# UNIT-V
# Risk Management (Part-1)

## Introduction:-

→ "The risk denotes the uncertainty that may occur in the choices due to past actions and risk is something which causes heavy losses"

"The risk is nothing but it is uncertain event that may occ or may not occur in the future. That may affect +ve or -ve impact on the product."

## Risk Management:-

→ Risk management is a methodology or a mechanism carried out throughout the development process to identify, manage and control risks evolved before & during software process.

→ Various activities carried out for risk management

i) Risk identification
ii) Risk projection
iii) Risk refinement
iv) RMMM.

→ Charette proposed a risk is categorized into known risks & unknown risk

→ known risks are software risks that are actually facts known to the team actually as well as to the entire project.

Eg:- Not having enough number of developers can delay the project delivery.

Unknown risks :- Those kind of risks about which the organization has no idea. These risks can't guess earlier.

⟹ Reactive & proactive risk strategy :-

→ Reactive and proactive risk strategies are the approaches used for managing the risk.

Reactive risk strategy :-

* Reactive risk management is a risk management strategy in when risk project gets into trouble then only corrective action is taken.
* When such risks can not be managed and new risks come up one after other, the slw team flies into action in an attempt to correct problems rapidly. These activities are called "firefighting activities"
* Resources are utilized to manage such risks. And if still the risks do not get managed then project is in danger.
* In this strategy no preventive action is taken about the risks. they are handled only on their occurances
* This is an older approach of risk management.

Proactive risk strategy :-

* proactive risk management strategy begins before the technical activity by considering the probable risks.
* In this strategy potential risks are identified first. then their probability & and impact is analyzed.
* such risks are the specified according to their priorities (i.e high priority risk should be managed first)

* Finally the slw team prepares a plan for managing these risks.
* The objective of this strategy is to avoid risks. But it is not possible to avoid all the risks, hence team prepares the risk management plan in such a manner that risk controlling can done efficiently.

⇒ Software Risks:-

1) The risk may or may not happen. It shows the uncertainty of the risks.
2) When risk occur, unconsequences or losses will occur.

Types of risk:-

1) project risk:- project risks arise in the slw develop-ment process then they basically effect budget, schedule, staffing, resources, and requirements. When project risks become severe then the total cost of the project gets increased.

2) Technical risk: These risks affect quality & timeliness of the project. If technical risks become reality the potential design implementation, interface, verification & maintenance problems gets created. Technical risks occur when problem becomes harder to solve.

3) Business risk:- When feasibility of slw product is in suspect then business risk occur.

→ Business risk can be further categorized as.

i) Market risk; When quality slw product is built but it the is customer for this product then it is called market risk.

ii) Strategic risk:- When a product is built and if it is not following the company's business policies then such a produ-ct brings strategic risk.

iii) Sales risk: When a product is built but how to sell it is not clear then such a situation brings sales risk.

iv) Management risk: When a senior management or staff responsible people leaves the organization then management risk occurs.

v) Budget risk: Losing the overall budget of the project is called budget risk.

⟹ Risk identification:-

→ Risk identification can be defined as the efforts taken to specify threats to the project plan. Risk identification can be done by identifying known & predictable risks.

→ Risk identification based on two approaches.

1) Generic risk identification: It includes potential threat identification to s/w project.

2) product-specific risk identification: It includes product specific threat identification by understanding people, technology & working environment in which the product gets built.

→ Generally Risk identification is done by project manager.

→ The project manager follows some risk item check list to identify risks in product.

1) product size: The risk items based on overall size of the s/w product is identified.

2) Business impact:- Risks items related to the market place or management can be predicted.

3) customer-characteristics: Risks associated with customer-developed communication identified.

4) Development Environment: The risk associated with the technology and tool being used for developing the product.

5) staff size & experience: once the technology and tool re-lated risks items are identified. it is essential to iden-tify the risks associated with sufficient, highly experi-enced and skilled staff who will do the development.

⇒ creating risk components & drivers list.

→ The set of risk components and drivers list is prepar-ed along with their probability of occurence. then their impact on the project can be analyzed.

