Module 4 Notes - project management chap 4 -

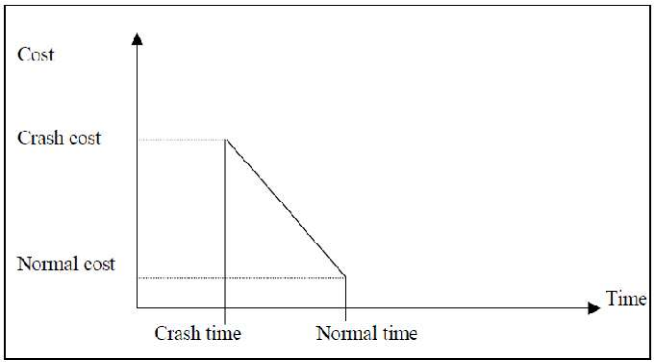
Project Management (University of Mumbai)

Module 4

Planning Projects

4.1 Crashing project time

The project manager is frequently confronted with having to reduce the scheduled completion time of a project to meet a deadline. In other words, the manager must finish the project sooner than indicated by the CPM/PERT network analysis. Project duration can often be reduced by assigning more labor to project activities, in the form of overtime, and by assigning more resources (material, equipment, and so on). However, additional labor and resources increase the project cost. Thus, the decision to reduce the project duration must be based on an analysis of the trade-off between time and cost. *Project crashing* is a method for shortening the project duration by reducing the time of one (or more) of the critical project activities to less than its normal activity time. This reduction in the normal activity time is referred to as crashing. Crashing is achieved by devoting more resources, usually measured in terms of dollars, to the activities to be crashed.



4.2 Resource loading and leveling

4.2.1 Resource loading in Project Management:

Resource loading in project management is the process of loading employees' total available hours with assignments. In resource loading, an employee will typically be assigned a percentage of a project, and can then be assigned additional project percentages until that employee reaches 100% of their hourly work week capacity. Once an employee reaches 100%, they are effectively booked and should not be scheduled for more work. By looking at a resource loading chart, a manager can view the total hours their employees can work for a given time period and adjust each team member's assignments accordingly.

Resource loading's main drawback is that, while managers are technically able to schedule employees for 100% work, doing so will inevitably mean that employees end up overloaded at some point. This can happen when unexpected responsibilities come up during a project.

In a simple resource loading example, if an employee is scheduled at 100% and has to fill in for another employee who is sick or unavailable, that employee will then be working at over 100% capacity. Projects can go over deadline or budget due to workforce limitations if you use resource loading to manage workloads.

4.2.2 What is the difference between resource loading and resource leveling?

Resource loading and resource-leveling are similar in that they both deal with manpower. However, resource loading attempts to balance other additional elements. The difference between resource loading and resource leveling is that resource loading looks to maximize workforce capacity, whereas leveling prioritizes timelines and budgets as well.

Resource leveling requires managers to have an understanding of whether a project is critical. A manager will then shift all available resources and money to complete those projects deemed critical. When resources are utilized, resource leveling will dictate that start or end dates be adjusted to reduce the conflict.

The drawback of resource leveling is that it can be difficult for managers to anticipate which projects are the highest priorities ahead of time. Resource loading and leveling are both important elements in the project management decision-making arena.

4.3 Goldratt's critical chain

Critical chain project management (CCPM) is a method of planning and managing projects that emphasizes the resources (people, equipment, physical space) required to execute project tasks. It was developed by Eliyahu M. Goldratt. It differs from more traditional methods that derive from critical path and PERT algorithms, which emphasize task order and rigid scheduling. A critical chain project network strives to keep resources levelled, and requires that they be flexible in start times.

- **Planning**: A project plan or WBS is created in much the same fashion as with critical path. The plan is worked backward from a completion date with each task starting as late as possible. A duration is assigned to each task. Some software implementations add a

second duration: one a "best guess," or 50% probability duration, and a second "safe" duration, which should have higher probability of completion (perhaps 90% or 95%, depending on the amount of risk that the organization can accept). Other software implementations go through the duration estimate of every task and remove a fixed percentage to be aggregated into the buffers. Resources are assigned to each task, and the plan is resource leveled using the aggressive durations. The longest sequence of resource-leveled tasks that lead from beginning to end of the project is then identified as the critical chain. The justification for using the 50% estimates is that half of the tasks will finish early and half will finish late, so that the variance over the course of the project should be zero. Recognizing that tasks are more likely to take more time than less time due to Parkinson's law, students syndrome, or other reasons, CCPM uses "buffers" to monitor project schedule and financial performance. The "extra" duration of each task on the critical chain—the difference between the "safe" durations and the 50% durations—is gathered in a buffer at the end of the project. In the same way, buffers are gathered at the end of each sequence of tasks that feed into the critical chain. The date at the end of the project buffer is given to external stakeholders as the delivery date. Finally, a baseline is established, which enables financial monitoring of the project.

