

Course Name -Project Management: Planning, Execution, Evaluation and Control

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Welcome to the course Project Management Planning, Education, Evolution and Control. I am Professor Sanjeev Choudhury from Indian Institute of Technology Kharagpur. In continuation with the module 7 that is Project Risk Management, this lecture we will be devoting time on Risk Response Development and Contingency Planning. This is one of the important steps for this module. So, concepts that will be covered in this lecture are risk response development, contingency planning, contingency finding and time buffers. And rest of the things we will be of this module we will be discussing in the next or subsequent lectures.

So, as we know this is the risk management process. In this we have already completed in the last two lectures the risk identifications that is the step 1 we have completed. We have also completed step 2 that is risk assessment, how do you measure the risk value that we have done. Today in this lecture we will be discussing the risk response development.

Now I have given you an exercise in the last lecture, there you identify your risk of your domain of work or of your organizations and you assess the risk that is likelihood and impact and prioritize the risk that I think you have already done it. So, and in that risk assessment form I have shown you in the last lecture that that also contains a column when those risk you have identified are supposed to happen when. So, now you have prioritized the risk and ranked it. Now next what do you do with this? So, next step, step 3 is you have to prepare a risk response development means if that risk happens or before it happens what do you have to be a proactive risk management and take measures not to happen that risk not to occur that risk you have to measure that. So, that way those are the called risk response plan.

So, you have to develop a strategy to reduce the damage you have to the control the damage if the risk happens. So, for that what are the there are different types of response plan. So, we will be discussing those response plan. One response plan there are four response plans basically those are called mitigating risk, avoiding risk, transferring risk

and retaining risk. I will discuss in the in the subsequent time that all these four what is the mitigating risk? So, first, we will discuss the mitigating risk.

Mitigating risk is basically you try to reduce the likelihood of happening the risk before the risk happens your response plan will be what are the what are the reasons. So, you have to find out the root causes of that risk and now you take proactive actions to prevent those root causes from happening. Suppose I will give you an example you have a vendor who is unable to you fear that or you feel that the vendor will be unable to supply your special components or the special materials you have ordered for on time. If they do not offer on time your project will be delayed you have a feeling of that. So, this is then what you do you find out the root causes why the vendor will be unable to supply that critical components, critical materials to you that may be one may root cause reasons may be the poor vendor relationships or other reasons may be that the miscommunication the design miscommunication and the third may be other reasons may be that the vendors may be for having some fund crunch.

So, it may be may these may be the root causes. So, as a project manager you take a proactive approach what you do what should be you make a response plan your risk response plan since these are the risk these are the root causes. So, your response plan may be to you invite your counterpart like project managers of that vendor organizations. So, invite him for a lunch and make a cordial relationship that eliminate that improves the poor vendor relationships is improved. And the second another response plan maybe you incorporate the vendors during the design stage.

So, you call them during the meeting of the design. So, they feel a part of it that may be another response plan the third may be since their fund crunch or those things. So, they are not they may be lack of motivation. So, to motivate them that reason may be lack of motivation for that you incorporate in the clause restructure the contract that if they complete the supply, they give the supply before the due date they should earn then bonus or they should get some incentive these will propel them to give it earlier on time. So, these are the so mitigating of the risk basically what you do you try to likelihood how happen try to reduce the likelihood of happening that risk probability of happening that risk and or the reduce the impact of the risk try to reduce the impact of the risk that is called mitigating the risk.

So, the this is step 1 then the another one is the avoiding risk. what is avoiding risk? Avoiding risk is you change your original plan of activities you change that way you are avoiding the risk suppose you you are to introduce a new technology, but you are very skeptical that this may not work. So, you change your plan to the conventional technology. Suppose you are using German material or equipment instead of Chinese

equipment or Chinese material you are avoiding the risk. So, suppose your vendor your supplier you are choosing a European supplier over a supplier from the Middle East.

So, you are avoiding the risk. So, you are another example suppose you have made a plan to have your concert in the open air during the rainy season. Now, that may be for rainy season inclement weather and all the chances are high to get washed out. So, you change your plan and hold that concert indoor stadium instead of open. So, these are you are changing the plan.

