khosla ventures

STANDARD OPERATING PROCEDURES

Risk Matrix

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Risk matrix

Understand and quantify your major risks and know what you have to prove to get your product to market.

General approach

- Quantify the level of risk in a technology
- Ensure that all milestones are focused on reducing risk
- Identify milestones that are most important to reducing risk
- Communicate the reduction in risk relative to time and cost involved

Steps taken:

Step 1
Identify major technical risk areas and failure modes by technology component

Step 2
Assign an initial absolute level to each risk

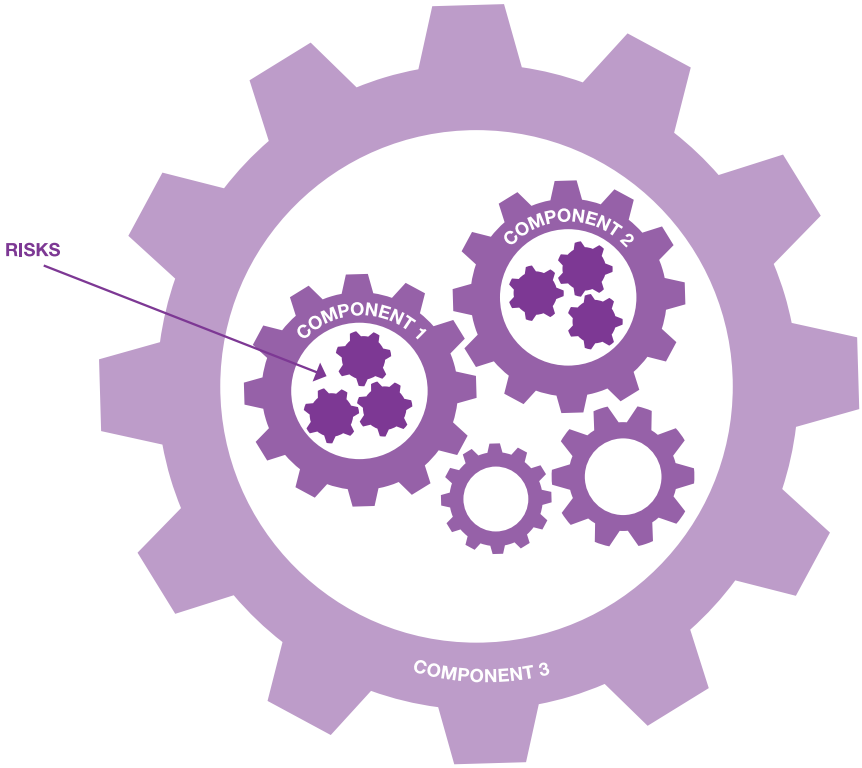
Step 3
Lay out a milestone schedule

Step 4
Assign a level of risk reduction associated with successful completion of milestone

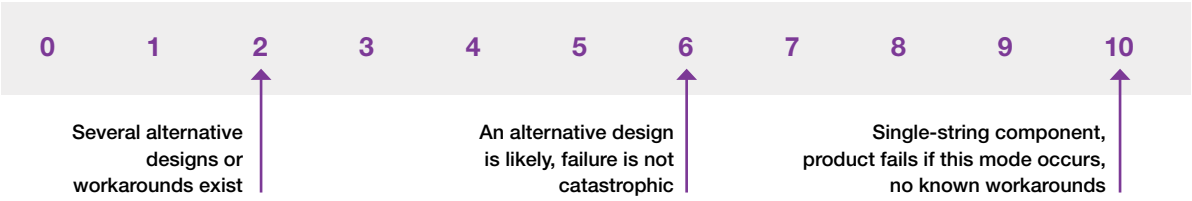
Step 5
Track risk reduction relative to time and expenditures to show progress

Step 1: Identify major technical risk areas

- Identify and group critical technical risks or failure modes by product component
- Groups of components also can have additional risks or failure modes



- Assign each risk a weighting factor on a scale of zero to 10, based on criticality and importance relative to component performance
- The weighting factors represent the importance of when something goes wrong



Step 1: Identify major technical risk areas (continued)

- Each component or component group also can be weighted relative to its importance to product success
- Each failure mode represents a different way that a component can fail

Component	Failure Mode	Criticality Level
Component 1	Failure mode 1	10
	Failure mode 2	7
	Failure mode 3	5
Component 2	Failure mode 1	8
	Failure mode 2	8
Component 3	Failure mode 1	10
	Failure mode 2	10
	Failure mode 3	6

Step 2: Assign an initial absolute level to each risk

- Assign an initial and absolute risk level, on a scale from zero to 100, based on your level of confidence in preventing the failure mode at a manufacturing level

- The total initial level of risk of a component is the weighted average of the risk levels of the failure modes

	Criticality Level	Initial Risk Level
Component 1		**63**
Failure mode 1	10	40
Failure mode 2	7	90
Failure mode 3	5	70
Component 2		**50**
Failure mode 1	8	70
Failure mode 2	8	30
Component 3		**54**
Failure mode 1	10	80
Failure mode 2	10	30
Failure mode 3	6	50

Step 3: Lay out a milestone schedule

- List major project milestones (from Gantt chart)
- Each milestone is expected to reduce risk in one or more categories

