Project Management for Managers
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Lecture - 21
Risk Management (Control and Documentation)

Hello friends, I welcome you all in this session. As you are aware in previous session we were discussing about risk management and we have already seen three steps of risk management process right. So, the first step was identification of risk; the second one was analysis of risk, and the third one was how to come up with different strategies and finally, it is control and documentation, most important risk because if you control and document risks of risk which you have faced in current based this would help you in future for other projects, so how you are controlling and documenting it.

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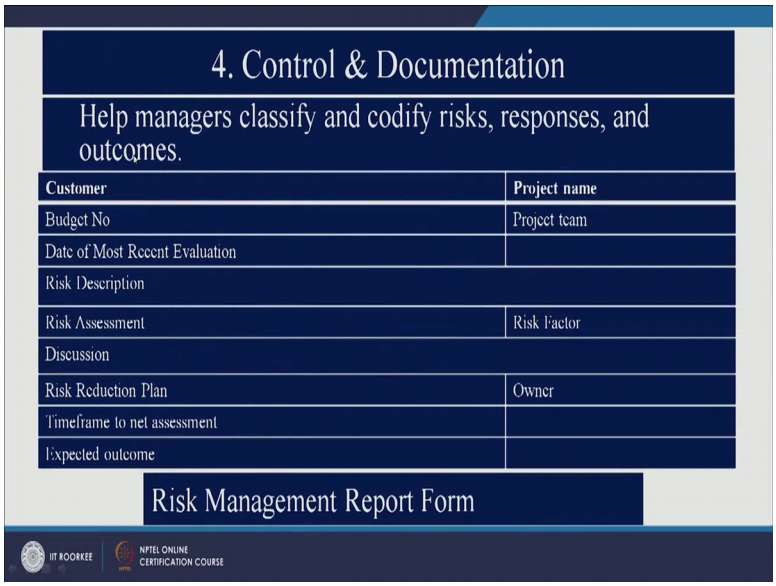

So, you should prepare a chart like this right. So, where you can you can write name of the customer name of the project, what was the cost of the project, who funded that project and what are the risks which you have faced right. For example, did you faced risk related to employees, was it related to technical risk or marketing risk let say economic risk or financial risk or so on right. So, you just note down the type of risk and then you also note down how did you mitigate that risk right, whether you accepted it or whether you minimized it or whether you shared it with someone else is not it.

So, documents should be prepared right and you should also write points like let say what was the risk factor in that project and after risk factor calculation, you should also write who are the people who handled that particular risk right. So, just write names of those people and did you setup a timeline for completion of that risk, so all those points should be noted down right and then keep it in your library right. Because if there is a library of risks of all the projects, you can easily retrieve for your next projects, so this is called risk management report form.

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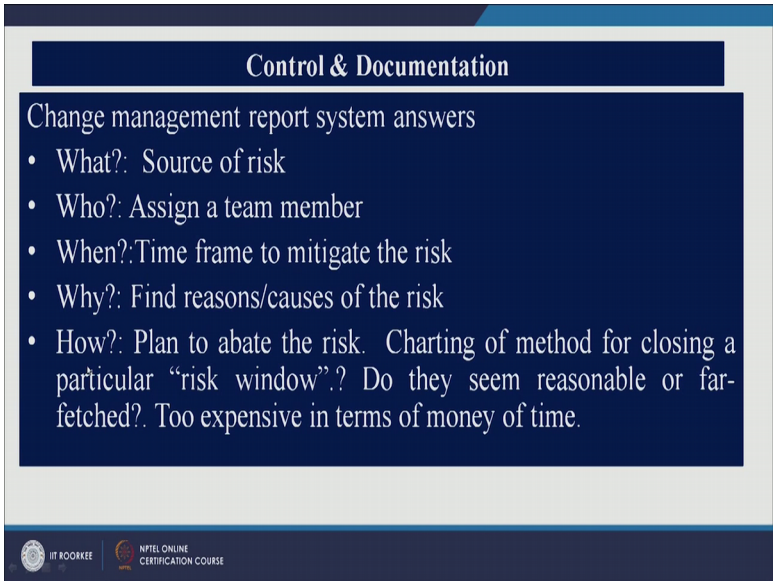

You should also note down points like what was the source of risk as I have already talked about. Who was the person, who handle that risk, during what period that risk was solved, why that risk occurred right most important point right, find out reasons for that particular risk right? And how it was solved right.