- **Execution**: When the plan is complete and the project is ready to start, the project network is fixed and the buffers' sizes are "locked" (i.e., their planned duration may not be altered during the project), because they are used to monitor project schedule and financial performance. With no slack in the duration of individual tasks, resources are encouraged to focus on the task at hand to complete it and hand it off to the next person or group. The objective here is to eliminate bad multitasking. This is done by providing priority information to all resources. The literature draws an analogy with a relay race. Each element on the project is encouraged to move as quickly as they can: when they are running their "leg" of the project, they should be focused on completing the assigned task as quickly as possible, with minimization of distractions and multitasking. In some case studies, actual batons are reportedly hung by the desks of people when they are working on critical chain tasks so that others know not to interrupt. The goal, here, is to overcome the tendency to delay work or to do extra work when there seems to be time. The CCPM literature contrasts this with "traditional" project management that monitors task start and completion dates. CCPM encourages people to move as quickly as possible, regardless of dates. Because task duration has been planned at the 50% probability duration, there is pressure on resources to complete critical chain tasks as quickly as possible, overcoming student's syndrome and Parkinson's Law.
- **Monitoring:** According to proponents, monitoring is, in some ways, the greatest advantage of the Critical Chain method. Because individual tasks vary in duration from the 50% estimate, there is no point in trying to force every task to complete "on time;" estimates can never be perfect. Instead, we monitor the buffers created during the planning stage. A fever chart or similar graph can be created and posted to show the

consumption of buffer as a function of project completion. If the rate of buffer consumption is low, the project is on target. If the rate of consumption is such that there is likely to be little or no buffer at the end of the project, then corrective actions or recovery plans must be developed to recover the loss. When the buffer consumption rate exceeds some critical value (roughly: the rate where all the buffer may be expected to be consumed *before* the end of the project, resulting in late completion), then those alternative plans need to be implemented.

4.4 Project Stakeholders and Communication plan

4.4.1 Project Stakeholders

According to the Project Management Institute, project stakeholders are defined as:
"Individuals and organizations who are actively involved in the project, or whose interests may be positively or negatively affected as a result of project execution or successful project completion."

In other words, your project's stakeholders are the people or groups who have something to gain (or lose) from your project's outcome.

So according to the project stakeholder definition above, a stakeholder is anyone with an interest or investment in your project. But what does that actually look like in practice?

Your stakeholders are a varied group, with varied interests. (If you're playing on Hard Mode, they might even have completely conflicting interests that you need to balance — fun!)

Not only that, but the list of stakeholders can change throughout the project's journey: a certain stakeholder's influence might become more or less important depending on the project phase, for example.

Your job as a project manager is to keep all stakeholders informed, involved, and on-board throughout the project's progression. Stakeholder happiness is one of the key metrics of a successful project, so making sure you get the right buy-in and tick the right boxes — at the right times — is crucial.

Ultimately, managing those complex stakeholder relationships is one of the key skills of a project manager. But with so many different interests, perspectives, and personalities to juggle, it's no easy feat.

Who are the stakeholders in a project?

Now that you know the answer to the question "what are project stakeholders", the natural next question is "who are the stakeholders in a project".

As we've already seen in the project stakeholder definition above, a stakeholder is anyone with an interest or investment in your project. But when you actually start to map that out, you might be surprised by how long the list can be.

That's because investment in your project can take a number of different forms. It can be the company's money, an executive's sponsorship or a manager's resources. It can also apply to the end user or customer, as their needs are a critical consideration when it comes to steering your project.

Types of stakeholders in project management

There are two main types of stakeholders in project management, internal and external.

Internal stakeholders

These stakeholders are coming from within the house!!! Internal stakeholders are people or groups **within** the business, such as team members, managers, executives, and so on.

External stakeholders

External stakeholders are — as you can probably guess — people or groups **outside** the business. This includes customers, users, suppliers, and investors.

As you can see, stakeholders don't always work for the project manager. Needless to say, this can add an extra layer of complexity, as you need to be able to communicate with people at all different levels of the business and with varying degrees of engagement, influence, and interest.

Examples of stakeholders in a project

The stakeholders in each particular project will vary depending on the type of project and industry, but here are a few examples of the types of stakeholders in project management you might need to consider:

- Project manager
- Team members
- Managers
- Resource managers
- Executives
- Senior management
- Company owners
- Investors
- Sponsors
- Financiers (the people, not the cakes)
- Suppliers
- Vendors

- Consultants
- Customers

How to do a stakeholder analysis?

As soon as your project charter is complete and the scope of your project is defined, you can use it to start mapping out your stakeholders. Here's how to get the ball rolling with a basic stakeholder analysis process.

1. Identify your stakeholders

First step, you need to identify who your stakeholders actually are. To do this, draw on your project charter and any other project plans and documentation to compile a full list of your project stakeholders, both internal and external.