So, you are avoiding the risk. The next is the transferring risk. What is transferring risk? Transferring risk is basically you are not reducing the risk only thing you are passing the risk to some other entity or some other person or organization that is transferring risk like you insurance you pay a premium for that. One example of transferring risk is fixed contract a fixed price contract here what you do everything your risk and all everything you are transferring to the contractor contractor. So, contractors also know that they have to pay for any eventualities.

So, then they they they insert some premium when they bid because they they take those things into account these are the transferring of risk. Another example may be the boot like you can see the build own operate and transfer you know in international projects and all suppose you are building a petrochemical or a refinery. So, in your country some small countries and all they do not have the capability of doing that. So, what do they do? They give it to the major big organizations or companies on the BOOT basis means they will build the plant, they will own the plant, they will operate till it stabilizes. After it stabilizes, they will transfer the plant to them.

So, owner is not or clients are not taking any any risk to them those risk are borne by them. So, even in the you know boot approach is also there in making highways roads and all. So, these are another example of transferring the risk. Then the last one is the retaining risk you know some risks are so huge that it does not make sense to to sense to transfer or avoid and all. So, what you do? You take a conscious decision that that if it happens, we will bear it and the chances of happening such risks are very rare.

So, like an earthquake flood you take a conscious decision will if it happens, we will bear that. So, these are called retaining the risk. So, these are some of the risk response plans you should make that is mitigating risk, avoiding risk, transferring risk, and retaining risk. Then comes the develop contingency plan what is the difference between a risk response plan and a contingency plan can anyone answer? Anyway, I will explain that risk response plan is proactive in nature it starts the moment you make the plan and the risk management is initiated. So, beforehand as the project starts you are the risk

response for the starts basically you try to reduce the probability of occurrence of risk and the impact of the risk that goes on.

But the contingency plan is actually an alternate plan if that risk occurs or happens then only it gets activated the plan B alternative plan gets activated. So, this is the difference between a risk response plan and a risk contingency plan. Contingency plan has different types of risk we will be discussing that. So, I think it is clear what is a what is a contingency plan and what is a risk response plan. So, what is a contingency plan I have just discussed it.

The next we will be coming to risks of not having a contingency plan. If an organization do not have a contingency plan what are the risk you know that risk is at the if you have a contingency plan means you are better prepared for any when the crisis comes you have a plan B you do not waste your time and you just start taking the plan B or the alternative plan. So, you are better prepared and also it is not only that at the time of crisis you know that time is very precious and if you do not have a plan then you will be under pressure. you have to take a decision and that decision may not be correct under pressure taking a decision and all that the most likely it may not be correct and it will be more costly also. So, if you are prepared for that if you have a plan for that contingency plan, you just initiate that alternative plan to counter the risk.

So, these are the risk of not having a contingency plan. Now, I will tell you some common risk and contingency planning. The common risk and contingency planning these are the technical risk, schedule risk, cost risk and funding risk these are some risks common risk for the contingency planning. What is this schedule technical risk? Technical risk is the you must have a technical backup you know support for the any technical suppose if you are going to introduce a new technology unproven technology. So, you are not sure you must have a backup for the traditional technology.

you just cannot because if that chances of failure for a new technology are much higher than so, you must need a backup. So, that is the technical risk and this can also be further supported by if you have your organization CAD computer aided design and all then suppose your design goes wrong. So, you can generate a number of designs you know and you can choose an alternate design that will help you for your for overcoming the technical risk. So, this is some of the common risks is the technical risk you must have a backup. Then there is a schedule risk, what is schedule risk? Schedule risk is your slipping of your durations you know slipping of you of time may increase for project completion duration may slip.

It may happen due to many reasons one reasons may be that you know use of slack that

from we have seen some activities have slack. If use that slack to offend and all it might happen the slack may not be completed within the that slack period. So, your project may increase its duration. Similarly, sometime a time period is imposed by the higher management or senior management imposed on you. So, that you require to complete the project within that imposed dates those are the schedule risks and also you try to for that what you do? You try to crash the project means shortening the compression of the project using that crashing and all.