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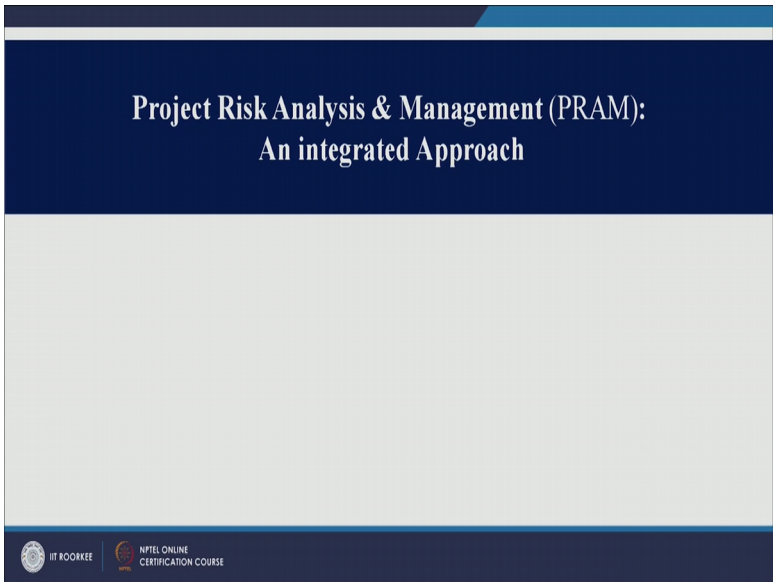

Now after discussing all those four points, let us discuss there is something called PRAM this is basically another project risk analysis management tool. It is quite a widely used technique for risk assessment namely PRAM - project risk analysis and management. So, European association for project management has developed an integrated program for risk management. So, they have given guidelines how to identify risk how to mitigate risk right, so based on efforts to extend risk management to cover project's entire life cycle.

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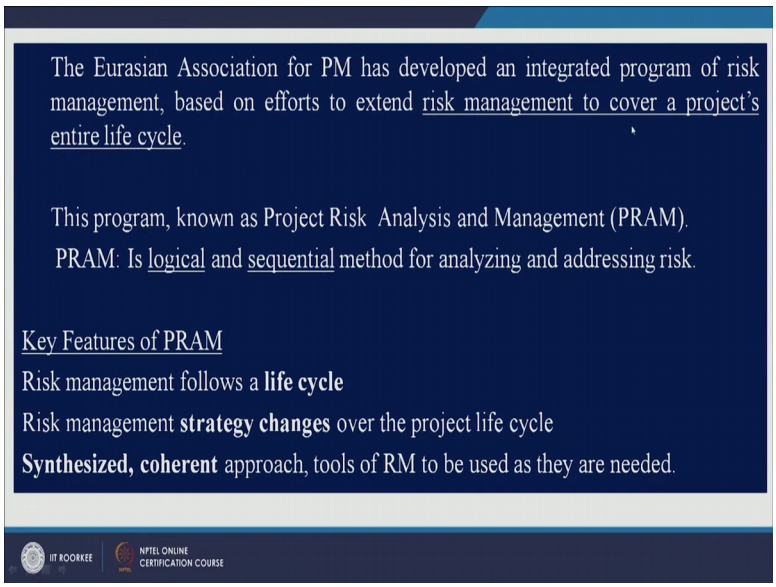

So, what European association has done is that whenever there is a project there would be life cycle right you will have let say conceptual phase, introduction phase, planning phase right; before conceptual phase there would be planning phase right then there would be execution phase finish finishing phase and so on. So, in each phase there would be a different risks and you need to have different strategy for those risks you cannot have one single strategy to deal with risks related to different phases so that is the important point. So, they have talked about in their PRAM approach.

So, this is basically quite a logical and sequential method for analyzing and addressing risk and it has to be test to be because if you are assessing risk it has to be logical right, but PRAM, they have listed down what one should do to identify a risk. So, key features of PRAM. So, risk management follows a life cycle as I have already talked about. Risk management strategy changes over project life cycle. Synthesized, coherent approach, tools for risk management to be used as they are needed necessary. So, you need to apply different risk management tools. So, these are three key features of PRAM approach.