Bear in mind that some stakeholders won't come into play until later in the project lifecycle — but if you can anticipate who they'll be in advance, you can start to get their buy-in, build the relationship from the outset, and help them to feel involved from the beginning.

2. Prioritize your stakeholders

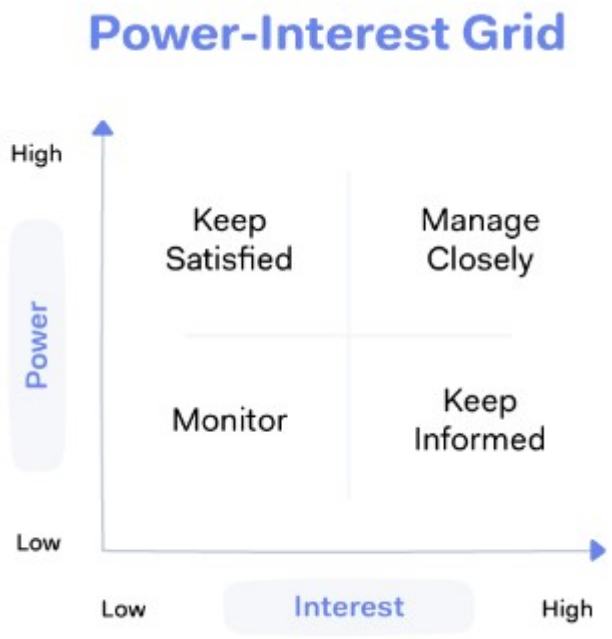
Once you've identified all of your stakeholders, you can start to prioritize them.

Prioritizing your stakeholders is important because it helps you understand where to invest your resources. In other words, it helps you — as the project manager — to identify who the key decision makers are at any given moment, so you can ensure that you're talking to the right people, at the right time.

There are a few methods of doing this stakeholder prioritization, but one simple way is to plot them out using a power/interest (or power/influence, or impact/influence) grid.

The power/interest grid helps you to identify your key stakeholders by answering two key questions that help you to group them into one of four categories:

- **What level of power do they have? :** How important is it that they're happy with the project's progress and results? How integral are they to the project's success? How influential are they to the project, to other stakeholders, to the team, and so on? (Remember: a stakeholder's influence can be positive or negative!)
- What level of interest do they have?: Is this project super important to them, or are they only tangentially connected to it? Is it something they're directly accountable for? Are they reliant on it for other work or results? Are they opposed to the project or concerned about it in some way?



As we can see from the (highly technologically-advanced) matrix above, stakeholders who fall into the top-right quadrant (powerful + interested) are the ones you should be giving extra attention to, because they're the ones who can have the most impact on your project — for better or for worse.

3. Understand your stakeholders

Now that you know who the key players are and which ones to prioritize, you need to get a full grasp of their expectations for the project.

For key stakeholders, this might involve meeting up for a short face-to-face interview or conversation where you discuss things like:

- What their definition of project success looks like
- Any concerns or reservations they have about the project or its outcomes
- What their expectations for the project are
- What impact a positive or negative project outcome would have on them
- Whether there are any anticipated conflicts of interest with other stakeholders that you need to be aware of

Not only will these conversations help you to understand each stakeholder's involvement in, and outlook on, the project, but it also helps you to build a bigger picture of your stakeholder network and how each stakeholder interrelates.

And on a personal level, meeting with the key stakeholders at the beginning of the project helps you to feel out some basic interpersonal preferences (like communication style), as well as start building your relationships with each stakeholder.

It's also helpful to keep your eyes open for any political, cultural, or environmental cues, if you can. Picking up on things like the political climate of the organization, how your key stakeholders interact with each other, and any potential conflicts of interest can help to give you some essential context when it comes to running your project or pre-empting certain decisions — and it's a project manager superpower that you should start cultivating as soon as possible.

How to manage your project stakeholders?

Identifying your stakeholders and their needs is just one piece of the stakeholder management puzzle. But it doesn't end there. For a successful project, your key stakeholders' requirements, project objectives, and happiness should be an ongoing concern throughout your project.

Now, that doesn't mean that the stakeholder is always right — and your job as a project manager will sometimes involve pushing back on your stakeholders and re-balancing their expectations with the project charter and project plan you all agreed on at the start.

The tricky part is in balancing everyone's needs, requirements and objectives so you can keep your stakeholders happy — while also delivering the project you set out to deliver.

Here are a few ways you can establish some best practices for stakeholder management and develop better stakeholder relationships at every phase of your project.

Document each stakeholder's roles and needs:

All that work you did identifying your stakeholders and their individual needs in relation to your project? Put it to good use by compiling it into a shared, accessible document to make sure you have a record of everyone's role and responsibilities and keep you all on the same page.

