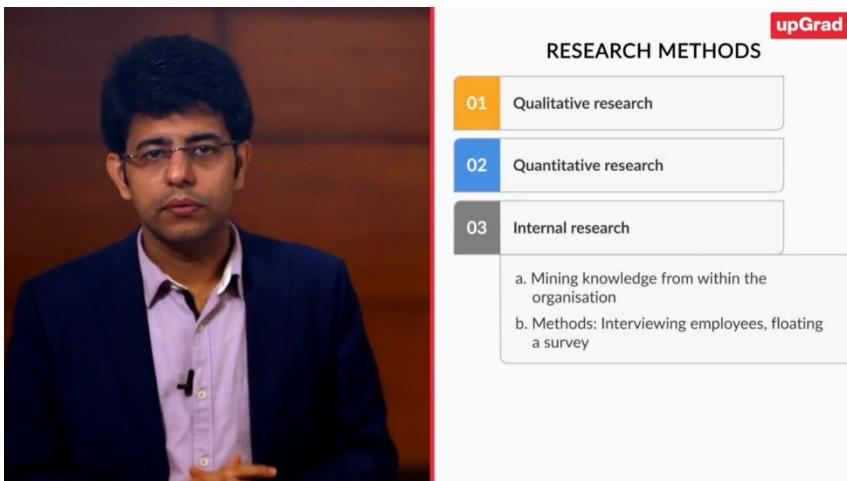
upGrad

01 Qualitative research

02 Quantitative research

- a. Helps establish findings through statistical analysis
- b. Methods: Survey with close-ended questions, analysis of financial statements, etc.

On the other hand, quantitative research is gathered and expressed in numbers through statistical and mathematical calculations. This type of research is used to establish findings conclusively. It can lend extra credibility to the research because numbers are harder to question. It can also help assess the extent of something. Some of the most common methods of quantitative research are surveys with closed-ended questions, analysis of financial statements, experiments anchored around numbers.

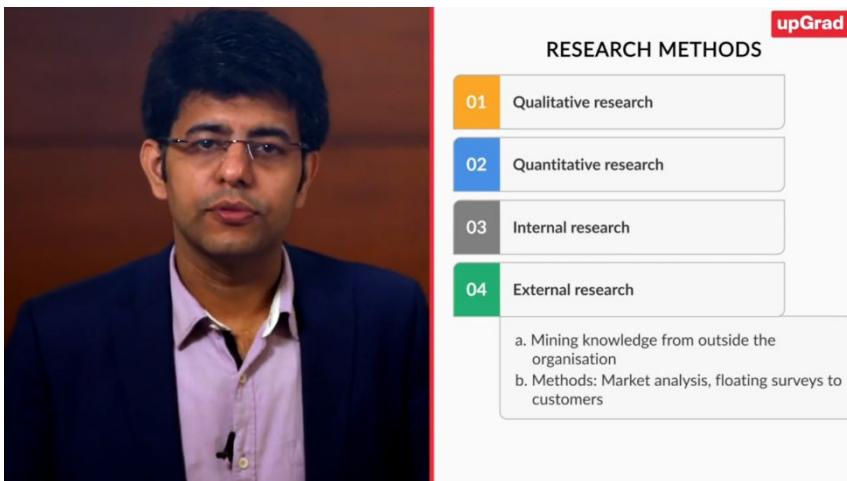


The image shows a video player interface. On the left, there is a video frame of a man wearing glasses, a purple shirt, and a dark blazer. On the right, there is a slide titled 'RESEARCH METHODS' with the 'upGrad' logo at the top. The slide contains three main points: '01 Qualitative research', '02 Quantitative research', and '03 Internal research'. Point '03' has two sub-points: 'a. Mining knowledge from within the organisation' and 'b. Methods: Interviewing employees, floating a survey'.

Let's now look at internal and external research. Internal research refers to research, which is focused on mining knowledge, which lies within the organisation that you belong to. It is often a preferred route ahead of doing external research, because expertise and data is a lot more accessible and cheaper to get on most occasions.

Use this effectively to gain more context around the problem you are solving, use it for framing your initial hypotheses, but largely from an internal viewpoint. Do note that internal research does suffer from some disadvantages. For example, people are likely to be looking for external perspective, findings could be biased by the organization or its people's agendas.

Some common methods of carrying out internal research are, one, Interviewing the employees of your organisation. And two, floating a survey within your organisation, and there are many more.