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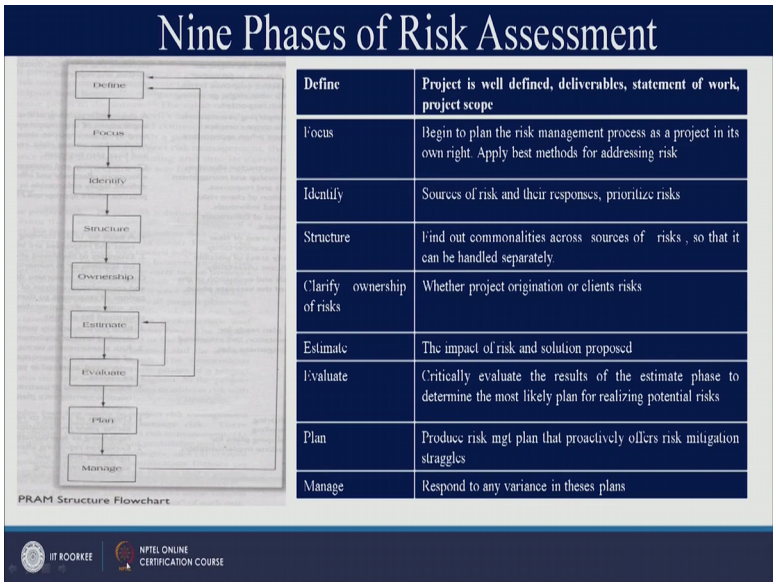

And they have given nine phases of risk management; and these 9 phases are like this. The first one is define, focus, identify, structure, ownership, estimate, evaluate, plan and manage. So, this is nothing but PRAM structure flowchart or PRAM approach of risk management. Suppose, if you are appearing for an interview and if the question is asked about what are different, different risk management methods, so you just say PRAM. If

experts or knowledgeable they will select you only on this answer just say PRAM. Let us look at in detail about these nine phases.

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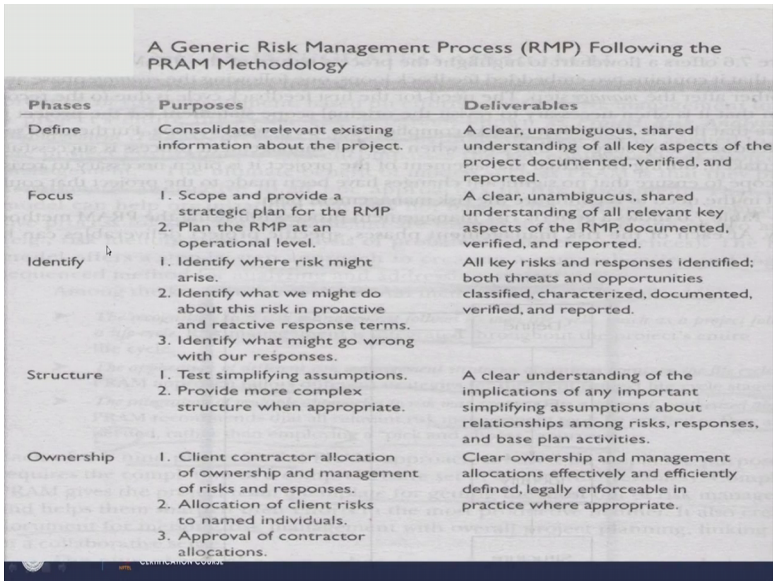

A Generic Risk Management Process (RMP) Following the PRAM Methodology

Phases	Purposes	Deliverables
Define	Consolidate relevant existing information about the project.	A clear, unambiguous, shared understanding of all key aspects of the project documented, verified, and reported.
Focus	1. Scope and provide a strategic plan for the RMP 2. Plan the RMP at an operational level.	A clear, unambiguous, shared understanding of all relevant key aspects of the RMP, documented, verified, and reported.
Identify	1. Identify where risk might arise. 2. Identify what we might do about this risk in proactive and reactive response terms. 3. Identify what might go wrong with our responses.	All key risks and responses identified; both threats and opportunities classified, characterized, documented, verified, and reported.
Structure	1. Test simplifying assumptions. 2. Provide more complex structure when appropriate.	A clear understanding of the implications of any important simplifying assumptions about relationships among risks, responses, and base plan activities.
Ownership	1. Client contractor allocation of ownership and management of risks and responses. 2. Allocation of client risks to named individuals. 3. Approval of contractor allocations.	Clear ownership and management allocations effectively and efficiently defined, legally enforceable in practice where appropriate.

Define phase - consolidate relevant existing information about the project. And when you define it you need to also come up with what are different deliverables. A clear unambiguous shared understanding of all key aspects of the project, so that is deliverable. Do not you just define theoretical, right you just come up with what would be the deliverable after each of these nine phases. Focus means what, scope; you need to come up with scope of the project, because if you are going beyond scope then cost will increase time will increase and there would be problem between client and yourself. So, scope means what, a clear unambiguous shared understanding of all relevant key aspects of risk management process; documented, verified and reported. So, you need to have deliverables also.