Creating a stakeholder register for your project helps you to keep track of a long list of people and priorities. With a definitive document you can update, edit, and consult as your project progresses, you can ensure that you're always driving the project in the right direction and keeping the right people informed at the right times.

4.4.2 Project Communication Plan

All projects require a sound communication plan, but not all projects will have the same types of com-munication or the same methods for distributing the information. The communication plan documents the types of information needs the stakeholders have, when the information should be distributed, and how the information will be delivered.

The types of information you will communicate typically include project status, project scope statements and updates, project baseline information, risks, action items, performance measures, project acceptance, and so on. It's important that the information needs of the stakeholders be determined as early in the planning phase of the project management life cycle as possible so that as you and your team develop project planning documents, you already know who should receive copies of them and how they should be delivered.

Types of Communication

Completing a complex project successfully requires good communication among team members. If those team members work in the same building, they can arrange regular meetings, simply stop by each other's office space to get a quick answer, or even discuss a project informally at other office functions. Many projects are performed by teams that interact primarily through electronic communication and are, therefore, called virtual teams. To avoid miscommunication that can harm trust and to include team members in a project culture, the project team needs a plan for communicating reliably and in a timely manner. This planning begins with understanding two major categories of communication.

Synchronous Communications

If all the parties to the communication are taking part in the exchange at the same time, the communication is synchronous. A telephone or Skype conference call is an example of synchronous communication. The following are examples of synchronous communications:

- Live meeting: Gathering of team members at the same location
- Conference call: A telephone call in which several people participate
- Audio conference: Like a conference call, but conducted online using software like Skype
- Computer-assisted conference: Audio conference with a connection between computers that can display a document or spreadsheet that can be edited by both parties
- Video conference: Similar to an audio conference but with live video of the participants. Some laptop computers have built-in cameras to facilitate video conferencing
- IM (instant messaging): Exchange of text or voice messages using pop-up windows on the participants' computer screens
- Texting: Exchange of text messages between mobile phones, pagers, or personal digital assistants (PDAs)—devices that hold a calendar, a contact list, a task list, and other support programs

Modern communication technologies make it possible to assemble project teams from anywhere in the world. Most people work during daylight hours, which can make synchronous meetings

difficult if the participants are in different time zones. However, it can be an advantage in some circumstances; for example, if something must be done by the start of business tomorrow, team members in Asia can work on the problem during their normal work hours while team members in North America get some sleep.

Remember Time Zones

It is important to remember time zones and calculate the difference between yours and your associates' zones correctly so as not to miss important meetings or deadlines. Cities and countries to the north or south of each other all observe the same local time. Be aware that many well-educated people in the United States and Canada think of South America as directly south of North America. As you can see, South American countries can be up to five time zones east of North America.

Asynchronous Communications

Getting a team together at the same time can be a challenge—especially if they are spread out across time zones. Many types of communication do not require that the parties are present at the same time. This type of communication is asynchronous. There are several choices of asynchronous communications.

Mail and Package Delivery

Many companies prefer that final contracts are personally signed by an authorized representative of each party to the agreement. If several signatures are required, this can take weeks to get all the signatures if the contracts are transferred by a postal service. If this process is holding up the start of the project, you can use an overnight delivery service to minimize the time spent transferring the documents.

Fax

Fax machines have been around a long time and enjoy a high level of trust for transmitting documents accurately. Although it might seem archaic to still use fax transmissions, in many countries a fax of a signed contract is legal, but a computer-scanned image is not.

Email

Electronic mail (email) is widely used to coordinate projects and to communicate between team members. It has several valuable characteristics for project management:

Information can be sent to a list of team members.

Messages can be saved to document the process in case of a misunderstanding or miscommunication.

Files can be attached and distributed.

Project Blog

A blog is an online journal that can be private, shared by invitation, or made available to the world. Some project managers keep a journal in which they summarize the day's challenges and triumphs and the decisions they made. They return to this journal at a later date to review their decision-making process after the results of those decisions are known to see if they can learn from their mistakes. Many decisions in project management are made with incomplete knowledge, and reflecting on previous decisions to develop this decision-making skill is important to growth as a project manager.

Assessing New Communication Technologies

New technologies for communicating electronically appear with increasing frequency. Using a new technology that is unfamiliar to the team increases the technology complexity, which can cause delays and increase costs. To decide if a new technology should be included in a communications plan, seek answers to the following questions (Business Dictionary):

Does the new communication technology provide a competitive advantage for the project by reducing cost, saving time, or preventing mistakes?

Does the project team have the expertise to learn the new technology quickly?

Does the company offer support such as a help desk and equipment service for new communication technology?

What is the cost of training and implementation in terms of time as well as money.

What is Communication Plan Template?