So, that also increases the cost. So, what are the cost risks? Cost risk is you know time and cost project time and cost are interdependent. If time durations increase the project cost will will proportionately increase that we know. So, Cost risks are also for a long-duration project say there are likelihood of increase in fuel price increase is material price that may happen. So, you must have some contingency plan for that.

So, in such cases the contingency plan will take care of it these are the cost risk. Then there are funding risks that are suppose your projects ongoing project the fund has been slashed by 25 percent. So, what happens? So, that fund slash will be pervaded or will go to the other downstream activities. So, you're the contingent you should must have some contingency plan to face it. These are the suppose your new CEO comes then he comes with his pet project the old CEOs project is shelved or it is the funding is slashed.

So, these are some of the funding risks. these are the for comprehension then now we will be discussing an opportunity. We have talked about the any uncertain event and condition if it occurs and has a positive or negative effect on the project. So, the positive effect is the opportunity in the context of risk management. the opportunity is the positive effect as you told the as we discussed.

So, there are four types of opportunity response. Those are called exploit, share, enhance, and accept. Exploit is when you try to ensure that the opportunities is a conducive opportunity so that you can get the benefit of that opportunity. So, you are trying to ensure that opportunity to happen that is the exploit. For example, you send your best personnel for a burst activity because the burst activity will that many other activities will follow the burst activity that is you send a best person.

So, you send your best technical person to negotiate technical some conflict happening with your clients. So, that is the exploit you are ensuring the opportunity to happen. So, then another is the share. Sharing the opportunity this may happen if you do not have the capability to grab that opportunity do not have the capability to make benefits from that opportunity. So, what you look now you go you share it with that share it with others who has that capability to exploit that.

Suppose so, you that is why you go for joint ventures and all. So, I will give you an example suppose the oil field say difficult oil field that heavy oil and all it cannot come up of it own you do not have technology the country may not have the technology to exploit that oil from the field. So, what they will be doing they will go to some organizations who has the capability to exploit the that dirty oil or the heavy oil. So, they make some plan they share it with those opportunity with those who has the technical capability. Then enhance, enhance is just the opposite opposite of mitigating strategy, mitigating response.

So, mitigating response what do you do? you try to reduce the probability of occurring and the probability of the and the impact. So, here what you do enhance you try to maximize the probability of happening that probability of happening and improve the impact. So, it is just the opposite of your mitigation plan. For example, you choose a site for your plan where the weather is good for round the season, round the year the weather is good weather will not be impediments to your plan. So, that is you are enhancing the opportunity and accepting the risk.

you are not interested in the opportunity, but if it comes to you, you accept that you, but you do not put any extra effort or do not put any resources to get that opportunity. So, that is called accept these are the four responses for the opportunity in the context of the risk management. Next, we will be so, this is the risk response matrix. So, I have given you that you have done those you have identified those risk you have ranked that I have told you. Now, you make a risk response matrix like this here this is the risk event you whatever you have identified you put it in the prioritization way.

So, which is the rank risk value high the next risk and all. then you develop the risk response may be the mitigation risk, avoiding risk or transferring risk retaining risk mostly it is the mitigation of risk. So, you put the what is your mitigations of risk. So, these are just the examples given you followed this. then you develop a contingency plan that is alternative plan if the risk happens what you will be doing.

So, you just put it these are put system freezing contingency plan is reinstall the operating system. So, you make the contingency plan then after that what you have to do you have to mention that triggering point of the contingency plan. The contingency plan has to be activated. what is the triggering point that this the contingency plan will come into effect that has to be specified and this column this has to be determined with your stakeholders, determined with your clients and the experts and the responsible people who are there. So, you have to identify the triggering points for activating the contingency plan then you have to make a 'who is responsibility' you assign the

responsibility to a group or to a person you mention that this is called risk response matrix.

The example which I have given you have done for those risk identification, risk assessment, and all now you prepare a risk response matrix similar to this related to your work or your organization. After doing this risk response matrix now I will be discussing about the contingency funding and time buffer. What is contingency? This contingency plan requires fund. how much fund has to be kept for this because contingency plan is not kept in the in the work packages because by the nature of contingency plan it is a probabilistic in nature. So, work package cannot be a probabilistic cannot the you cannot assign any probabilistic things to work packages it has to be given separately.