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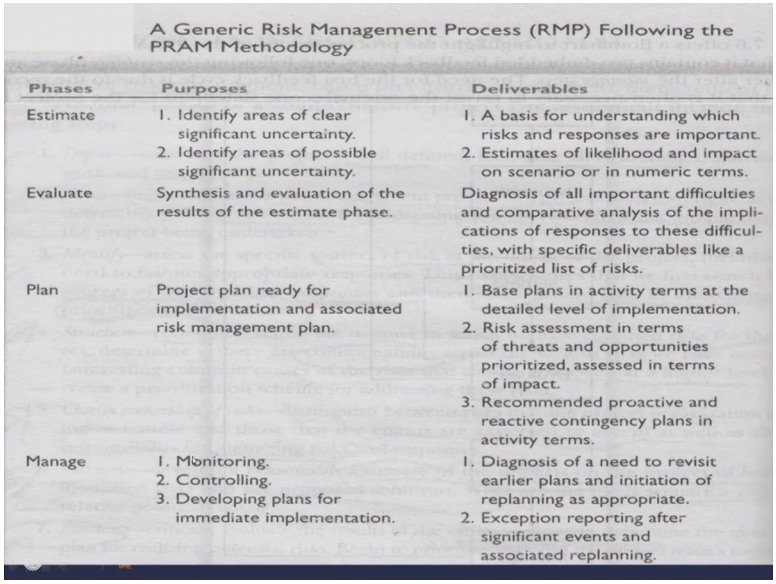

A Generic Risk Management Process (RMP) Following the PRAM Methodology

Phases	Purposes	Deliverables
Estimate	1. Identify areas of clear significant uncertainty. 2. Identify areas of possible significant uncertainty.	1. A basis for understanding which risks and responses are important. 2. Estimates of likelihood and impact on scenario or in numeric terms.
Evaluate	Synthesis and evaluation of the results of the estimate phase.	Diagnosis of all important difficulties and comparative analysis of the implications of responses to these difficulties, with specific deliverables like a prioritized list of risks.
Plan	Project plan ready for implementation and associated risk management plan.	1. Base plans in activity terms at the detailed level of implementation. 2. Risk assessment in terms of threats and opportunities prioritized, assessed in terms of impact. 3. Recommended proactive and reactive contingency plans in activity terms.
Manage	1. Monitoring. 2. Controlling. 3. Developing plans for immediate implementation.	1. Diagnosis of a need to revisit earlier plans and initiation of replanning as appropriate. 2. Exception reporting after significant events and associated replanning.

Let us look at the last one manage. Manage means monitoring, controlling, developing plan for immediate implementation. So, deliverables would be diagnosis of you need to revisit earlier plans and initiation of re planning as appropriate. Controlling, let us look at controlling. What to control, what do you control in a project? You need to control several things. In one statement, you can say we need to control resources. So, you need to control money; in other words budget; you need to control time schedule, you need to control your human resources your machineries and equipment and so on. So, this is very important step, controlling. And there are different methods of controlling a project right. So, this is PRAM approach.

Now let us look at one more point in risk management, how to measure risk. So far, we discussed about theoretical points about risk management, but how actually you should measure a risk in a standalone project. So, let us look at this point.

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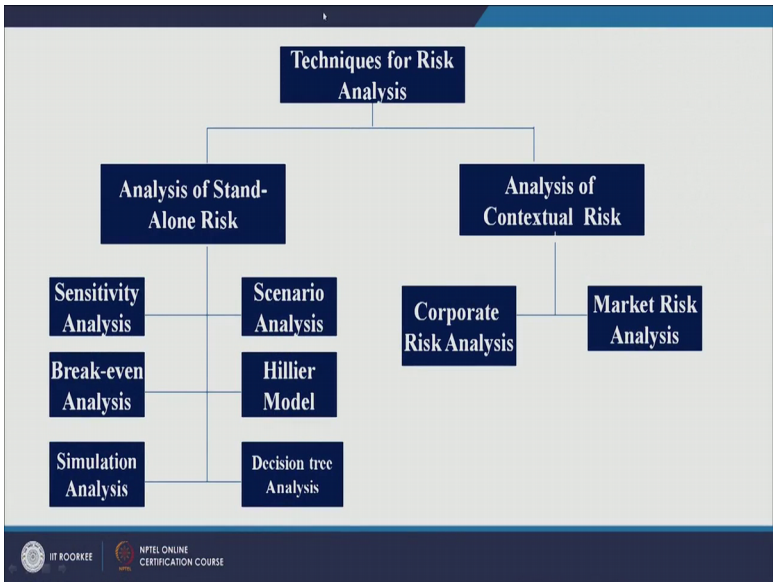