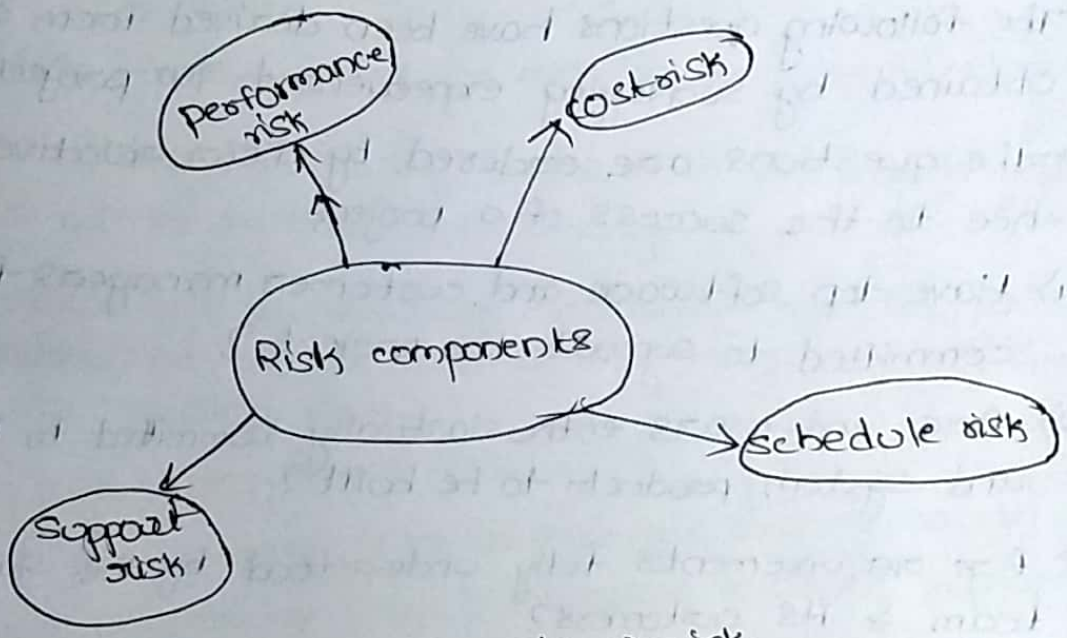


fig components of risk.

1) performance risk:- It is the degree of uncertainty that the product will satisfy the requirements.

2) cost risk:- It is the degree of uncertainty that the project will maintain the budget.

3) support risk: It is the degree of uncertainty that the resu project being developed will easy to correct, modify or adapt.

4) Schedule risk: It the degree of uncertainty that the s/w project will maintain the schedule and the project will be delivered in time.

→ The components and risk drivers that are used to analyze the impact of the risk.

→ The risk drivers are. 1) Negligible - 4
2) Marginal - 3
3) critical - 2
4) catastrophic - 1

## Assessing overall risk project:-

→ The following questions have been derived from risk data obtained by surveying experienced s/w project managers.

→ The questions are ordered by their relative importance to the success of a project.

1) Have top software and customer managers formally committed to support the project?
2) Are end-users enthusiastically committed to the project and system/product to be built?
3) Are requirements fully understood by the s/w engineering team & its customers?
4) Have customer been involved fully in the definition of requirements?
5) Do end-users have realistics expectations?
6) Is the project scope stable?
7) Are project requirements stable?
8) Does the software engineering team have the right mix of skill?

## ⇒Risk projection :-

→ The risk projection is also called as risk estimation.

→ There are two ways by which risk can be rated
1) probability that the risk is real
2) consequences of problems associated with the risk.

→ The project planner, technical staff, project manager performs following steps for risk projection.
i) Enlist the consequences of the risk.
ii) Establish a scale that indicates the probability of risk being real.
iii) Estimate the impact of the risk on the project & product
iv) Note the overall accuracy of the risk projection so that there will be no misunderstandings.

→ These steps help to prioritize the risks. once the risks are prioritized then it becomes easy to allocate the resources for handling them.

→ Buiding risk table :-

1) Building the risk table is the simplest and most commonly used technique adopted by project managers in order to project the risk.

Risk table

| Risk | category | probability | Impact | RMMM |
|---|---|---|---|---|
| Is the skilled people available | staff | 60% | 1 | |
| Is that teamsize sufficient | staff | 62% | 2 | |
| Have the staff received sufficient training | staff | 30% | 2 | |

| | | | |
|---|---|---|---|
| will technology meet the Expectations | Technology | 30% | 2. |
| How much amount of reused s/w is required? | Project size | 60% | 3 |

→ While building the risk table the project team first of all enlists all probable risks with the help of risk item checklist.

→ Each risk is then categorized.

a) projectsize
b) Technology
c) customer
d) staff
e) Business
f) Developing environment

→ probability of occurences of each risk is then estimated by each team member individually.

→ The impact of each risks is assessed. While calculating the im-pact of each risk, each using the cost drives.

2) After building the this table then sorted by probability & impact. The high probability & high impact risks will be at the top of the table. And low probability & low impact risk will be at the bottom of the table. This arrangement of the tabled "first-order prioritization".

3) Then the project manager goes through this first-order prioritized risk table and draws horizontal line at some point in the table. This line is called cut-off line.

4) The risk table below the cut-off line is again sorted & a "second-order prioritization" is applied on this table.

