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CERTIFICATION COURSE

# Project Management for Managers

Lec – 20

Risk Management- II

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# A firm developing a new software product for the retail market.

The scenario considers both the probability of failure and consequences of failure.

In probability of failures, we are interested in identifying any factors that can significantly affect the probability that the new product can be successfully completed.

The potential causes of failure are:

**1.Maturity of the software design-** It is a new product or based on existing software platform.

**2.Complexity of the product:** Is the design relatively simple or it is highly complex in structure.

**3.Dependency-** Can the product be developed independently on any system currently in place in the company or is it slaved to current operating systems or practices.



Under the consequences of failures, we are concerned with the issues that will highlight the effects of project failure; that is, consequences of failure require us to critically evaluate the results of project's success or failure along a number of key dimensions.

1. **Cost** - budget adherence versus overruns

2. **Schedule** - on time verses severe delay

3. **Reliability** - the usefulness and quality of finished product and

4. **Performance** - how well it is performing



# Probability of Failure ( $P_f$ )

Score	Maturity	Complexity	Dependency
Low (0.1)	Existing software	Simple design	Not limited to existing system or clients. No external or uncontrollable events are likely to impact the project.
Minor (0.3)	Minor redesign	Minor increase in complexity	Schedule or performance depend on an existing system. Effect on cost or schedule is minor.
Moderate (0.5)	Major change	Moderate increase	Moderate risk to schedule or performance due to dependence on existing system, facility, or processes. Effect on cost is moderate.
Significant (0.7)	Technology is available, but complex design	Significant increase	Schedule or performance depend on new system or process. Significant cost or schedule risk.
Major (0.9)	State of art, some research complete	Extremely complex	Schedule and performance depend on new system and process. Very high cost or schedule risk.





## Consequence of Failure ( $C_f$ )

Score	Cost	Schedule	Reliability	Performance
Low (0.1)	Budget estimate not exceeded	Negligible impact on program, no impact on critical path	Minimal or no reliability consequence	Minimal or no performance consequence.
Minor (0.3)	Cost estimate exceeds budget by < 5%	Minor slip in schedule (less than 5%)	Small reduction in reliability	Small reduction in system performance
Moderate (0.5)	Cost estimate exceeds budget by < 15%	Small slip in schedule starting to impact critical path	Some reduction in reliability performance	Some reduction in system performance. May require moderate debugging.
Significant (0.7)	Cost estimate exceeds budget by < 30%	Development time slips in excess of 1 month, requires readjustment of critical path	Significant degradation in reliability performance	Significant degradation in system performance. Guarantees are at risk. Serious debugging required.
Major (0.9)	Cost estimate exceeds budget by > 50%	Large schedule slips ensure the system will miss client timeframe	Reliability goals cannot be achieved under current plan	Performance goals cannot be achieved. Results may not be usable.



## Project Risk Scoring

1. Identify factors and assess the probability ( $P_f$ ) and consequences ( $C_f$ ) of failure
2. Calculate overall probability & consequence

$$P_f = \frac{\sum P_i}{n}$$

$$C_f = \frac{\sum C_i}{m}$$

3. Calculate overall risk factor

$$RF = P_f + C_f - (P_f)(C_f)$$

### Rule of thumb

Low risk  $RF < 0.30$

Medium risk = 0.30 to 0.70

High risk  $> 0.70$



Score	Probability of Failure ( $P_f$ )			
	Maturity	Complexity	Dependency	
Low (0.1)	0.10	0.15	0.13	$0.38/3 = 0.12$
Minor (0.3)	0.30	0.20	0.25	= 0.25
Moderate (0.5)	0.50	0.45	0.40	=0.45
Significant (0.7)	0.72	0.75	0.65	=0.70
Major (0.9)	0.95	0.92	0.90	=.92

Score	Consequence of Failure ( $C_f$ )				
	Cost	Schedule	Reliability	Performance	
Low (0.1)	0.11	0.18	0.15	0.18	0.15
Minor (0.3)	0.32	0.25	0.25	0.29	0.27
Moderate (0.5)	0.52	0.47	0.44	0.49	0.48
Significant (0.7)	0.75	0.70	0.60	0.72	0.69
Major (0.9)	0.95	0.92	0.90	0.93	0.92



<b>0.10</b>	<b>0.15</b>	<b>0.13</b>	<b>0.38/3 = 0.12</b>
0.30	0.20	0.25	= 0.25
0.50	0.45	0.40	=0.45
0.72	0.75	0.65	=0.70
0.95	0.92	0.90	=.92
			<b>0.48</b>

<b>0.11</b>	<b>0.18</b>	<b>0.15</b>	<b>0.18</b>	<b>0.15</b>
0.32	0.25	0.25	0.29	0.27
0.52	0.47	0.44	0.49	0.48
0.75	0.70	0.60	0.72	0.69
0.95	0.92	0.90	0.93	0.92
				<b>.50</b>

$$RF = P_f + C_f - (P_f)(C_f)$$

#### Rule of thumb

Low risk  $RF < 0.30$

Medium risk = 0.30 to 0.70

High risk  $> 0.70$

$$RF = 0.48 + 0.50 - (0.48 * 0.50) = 0.74 \text{ (high risk)}$$





# 3.Risk Mitigation Strategies

- Accept - minor in nature, occurrence and consequences both are small.
- Minimize - next option is minimize risk. Boeing – millions of parts from thousands of vendors, direct contact of vendors with quality assessment team of Boeing. Right to intervene in the production process of vendors.



# 3. Risk Mitigation Strategies

- Share - ??????????..



# 3. Risk Mitigation Strategies

- Share - Risk may be allocated proportionately among **multiple** members of the project. European Space Agency and Airbus consortium - (huge capital and technical skills). BOOT is another example.
- Transfer - Insurance. Fixed price contracts (fixed price for the project upfront and if overruns builder will bear).



### 3.Risk Mitigation Strategies

- Use of Contingency Reserves: Depends on project. 10-15 % in construction projects.(Funds).
  - Task contingency (use to offset budget cutbacks, schedule overruns, or other unforeseen circumstances accruing to individual tasks or project work packages).
  - Managerial contingency ( client asks for changes which require change in technology, or acts of God).
- Mentoring of project managers and tam members.
- Cross training- one can handle other members duties.