So, you have got techniques for risk analysis. So, you can have analysis of standalone risk and analysis can be contextual with reference to some other thing with reference to let us say your competitors or with respect to let us say market conditions. So, those analysis are called contextual risk analysis or and this type of and if there is only one project then it would be standalone risk analysis. So, in this you can have several options. The first can be sensitivity analysis, the next can be scenario analysis, then you have breakeven point, Hillier model of risk analysis very famous model, decision tree analysis simulation analysis right. So, we will see this things in detail, but before this let me take up an example.

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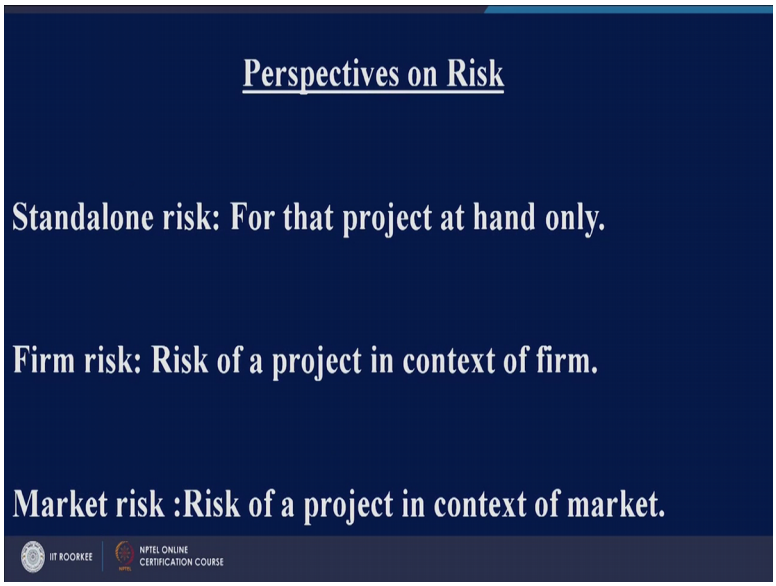

Before example, let us look at what do you mean by standalone risk. As I said it is for the project which is it hand right for just one project. Firm risk the risk at firm level, so firm would be having several projects. And you can you market risk right. So, firm risk and market risk are contextual risk. So, market risk, risk of a project in context of market, right different competitors would be there, different market forces would be there, so how to analyze risk under those situations.

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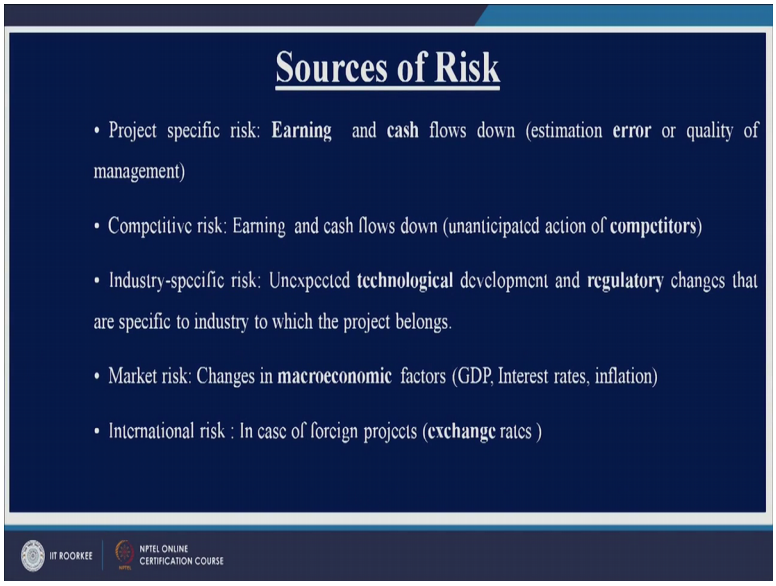

Sources of risk you can have several sources of risk as we have discussed in earlier session also. Let us say project specific risk. There is a project, which you are handling. So, risk related to that particular project. So, you have estimated something let us say there would be cash flow of x amount after two years, but that amount has not come up to you, so that is a risk. So, you may come it error in estimation of cash flows are earnings about a particular project. The second could be competitive risk because unanticipated action of comparators it is possible that your competitor has less price of its product by let say 25 percent. So, that would be a risk for your products. So, what to do, is not it, either now you can I see you can also cut prices 25 percent or are you can have some other strategy.