5) The risk table above the cut-off line is having the risks with high probability & high impact.

6) All the risks that lie above the cut-off line should be managed.

⇒ Assessing risks impacts:-

While assessing the risks impact three factors are considered

* Nature of risk
* scope of risk
* Timing at which risk occurs

Nature of risks: It denotes the type or kind of risk. for eg if s/w requirement is poorly understood, the s/w processes gets poorly designed and ultimately it will create a problem in unit testing.

Scope of risk:- It describes the severity of the risk.

Timing of risk:- It determines at which phase of s/w development lifecycle the risk will occur and how long it will persist.

Risk Exposure:-

Risk Exposure = probability of occurence of risk * cost

Eg:- consider a s/w project with 77% of risk probability in which 15 components are developed from the scratch. Each component have on an avg 500 LOC & each LOC have an average cost of $10. Then the risk exposure can be calculated as

first calculate cost

cost = N.o. of components * LOC * cost of each LOC
= 15 * 500 * 10
= $75000

Risk Exposure = probability of occurence of risk * cost
= 77/100 * 75000
= $57750.

⇒ Risk Refinement :-

Risk refinement is a process of specifying the risk in more detail. The risk refinement can be represented using CTC format suggested by D.P. Gluch.

→ The CTC is condition-Transition-consequence. The condition is stated first and then based on this condition sub conditions can be derived.

→ Then determine the effects of these sub conditions in order to refine the risk.

→ This refinement helps in exposing the underlying risks.

→ This approach makes easier for the project manager to analyze the risk in greater detail.

⇒ Risk Mitigation, Monitoring and Management (RMMM) :-

→ There are three issues in strategy for handling the risk is

1) Risk avoidance
2) Risk Monitoring
3) Risk Management

1) Risk Mitigation :- Risk mitigation means preventing the risks to occur.

→ Following are the steps to be taken for mitigating the risks.

1) communicate the concerned people to find of probable risk.
2) Find out and eliminate all those causes that can create risk before the project starts.
3) Develop a policy in an organization which will help to continue the project even though some staff leaves the organization
4) Everybody in the project team should be acquainted with the current development activity.

5) Maintain the corresponding documents in timely manner, this documentation should be strictly as per the standards set by the organization.

6) conduct timely reviews in order to speed up the works.

7) For conducting every critical activity during s/w develop-ment; provide additional staff if required.

Risk Monitoring :-

→ The project manager must be monitored the following steps

1) The approach or behaviour of the team members as project pressure

2) The degree in which the team perform with the spirit of "team work"

3) The type of co-operation among the team members.

4) The types of problems that are occuring.

5) Availability of jobs within and outside the organization.

6) Conduct timely reviews in order to speed up the works.

7) For conducting every critical activity during software development, provide the additional staff if required.

⇒ Risk Mo

8) Availability of jobs within and outside the organization.

→ The objective of risk monitoring is.

1) To check whether the predicted risks really occur or not.

2) To ensure the steps defined to avoid risk are applied properly or not.

3) To gather the information which can be useful for analy-zing the risk.

⇒ Risk Management :-

project manager performs this tasks when risks become reality. If project manager is successful in applying the project

mitigation effectively then it becomes very much easy to manage risk.

Ex: consider a scenario that may people are leaving the organization then if sufficient additional staff is avai -lable, if current development activity is known to every -body in the team, if latest and systematic documenta -tion is available then any 'new comer' can easily under -stand current development activity. This will ultimately help in continuing the works without any interval.

## ⇒ RMMM plan:-

The RMMM plan is a document in which all the risk analysis activities are described. sometimes project managed includes this document as a part of overall project plan. sometimes specific RMMM plan is not created, howe -ver each risk can be described individually using risk information sheet.

→ Typical template for RMMM plan or Risk Informationsheet.

→ The risk information sheet can be maintained by data -base systems. After documenting the risk using ei -ther RMMM plan or Risk information sheet the risks mitigation, monitoring & analysis activities are stopped.

# Risks Information sheet

Project Name <enter name of the project for which risks can be identified>

| Risk id <#> | Date <date at which risk is identified> | probability <risk probability> | Impact <low/ medium/ high> |
|---|---|---|---|
| Origin <the person who has identified the risk> | | Assigned to <who is responsible for mitigating the risk> | |
| Description <Description of risks identified> | | | |
| Refinement/ context <associated information for risk refinement> | | | |
| Mitigation/ Monitoring <enter the mitigation/ monitoring steps taken> | | | |
| Trigger/ contigency plan <if risk mitigation fails then the plan for handling the risk> | | | |
| Status <Running the status that provides a history of what is being done for the risk and changes in the risk. Include the date the status entry was made> | | | |
| Approval <name & signature of person approving closure> | | closing date <date> | |