1) Identify your stakeholders (to whom)
2) Identify stakeholder expectations (why)
3) Identify communication necessary to satisfy stakeholder expectations and keep them informed (what)
4) Identify time-frame and/or frequency of communication messages (when)
5) Identify how the message will be communicated (the stakeholder's preferred method) (how)
6) Identify who will communication each message (who)
7) Document items – templates, formats, or documents the project must use for communicating.

Figure 1
Communication plan template

Communications Plan				
Project Name:			Beginning Date:	
Project Manager:			Completion Date:	
Plan Owner:				
Planning				
Project objective and key message points (high level): • • •				
Stakeholders – target audience (list) • • •				
Outline				
Timeline (date)	**Team Member (responsible for communication)**	**Target (audience)**	**Tool (medium for communication delivery)**	**Messag Points**

4.5 Risk Management in projects: Risk management planning, Risk identification and risk register

Risk is an uncertainty that matters; it can affect project objectives negatively or positively. The uncertainty may be about a future event that may or may not happen and the unknown magnitude of the impact on project objectives if it does happen. Thus, a "risk" is characterized by its probability of occurrence and its uncertain impact on project objectives. The kinds of risks appearing in a risk register are shown below based on when they might occur during the life cycle of a project. Throughout the project life cycle, a future event that may occur at any time in a project's lifecycle is a risk. It has a probability of occurrence and an uncertain impact if it does occur. During Planning and Design, uncertainty in the total cost estimate, due to uncertain quantities and unit prices is a risk. In this case the probability is 100% (the estimate and its uncertainties exist), and the uncertainties impact the project cost. During construction, a Notice of Potential Claim (NOPC) has a probability of becoming a Contract Change Order (CCO) and an uncertain cost/time impact if this happens. This risk is retired from the register if the claim is dismissed or if it is replaced by a CCO. During construction, a CCO which has occurred (100% probability) is a risk, but its cost/time impact may be uncertain. If there is an estimate in the CCO Log of the project, the uncertainty is expressed as a range around the estimate. This risk is retired from the register when the CCO is executed with the contractor. These examples are collectively referred to as "risks" in this Handbook, and would all be included, when applicable, in the projects risk register because they contain uncertainty that affects project objectives.

The Basic Process

All approaches to project risk management strive to maximize both efficiency and effectiveness. Although the details of risk processes may differ depending on the project, risk management has three important parts: identification, analysis, and action. Before risk can be properly managed, it must first be identified, described, understood, and assessed. Analysis is a necessary step, but it is not sufficient; it must be followed by action. A risk process which does not lead to implementation of actions to deal with identified risks is incomplete and useless. The ultimate aim is to manage risk, not simply to analyze it.

The project risk management process (Figure 1) is not difficult. It simply offers a structured way to think about risk and how to deal with it. A full project risk Management endeavor includes these processes:

1. Risk Management Planning–Deciding how to approach, plan, and execute the risk management activities for a project.
2. Risk Identification–Determining which risks might affect the project and documenting their characteristics.
3. Qualitative Risk Analysis – Prioritizing risks for subsequent further analysis or action by assessing and combining their probability of occurrence and impact.
4. Quantitative Risk Analysis–Analyzing probabilistically the effect of identified risks on overall project objectives.
5. Risk Response –Developing options and actions to enhance opportunities and to reduce threats to project objectives.
6. Risk Monitoring – Tracking identified risks, monitoring residual risks, identifying new risks, executing risk response plans, and evaluating their effectiveness throughout the project life cycle.

4.5.1 Qualitative and quantitative risk assessment

An important aspect of managing risk is performing risk assessments at regular intervals. Risk assessments are essentially a single point in time in your larger risk management process, and to ensure an accurate, responsive process, each assessment should be undertaken with precision and thorough planning.

Each assessment is an audit of your company's threat landscape. They should examine if any new threats have developed since the previous assessment, if any old threats still linger, and what methods can be taken to mitigate these threats. In practice, there are two types of assessments you can implement to investigate your threat landscape: a qualitative risk assessment and a quantitative risk assessment.

Both work in different ways, but if executed correctly they can help you identify threats and respond to them in a timely manner, prepare your company for a potential worst case scenario,

establish a proactive rather than reactive approach to threats and ultimately, save you money. No matter how you choose to utilize assessments in your process, you should understand the difference between a qualitative and quantitative risk assessment process and what benefits they posses.

Qualitative Risk Assessment

A qualitative risk assessment focuses on the probability of a threat occurring and how it will impact the company (such as financially, legally, in reputation, etc.). Risks are usually on an established scale that estimates probability (for instance: low, medium, high), and risks are also usually categorized based on the source of it or on the effect to the company.

How to Apply Qualitative Assessments to Your Risk Management Process

Qualitative risk assessments work best when they are based on the personal experiences of your subject matter experts. Because the accuracy of these kinds of assessments is dependent upon a subjective rating system, it's important for assessors to have industry expertise, knowledge of your business including strengths, weaknesses and potential threats, and risk management experience.