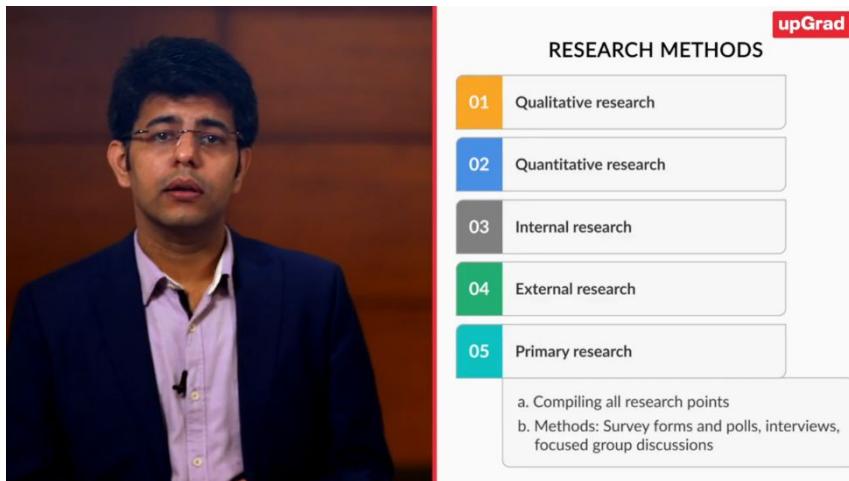


The image shows a video player interface. On the left, there is a video frame of a man wearing glasses, a purple shirt, and a dark blazer. On the right, there is a slide titled 'RESEARCH METHODS' with the 'upGrad' logo at the top. The slide contains four main points: '01 Qualitative research', '02 Quantitative research', '03 Internal research', and '04 External research'. Point '04' has two sub-points: 'a. Mining knowledge from outside the organisation' and 'b. Methods: Market analysis, floating surveys to customers'.

On the other hand, the research focused on mining knowledge, which lies outside of the organisation that you belong to is known as external research. Use this research to gather external perspective, use it to benchmark your organisation to the external best in class, use it to supplement the research that you've done internally, use it to gain greater credibility, as you establish the case for change or the solution.

Some of the most common methods of carrying out external research are:

- 1) Carrying out market analysis.
- 2) Floating surveys to your customers.
- 3) Market research conducted by market research firms also falls into this category.



**RESEARCH METHODS**

- 01 Qualitative research
- 02 Quantitative research
- 03 Internal research
- 04 External research
- 05 Primary research
  - a. Compiling all research points
  - b. Methods: Survey forms and polls, interviews, focused group discussions

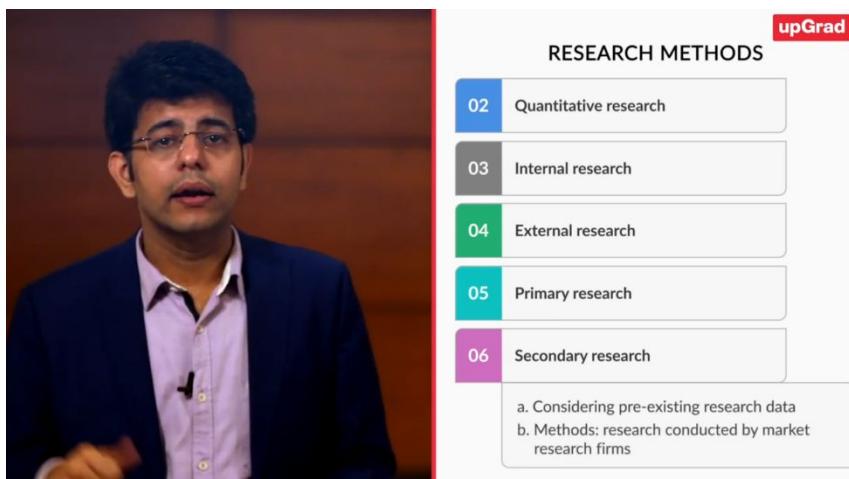
Another two commonly used forms of research are primary and secondary research. Primary research refers to research that does not pre-exist and must be compiled by you or your agent. It helps you get an independent opinion about a situation. Some of the most common methods of carrying out primary research are

- 1) Survey forms and polls circulated by you or your agent
- 2) Interviews conducted by you or your agent
- 3) Focus group discussions and
- 4) Market observations that you or your agent will drive.

The advantages with primary research are that

- 1) They are more controllable given you are in the driver's seat
- 2) They can be more conclusive, especially since you can be sure of the findings given it is your own study.

The disadvantages are that they may cost more and they may take longer.



**RESEARCH METHODS**

- 02 Quantitative research
- 03 Internal research
- 04 External research
- 05 Primary research
- 06 Secondary research
  - a. Considering pre-existing research data
  - b. Methods: research conducted by market research firms

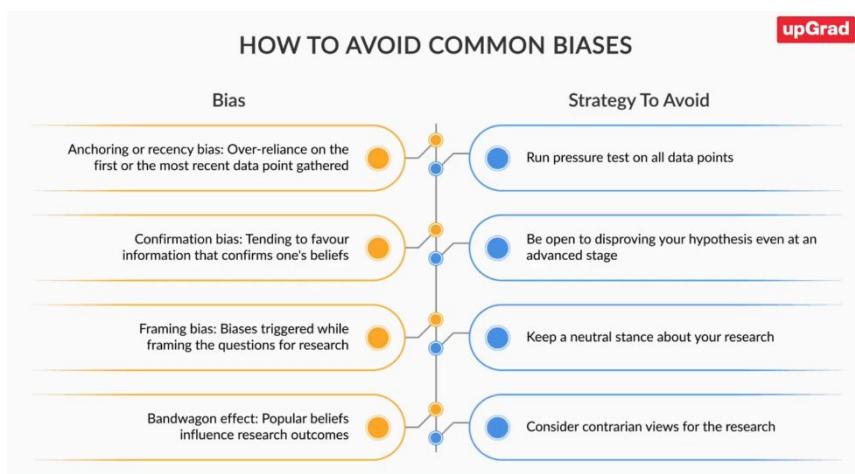
On the other hand, research that has already been compiled by somebody else is known as secondary research. This type of research often precedes primary research, thereby helping in optimising the time and the cost required for conducting research. The advantages with secondary research are that they may optimise for time and they may optimise for costs. However, it is less controllable, given the research has already been performed by somebody else. You also cannot be a 100% sure about the quality given you personally not done it. Some of the most common methods of carrying out secondary research are