No.	Milestones	Original Date
1000	**Component 1 tests**	
1100	Milestone X1.1	03/31/05
1200	Milestone X1.2	04/25/05
2000	**Component 2 tests**	
2100	Milestone X2.1	03/31/05
2200	Milestone X2.2	05/15/05
2300	Milestone X2.3	06/15/05
2400	Milestone X2.4	06/30/05
3000	**Component 3 tests**	
3100	Milestone X3.1	03/15/05
3200	Milestone X3.2	04/30/05
3300	Milestone X3.3	05/15/05
3400	Milestone X3.4	05/30/05

Step 4: Assign a level of risk reduction associated with successful completion of milestone

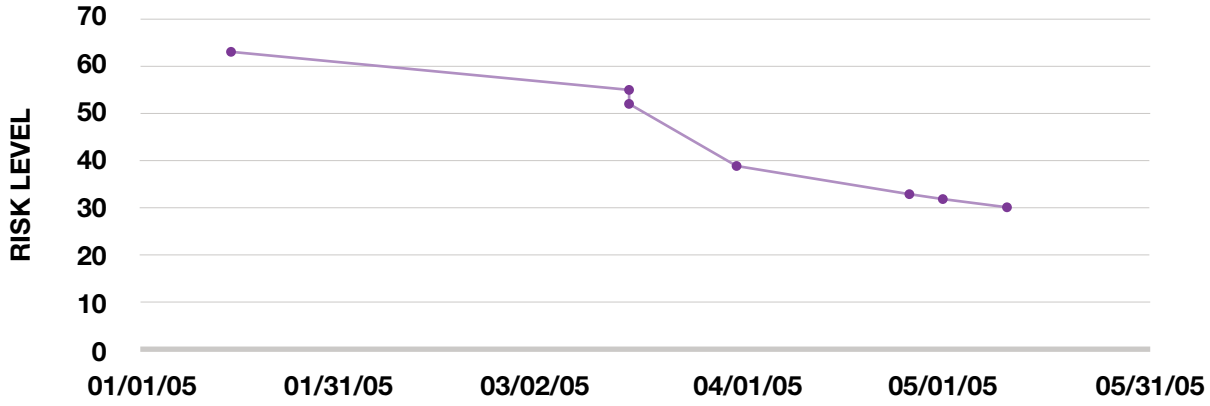
- Lay out risks and milestones in a matrix
- Each milestone reduces the risk of a particular failure mode by some percentage
- When a milestone is achieved, the absolute risk associated with a component falls resulting in a reduction in the overall product risk (the average of all component risks)

Milestone			**X2.1**	**X3.1**	**X1.1**	**X1.2**	**X3.2**	**X2.2**
Milestone #			**2100**	**3100**	**1100**	**1200**	**3200**	**2200**
Date		**01/15/05**	**03/15/05**	**03/15/05**	**03/31/05**	**04/25/05**	**04/30/05**	**05/10/05**
Component 1		**63**	**54.1**	**52.1**	**38.8**	**32.7**	**31.8**	**30.2**
Failure mode 1	10	40		10%	50%		5%	
Failure mode 2	7	90	30%		10%	10%		
Failure mode 3	5	70			10%	20%		10%
Component 2		**50**	**43.0**	**41.3**	**41.3**	**39.8**	**38.3**	**27**
Failure mode 1	8	70	20%	5%				30%
Failure mode 2	8	30				10%	10%	5
Component 3		**54**	**47.7**	**34.8**	**34.8**	**30.2**	**24.2**	**22.1**
Failure mode 1	10	80	20%	40%			10%	5%
Failure mode 2	10	30				20%	20%	5%
Failure mode 3	6	50		5%		20%	5%	
Product		**56**	**48**	**43**	**38**	**34**	**31**	**26**

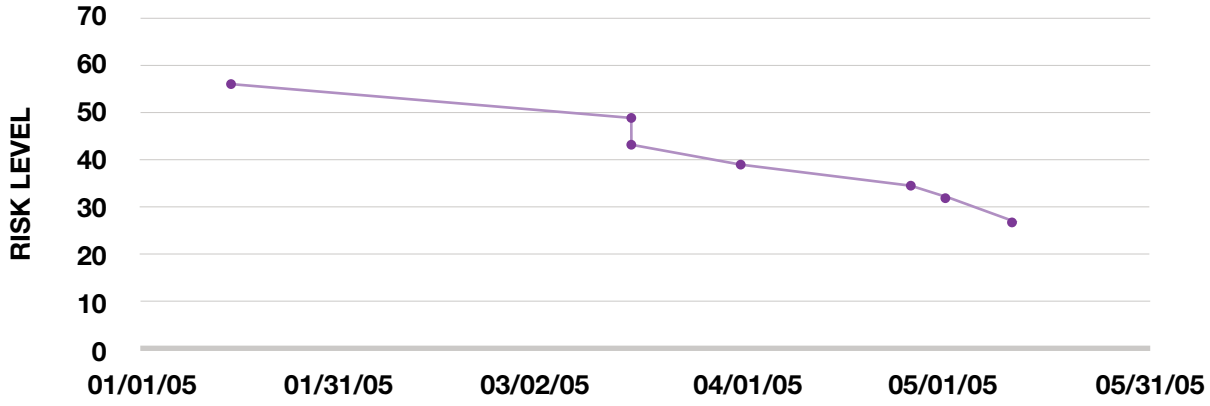
Step 5: Track risk reduction relative to time and expenditures to show progress

- For any component (and for product risk), risk reduction can be plotted relative to time and milestones
- Expenditures also may be plotted relative to time on the same charts

Single component risk reduction



Product risk reduction



Note: Chart data maps to risk and milestone matrix

Risk matrix example

Product Risk Reduction