Industry specific risk, so unexpected technological development and regulations. So, let say you are in a business of insurance and let say if IRD comes up with some new regulations tomorrow, then what will happen. So, it will affect entire industry all the insurance companies Beet, LIC or ICICI or any other insurance company. So, these are called industry specific risk and this could be due to technology. So, there are several technological changes taking place in let say a mobile phones these days. So, a breakthrough in technology for a company would affect profit of all other mobile phone companies rate, so that is nothing, but industry specific risk.

You can have market risk also changes in macroeconomic factors. Let say if you are in housing industry. So, if there is a change in interest rates by RBI then things would be changed because of that effect. And changes in let us say macroeconomic factors like GDPL is not I, so you can have market risks also right and international risk in case of foreign projects. If there is let say if there is a project between two countries and if there is fluctuation in exchange rates then that would also affect your project. I will let say if you are in a business of let say oil exploration then if opaque decide to increase their oil production are to decrease their oil production then that would affect your company which is in the business of oil extraction. So, these are couple of sources of risks.

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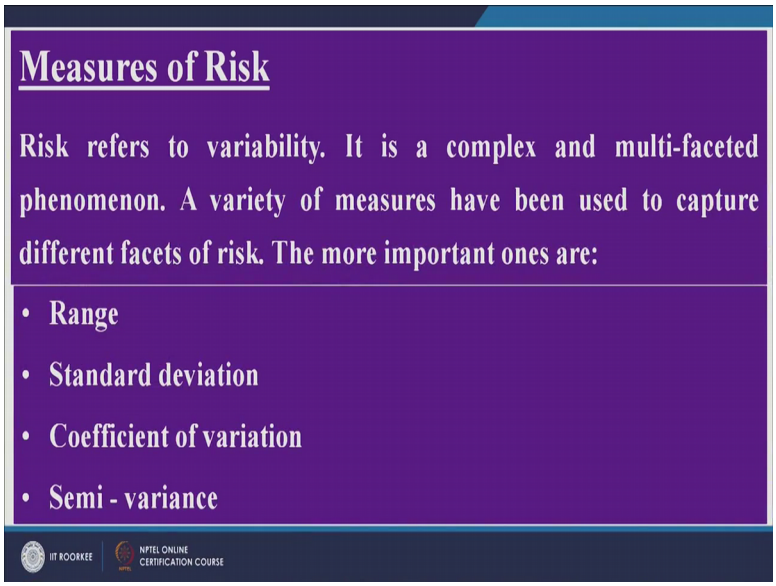

How to measure risk and when we measure risk in terms of statistics risk is nothing but variability, it is the variation in data. So, whenever you have got data, you need to know there is something called central tendency. Central tendency is a point where you have how will distribution of data risks. So, you can measure central tendency through mean mode medium right, but you should not only be measuring central tendency, but you should also be measuring its variability or disruption in data. So, let dispersion can be measured through different techniques. Let say a range, range is one of the methods of finding variability.

So, range is what. So, let us say if there are five data points, so range would be the difference between maximum to minimum. Then you can have standard deviation, actually range is not good measure of variability, because it takes into account only two data points right maximum and minimum; on the other hand standard deviation takes care of all the data points, so a better measure of variability. Then coefficient of variation it is basically you can compare two different projects using coefficient of variation and then there is something called semi variance. We will see all these things.

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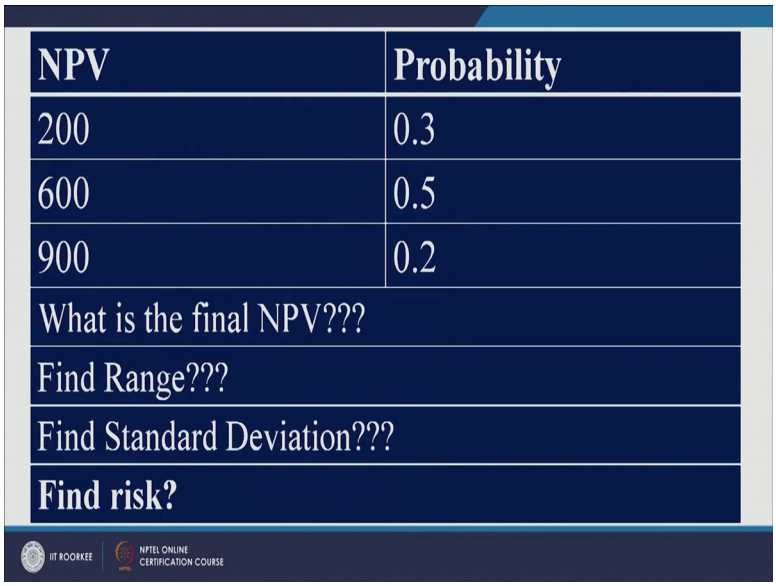