The success of the process also depends on having a well-established and understood system for recording assessments and interpreting their results.

The Benefits

Opting to form your risk management strategy around qualitative assessments can have several benefits if you have the risk management infrastructure to support it. In fact, subjectivity in your assessments is not always a bad thing – it allows assessors to analyze your threat landscape based on their own wealth of knowledge and experiences. Of course, that does mean you must ensure you're choosing the appropriate members of your organization to assess risk.

Probability ratings, however you choose to make them, can also be an easy and accurate method for quickly gaining an understanding of potential risks. Qualitative risk assessments give you more freedom to customize question and answer sets to yield the most enlightening responses from your experts.

You can also expand your probability ratings to add in more situational nuance. The qualitative risk assessment matrix (RAM), or your rating scales, can be project or area specific, meaning that from area to area, you can customize the risk management process to fit your goals.

Lastly, qualitative assessments tend to be the easiest to implement for companies. Through interviews or workshops, you can engage your experts to determine where the threats are and how to address them.

The Results

Rather than using numerical estimates, qualitative risk assessments work with descriptive and categorical treatments of information. From these assessments, you should gain a thorough characterization of risk and be able to define it in terms of the severity of its impact and the estimated likelihood of it actually happening.

By understanding how vulnerable you are to a risk, you can choose an appropriate risk mitigation strategy: risk avoidance, risk acceptance, risk reduction or risk transference. You can also use these results as an indicator of where you should focus your attention for further risk assessment.

Conclusion

A qualitative risk assessment should help you prioritize and manage risk better as well as utilize your time and resources more wisely. By using your qualitative RAM and categorization of risk impact and likelihood, you can determine which risks are the highest priority. However, these results must be analyzed with the same amount of subjectivity in which they were produced. Qualitative assessments lack a level of accuracy that must be understood going into the process; these are not objective, numerical data but opinions and judgements of those with knowledge of your company and the industry.

Quantitative Risk Assessment

Whereas qualitative risk assessments utilize knowledge and experience to determine risk probability, a quantitative risk assessment relies on objective, measurable data to provide insights into your risk management process.

How to Apply Quantitative Assessments to Your Risk Management Process

Quantitative assessments are particularly useful for a complex risk management process that involves looking at a large project or company area. It leads to more objective results by attaching numerical values, such as money or time, to the risk. By using historical data to determine the probability of a risk scenario occurring and numerical values such as money, time or lost assets to determine risk impact, a quantitative risk assessment provides an accurate reflection of your threat landscape.

Quantitative assessments require many data requirements to work as intended. For example to determine potential threats or hazards, an assessment may utilize risk scenarios that call for the value of assets to be determined and then how a risk may cause loss of value. Beyond just collecting data, a company needs risk management experts that are able to analyze and report the results appropriately.

The Benefits

A quantitative risk assessment gives you the data you need to accurately predict future outcomes or estimate the likelihood of meeting your targets. Along with this information, it strengthens your risk management strategy moving forward by communicating to you any contingency you need to properly address a risk to your satisfaction.

By basing the results on objective, numerical and measurable data, you won't need to account for the window of uncertainty that qualitative assessments have. This gives you and other stakeholders more confidence in the outcome of assessments. Each risk will have a numerical value attached to the likelihood of its occurrence and the impact of its occurrence. This will paint a much clearer picture of your threat landscape and make it easier to determine the mitigation strategy that works best.

As long as the information you have is dependable, a quantitative risk assessment can create more realistic targets than a qualitative assessment. Whereas qualitative assessments depend on an estimated likelihood such as low, medium or high, using a data-driven approach yields more accurate, usable information.

The Results

The quality of the results in a quantitative assessment depends on the quality of the data used. As long as it is of a high standard, you can use this type of assessment to discover important factors concerning your risk. For instance, you can use data to predict the potential outcome of events, the impact a hazard occurring will have on assets or the sensitivity of a risk to a number of variables.

The results of quantitative assessments can be evaluated in order to choose a risk response that everyone has confidence in.

Conclusion

A quantitative risk assessment will deliver more accurate information. That's not to say that qualitative assessments are not trustworthy. In fact, doing a qualitative assessment prior to a quantitative assessment will help you zero in on the areas you should give the highest priority in your risk management process.

However, a quantitative assessment, while the most accurate, can be impractical if you don't have the infrastructure to obtain high quality data and perform analyses. An audit and risk management software can help stakeholders properly conduct qualitative or quantitative risk assessments and manage the entire process.