So, contingency funds generally cover the project risk those are identified risk or unknown risk like foreseen risk or unforeseen risk both is covered under contingency fund and size of the funds actually reflects the overall risk of a project. If some projects are more uncertain maybe the contingency plan will be higher and say new technology, new product, new unproven technology these are the contingency fund may be requiring more. Generally, for the projects and all for traditional projects and all it is contingency fund is kept somewhere between 1 percent to 10 percent of the total project cost, but for some special projects and all where uncertainty is more it may go up from 20 percent to 60 percent that is not uncommon. So, size of funds reflects overall risk of the project. Then contingency fund you keep the budget reserves and the management reserve.

Budget reserves are linked with the specific work package and specific activities. some activities are riskier than the other activities and all. So, you link those budget reserves for that high-risk activities not all activities nor all activities do not require contingency only few high-risk activities you allowed the budget reserves. Then the another one is the management reserve. Management reserves are the large funds those are to be used to cover major unforeseen risk that is change in project scope.

Suppose in the middle you required to change your project scope that will require huge amount because for the total project. So, management reserves are given for the higher level at the covering the total project not for specific one to that deliverable or one-to-work packages and all. It covers the unforeseen risks for the total project. It is given in a lump sum and is activated for the entire project. So, now, I will show you this is an illustrative contingency fund estimates say activities say WBS 1, 2, 3.

So, these are the baseline budget baseline budgets are given. Now reserve budget, budget reserves you keep it that is specific to work package or specific to some deliverable not all. So, this is generally given how much some percentage of this may be the 3 percent 3

percent it has been given you did. Then the project budget becomes baseline budget plus reserve budget it becomes the total project budget becomes like this. Management reserves are not given the activity wise it is given as I told entire project as a whole.

So, this will give you the baseline budget plus reserve budget plus this management budget will give you the project total project budget this is the illustrative one. So, here baseline budget does not contain any contingency plan because contingency plan is probabilistic in nature on, but after the contingency plan is activated then you need to transfer this to the baseline budget so to add to the baseline budget. So, now, another thing I will just discuss like similar to the contingency fund we have that is a buffer contingency buffer we have also time buffer time also may slip. So, what is the time buffer it is amount of time used to compensate for unplanned delays in the project because these delays can happen you know delays can happen for many reasons. Initially the project may be facing hurdles and all then it becomes very imperative for the projects at the late stage to crash.

So, that is why you have to keep some buffers for the time as well. So, the buffers are generally added to the activities with severe risk you identify some activities are chances are more than average are very high for refreshing risk. So, activities with severe risk you try to keep some time buffer then also you must you may keep the merge activities which are prone to delays because merge activities depend on a number of activities that will be completed then only it can start. So, the number of activities one or two activities may not might be delayed and the merged activity will be subject to delays.

So, you try to put there also some merge activities. Then non critical activities so, those to reduce likelihood of creating another critical path non critical activities if it has very low slack low slack then it may create another if some other activities in the critical path is delayed. So, these will become a critical path that the non critical activities will fall in the critical path. So, that you must keep some time buffer for it. So, that it does not get create another critical path then activities that requires scarce resources some activities will require very very scarce or the limited resources which are not available generally on the market for that. So, to get in order to that those activities are not nearly delayed.

So, you try to get the scarce material, but even then, it may chance are high that may get delayed. So, in such activities, you may keep some time buffer. So, these are the some of the cost and time buffers for the contingency funding and this. So, to summarize what we have discussed in this lecture we can tell this session deals with developing risk response plan that includes mitigating risk, avoiding risk, transferring risk and retaining risk. It further illustrates contingency planning which is an alternative plan in case of eventualities that is if risk becomes reality.

Contingency plan is associated with four types of risk namely technical risk, schedule risk, cost risk and funding risk. Its further module further elucidates opportunity in the context of risk management which are essentially of four types namely exploit, share, enhance and accept. Further we have discussed the management reserves and the budget reserves, contingency funding, and time buffer. So, these are some of the reference books you can refer and enhance your knowledge. Thank you very much for attending today's lecture.