So, let us take a project. This is a project where the probability that the NPV of the project is 0.3. NPV 600 probability is 0.5, NPV 900 probability 0.3. So, find out what is the final NPV, find out range find out standard deviation. So, just try to find out final NPV. Question is very simple, there is a project NPV of the project would be 200, it is probability is 0.3. The NPV of the project would be 600 and its probability is 1.1, NPV 900 its probability is 0.2. So, this sum of this probability is 1.

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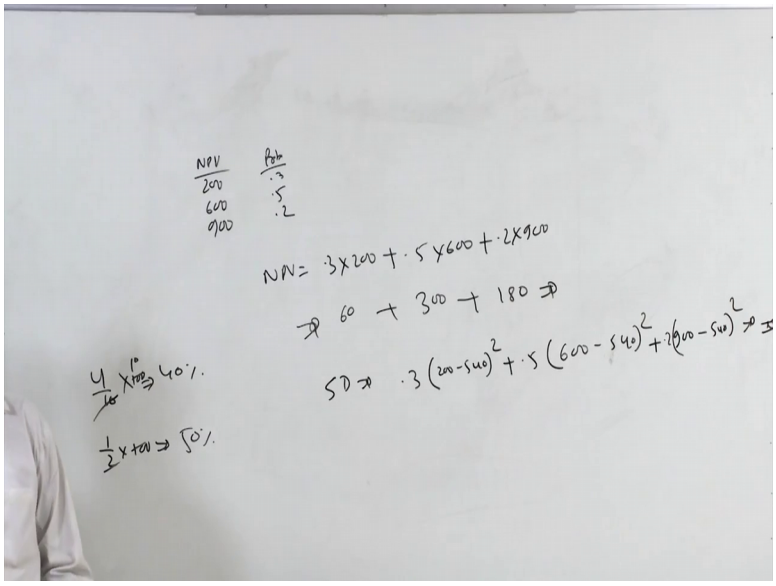

So, how to solve this question, what would be the final NPV. It is very simple. Let us use board for this question. So, NPV 200, 600, 900, probability is 0.3, 0.5 and 0.2. So, what would be the final NPV, it is very simple just multiply 0.3 into 200 plus 0.5 into 600 plus 0.2 into 900. So, this would be 60, this would be 300 plus 180. So, this total would be NPV of this particular project.

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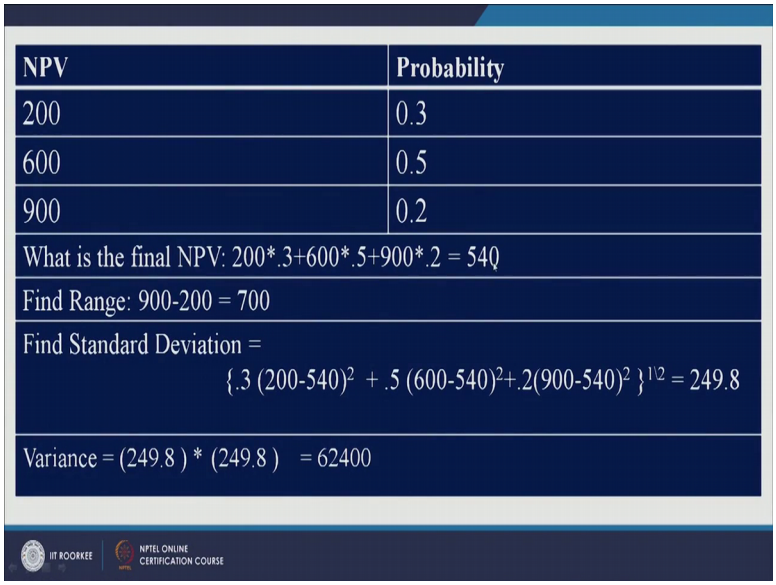

What would be the range? So, this is NPV, it is 540. Range is maximum to minimum. So, it is 900 minus 200 it is range. Then how to find out standard deviation, standard deviation is you have got NPV and you have got individual NPV s also. So, for this let us find out standard deviation, this 0.3 into 200 minus 540 whole square plus 0.5 into 600 minus 540 whole square plus this 540 and this is 600 plus 900 minus before that 0.2, 900 minus 540 whole square. So, this is standard deviation, you can get a value over here and that value is nothing but 249.8 is the standard deviation of this particular project. What is variance? Variance is nothing but square of standard deviation. So, just take a square of 249.8. So, this would be 62400. So, this how you can calculate final NPV range standard deviation and variance.