4.6 Probability and impact matrix

Probability and Impact Matrix is a tool for the project team to aid in prioritizing risks. As you know, there may be several risks in any project. Depending on the size and complexity of the project in hand, the risks may vary somewhere from double digits to triple digits. But, do we have the time and money to look into all these risks, let alone the response action. The answer is NO; we do not have such luxury of time. So, it is necessary to find a way to identify those critical risks which needs the most attention from the project team. Probability and Impact Matrix uses the combination of probability and impact scores of individual risks and ranks/ prioritizes them for easy handling of the risks. In other words, the probability and impact matrix helps to determine which risks need detailed risk response plans. It is vital to understand the priority for each risk as it allows the project team to appreciate the relative importance of each risk. For example, a risk with a high probability/ likelihood of occurring and which will have a high impact on the project objectives will likely need a response plan. The matrix generally used is a 3x3 matrix (with Low, Medium, High rating for Probability and Impact) or 5x5 matrix (with Very Low, Low, Medium, High and Very High ratings for probability and impact). A sample Probability-Impact Matrix is given below for your reference.

		Impact				
		Trivial	Minor	Moderate	Major	Extreme
Probability	Rare	Low	Low	Low	Medium	Medium
	Unlikely	Low	Low	Medium	Medium	Medium
	Moderate	Low	Medium	Medium	Medium	High
	Likely	Medium	Medium	Medium	High	High
	Very likely	Medium	Medium	High	High	High

How to use this matrix? If a particular risk has a moderate probability and the estimated impact of this risk is major, then you look into the respective row and column to identify the risk rating. For a moderate probability and major impact, the risk rating in the above matrix is "Medium". The colors are visual indications of the seriousness of the risks. We will use this matrix in the risk assessment process to determine the risk rating for each risk.

4.7 Risk response strategies for positive and negative risks

It is important for you to manage risks proactively to finish your project with minimal obstruction. To do so, you must start to identify risks at the beginning of the project and develop strategies to manage them.

Risks can be divided into two categories: negative risks and positive risks. A negative risk has a negative impact on your project objectives and a positive risk has a positive impact on your project. Negative risks are also known as threats and positive risks as opportunities.

For an effective risk management plan, you will have to manage both types of risks. However, generally, project managers focus on negative risks and avoid managing positive risks. You should not do this and must instead focus on managing both types of risks.

4.7.1 Strategies for Negative Risks

A negative risk can impact your project negatively, so you will want it to avoid or decrease the impact if one occurs.

As per the PMBOK Guide 6th edition, you have the following strategies to manage a negative risk:

- Avoid
- Mitigate
- Transfer
- Escalate
- Accept

Avoid

This is the best strategy to manage risk if it is an available option.

Here, you avoid the risk by changing the scope, planning, or schedule. You use this strategy when risk is critical and management or the client does not want it to happen.

For example:

Elections are imminent and the government will soon announce the dates. Therefore, you will not want to schedule activities during this period and so you move them ahead to avoid clashing with the election dates.

This is an example of the avoid risk response strategy because you have changed the schedule to keep your project activities from clashing with the election.

Mitigate

In the mitigate risk response strategy, you try to minimize the probability of the risk occurring or its impact.

For example:

You feel you may need a consumable during the peak of your project which might not be easily available, and if available it will be costly. Therefore you contact a few suppliers and ask them to supply the consumable during the execution of the project at a negotiable price if you need it, and they agree.

Here, if the risk occurs you will get consumables cheaper than you would have gotten without a pre-negotiated deal. Therefore, it is a mitigate risk response strategy.

This risk response strategy only reduces the probability or the impact of the risk. After developing the response there will still be a residual risk. You will analyze and record it in the risk register for future monitoring.

Transfer

The transfer risk response strategy is used when you cannot manage the risk on your own. For example, you are lacking resources, skills, or you are busy with other activities, etc.

Here the management of the risk is transferred to a third party. If the risk occurs, it will be their responsibility to manage it.

Insurance is an example of this risk response strategy.

Please note that this strategy can cause you a secondary risk. For example, though you have asked a third party to manage the risk, you are responsible for the guarantee with the client.

Escalate

This risk response is used when you lack the authority to manage the risk. Here you approach your PMO or management to manage the risk. Once they agree to manage the risk, your responsibility is limited to monitoring it.

For example:

The government is planning regulation and if it is approved, it could impact your project negatively. You have no legal advisor or other resources to manage this risk, so you will approach management to manage this risk.

You are a project manager and dealing with this issue is beyond your capability. Here you don't have access to legal advisors to advise you, and also you don't have the power to implement a solution. Therefore, it is an example of the escalate risk response strategy.

Accept

In the accept risk response strategy, you take no action except acknowledge it. You accept it.

This strategy is used for non-critical risks or if the effort involved does not outweigh the benefit.

This risk response strategy can be active or passive. In active acceptance, you keep a contingency reserve to manage it, and in passive acceptance, you do nothing except note it down in the risk register.

For example:

You are constructing a building and it is designed to withstand earthquakes up to 6 on the Richter scale. Although there is a small chance of an earthquake of 7 or above occurring, you choose to ignore it because the chance of it occurring is low and the change in design would carry a significant cost.