- 1) Market analysis
- 2) Research conducted by market research firms.

So, this is all about different types of research. Let's now try and understand how you can avoid some common biases while you are carrying out any type of research.



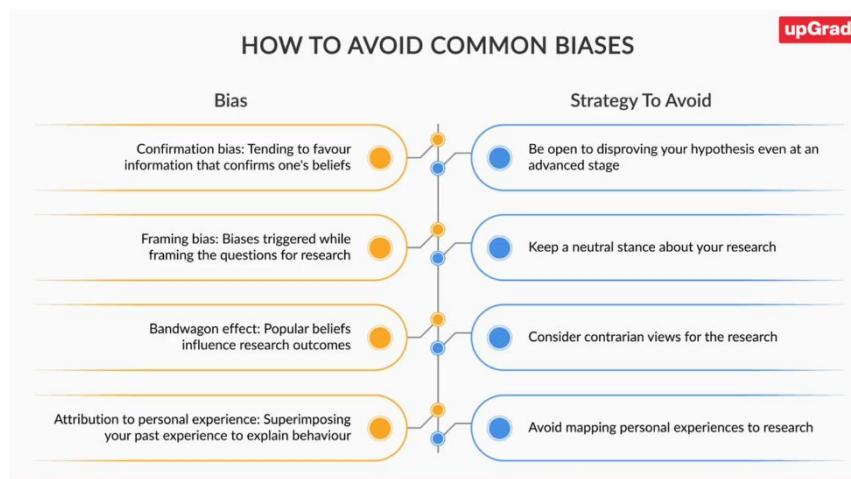
While carrying out research, we often tend to bring our own prejudices, our own perspectives, our own notions unconsciously. They are very likely to colour the findings of the studies and therefore lead to incorrect outcomes. These own prejudices, perspectives and preconceived notions are what people called biases. Let's look at some of the common biases and strategies to avoid these.



- A. The first kind of bias I see young researchers struggle to get past is that they over rely on the first or the most recent data point that they've gathered. This bias is called an anchoring or recency bias. While no one asks you to ignore these, do not get fixated on them while creating your hypotheses or worse deriving conclusions based on just the first or the most recent observation. Instead, note it down and pressure test once twice as many times as you can.
- B. The second bias I surprisingly see even with very experienced researchers is they tend to favour information that confirms their existing beliefs. This bias, you should guard against, is called the confirmation bias. So, instead of validating your hypotheses, you begin force-fitting them into the story. You should always be open to disproving your hypotheses at the extreme, but you should also be willing to pressure test outliers, thinking about identifying the average response, etc.
- C. Three, you might also get biased while framing the questions for research. Let's say, you are testing the preferences for a brand of frozen yoghurt that you are looking to launch into the market. This contains 20% fat. You could ask the question would you consider buying a frozen yoghurt that contains 20% fat. You could also frame the question a little differently. Would you consider buying a frozen yoghurt that is 80% fat-free? Do you think the insights on preferences that you derive from the respondents to the two questions could be different?

Yeah right, you yourself might on first glance like it when someone says something is 80% fat-free and then go for it. However, you might really think when someone says something contains 20% fat. That's framing bias for you. Consider very carefully the questions that you frame and pour through them many, many times over, have a neutral pair of eyes, watch out for these.

- D. Fourth, another bias, which can impact the outcome of your research adversely is when you go with the crowd. Remember, the wisdom of the crowd is useful, but not infinite. When popular beliefs and thoughts start driving your research, you are bound to get incorrect outcomes. This bias is called the bandwagon effect, always let the ones holding the contrarian opinions speak up. Give the minorities in the group a voice.



- E. Fifth and the last bias is when you begin superimposing your past, your background and your experiences to explain someone else's behaviours. Remember, the example I made earlier about the use of Gmail versus Hotmail. That's a classic. We just believed everybody would use Gmail, because Gmail happens to be more popular in our society here, at least more than Hotmail is, and we happen to use Gmail personally. This bias is called attribution to personal experience, and I would strongly recommend against extrapolating and mapping your personal experience on others behaviours that you are studying. So, these are some of the biases and the strategies to avoid these biases. It's not an exhaustive list, but I can tell you that you should always ensure that your research is completely unbiased, so that you arrive at the desired outcomes.

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