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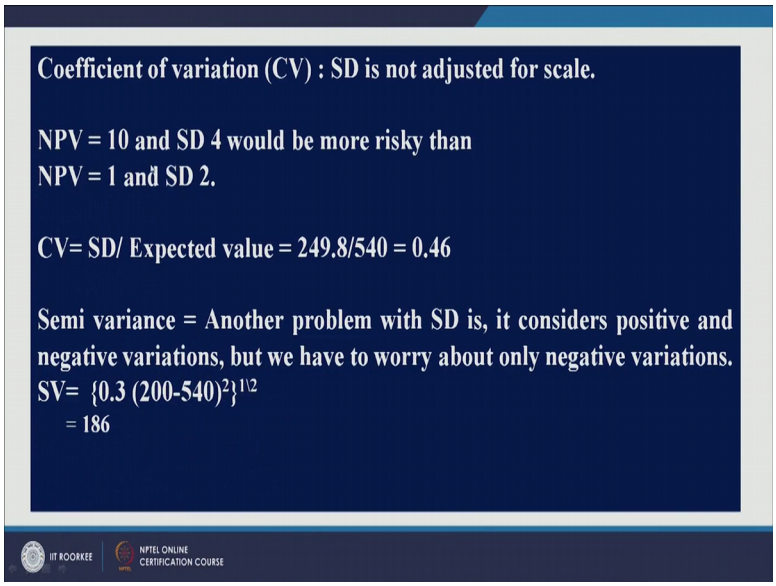

So, now there is something called coefficient of variation. So, as I said you can compare two projects using coefficient of variation. Let us say in a project NPV is 10 and standard deviation is 4. And there is one more project and for that NPV is one standard deviation is 2, so which is riskier project. So, coefficient of variation is nothing but standard deviation by expected value. So, standard deviation is also is already available. What is that standard deviation, it is 249.

So, for first project actually for this project which we have just taken up for this particular project coefficient of variation is 0.46, but if you compare these two, you can solve this question. So, NPV 10 standard deviation is 4. So, 4 by 10 and 4, so 4 by 10, and for the second project it is 1 by 2 multiply it by 100. So, this is 10, this is 40 percent and this is 50 percent. So, project having NPV its standard deviation 4 would be more riskier than this project because here standard deviation is much, much less.

Now, let us look at what is semi variance. In variance, what we did we just squared standard deviation, but the problem in standard deviation is, in standard deviation what is the problem, problem is that we took into account those NPVs which are more than 540. So, the mean the net the final NPV of this project is 540 it is 540. So, if NPV is more than 540 that is good for you. So, we need to look at only that variance which is less than this, it is less than 540, so that is a problem.

So, we should consider only those NPV s which are more than 540. So, just look at this it standard deviation, it considers positive and negative variations, but we have to worry about only negative variations; we do not worry about positive variations. Positive variations are good for us, we want to have more and more NPV. So, how to calculate this, it is 0.3 into 200 minus 540 whole square and under root of this. So, this is known as semi variance 186.

So, let me summarize what we have done in this particular session. We discussed points like whether you need to calculate risk for one particular project are for contextual project. Whether risk is to be calculated for it firm level or for those projects which are getting affected by market conditions or for just one project and if you consider and we have also seen different sources of risk. And if you consider standalone project then you need to come up with final NPV. So, you just multiply NPV is by respective probabilities.

Calculate range which is the difference between maximum and minimum value. And then you calculate standard deviation, so standard deviation is a better method compare to range. In standard deviation, you take into account all the data points. And then you also calculate variance which is nothing but square of standard deviation. And then semi variance this is very important semi variance. In semi variance, what we did we just considered those NPVs which are less than final NPV, just 200, we did not consider 600 NPV and 900 NPV. And we have also seen coefficient of variation. So, coefficient of variation will help you in comparing two projects to identify whether risk in a particular project is more or less. So, with this we come to the end of this particular session.

Thank you very much.