Since you decided not to take any action, it is an example of the accept risk response strategy.

Sometimes, developing a risk response plan can generate another risk. This risk is called a secondary risk. Keep watching out for these risks and do whatever is necessary to avoid them.

If you are not able to avoid a secondary risk, you will analyze it and develop a risk response plan for this risk as well.

Also, note that you develop risk response plans for identified risks, so you will use the contingency reserve to manage them. You will not use the management reserve here because it is used to manage unidentified risks.

4.7.2 Positive Risk Response Strategy

Since positive risks have a positive impact on your project, you will want them to happen.

Strategies used for positive risks are the opposite of those for negative risks. The purpose of a negative risk response strategy is to either avoid or minimize the impact of a negative risk. On

the other hand, the objective of positive risk response strategies is to increase the chance of the risk occurring and realize it if it occurs.

The PMBOK Guide 6th edition describes five strategies to manage positive risks:

- Enhance
- Exploit
- Escalate
- Accept
- Share

Enhance

In this risk response strategy, you increase the chance of the risk happening so if the risk occurs you can realize it. The enhance risk response strategy is the opposite of the mitigate risk response strategy where you reduce the probability of the risk happening or its impact.

For example:

Let's say your project will be completed in three months. You find out that an organization is about to float a similar project in two months. So, if you are able to finish your project in two months, you can get this new project.

This is an opportunity for you.

Therefore, you compress the schedule using fast-tracking so the project can be finished ahead of time and you can have a chance to bid for the new project.

Here you are using the enhance risk response strategy because here you are trying to realize the opportunity.

Exploit

In the exploit risk response strategy, you make sure that the risk is realized. This response strategy is the opposite of the avoid risk response strategy where you ensure that the risk does not occur.

For example:

Let’s say your project will be finished in three months. You find out that an organization is about to float a similar project in two months. So, if you are able to finish your project in two months, you can get this new project.

This is an opportunity for you.

Therefore, you compress the schedule using crashing and fast-tracking so the project can be completed ahead of time and you can have a chance to bid for the new project.

Here you are using the exploit risk response strategy because you are doing everything to realize the opportunity.

Escalate

You use this risk response strategy when there is an opportunity but you cannot develop a response to realize it as you don’t have the power to do so.

To realize this opportunity, you will approach your management. When they agree to manage the risk you will not be responsible, though you will note it in the risk register for monitoring.

For example:

If you team up with another project team from a big organization, you can jointly bid for a project. However, you don’t have the authority to contact other organizations and are also lacking resources to seal the deal. So you will ask your management to approach them and make an arrangement.

This is an example of the escalate risk response strategy because here you don’t have a communication channel to speak with the head of any organization and also lack experts to negotiate the terms and conditions of the deal. Therefore, you escalate the issue to management and they can take care of it.

Accept

Accept risk response strategy can be used with both types of risks. Here you take no action, and if a positive risk occurs you will benefit.

You use this strategy when the cost of the response is high and there is a small chance of it occurring or the benefit does not outweigh the effort involved.

For example:

You know a supplier may have spare equipment that you can use for your project for a short time at a low price. Since there is no guarantee you will need this equipment, you don't take any action.

This is an example of the accept risk response strategy because here you do not take any action to realize the opportunity.

Share

In the share risk response strategy, you will join or invite someone else to realize the opportunity together as you are not able to realize the opportunity on your own.

For example:

Due to a lack of expertise in electrical, plumbing, and painting work you are not able to bid for a construction project, but your management wants this project to expand their portfolio. Therefore, you team up with another company that has experience in these tasks and jointly bid for the project.

The key points of risk response strategy:

- If the negative risk is critical you will use the avoid risk response strategy.
- If you are able to decrease the impact of the risk to an acceptable limit, you will use the mitigate risk response strategy.
- If you cannot manage the risk on your own, you will use the transfer risk response strategy.
- If managing the risk is beyond your capability, you will use the escalate risk response strategy.
- You use the accept risk response strategy when a risk is not important, or if it is too costly to develop a response.
- If you want to realize an opportunity you will use the enhance risk response strategy.
- If you want to make sure that the opportunity is realized, you will use the exploit risk response strategy.
- If you want to realize the opportunity but cannot do so on your own, you will use the share risk response strategy.

Important Questions

1. How to crash project duration?
2. Explain resource loading in PM.
3. What is the difference between resource loading and resource leveling?
4. Explain Goldratt's critical chain.
5. Explain project stakeholder.
6. Who are the stakeholders in a project?
7. How to do a stakeholder analysis?
8. How to manage your project stakeholders?
9. What is project communication plan? What are types of communication?
10. What is Communication Plan Template?
11. Explain Qualitative and quantitative risk assessment.
12. Explain probability and impact matrix.
13. Explain Risk response strategies for positive and negative risks.