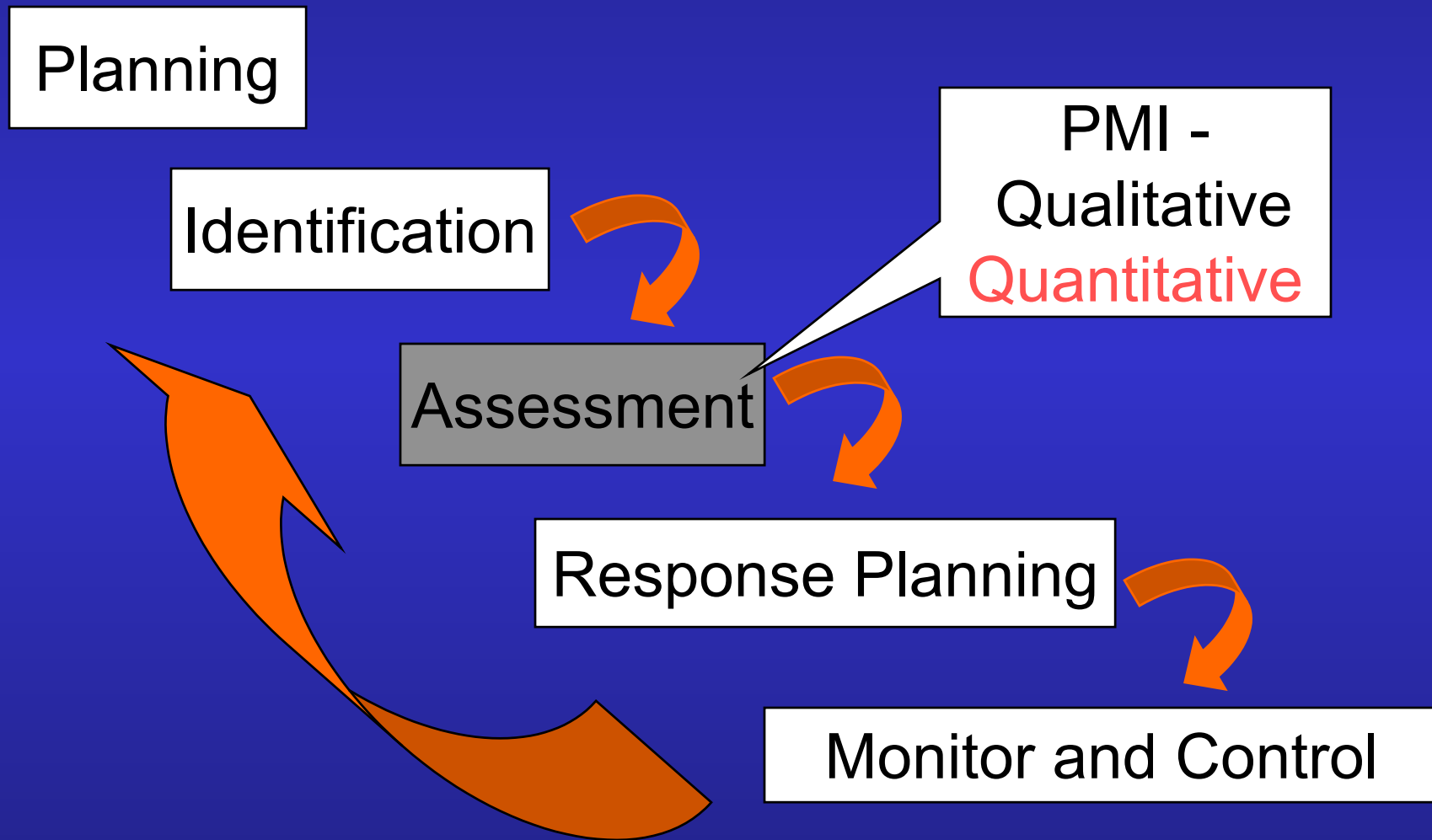


# *Section 7*

# **Quantitative Risk Analysis**

# PMI Risk Management Process



# Prerequisites for Quantitative Risk Analysis

- Project Plan
  - agreed project view (WBS, OBS, CBS ...)
  - established baseline
  - established task dependencies (network)
- Project Risk Register
  - map identified risks into model
- Assumptions
  - scope
  - exclusions

# Quantitative Analysis

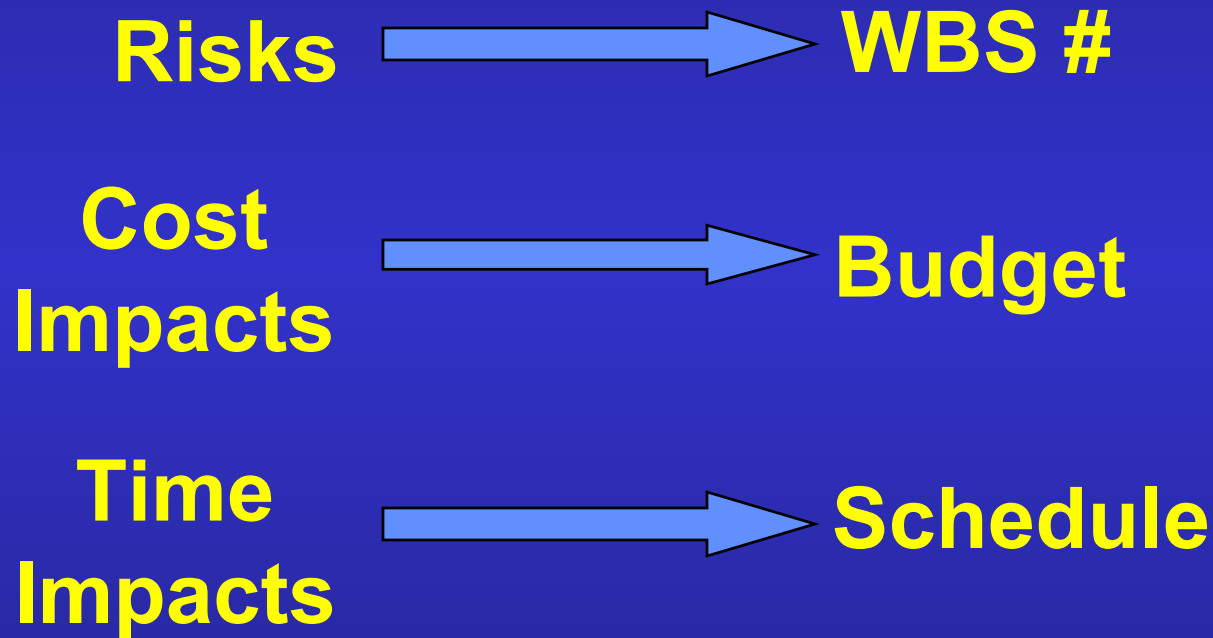
- All risks have potential impacts on
  - cost
  - schedule
- Impacts are rated in the RM process
  - dollars
  - months
- All risks are linked to
  - area (of program) i.e. the WBS #

# Quantitative Analysis

- your plan has
  - cost
  - schedule
- allocated to plan elements
  - cost accounts
  - tasks

# Quantitative Analysis

First step map:



# Mapped Impact Table

WBS #	Cost Budget	Schedule Budget	Cost impact	Schedule impact	Risk #
001	\$10M	7mths	\$2M	3mths	03
			\$0.5M	4mths	23
			\$1M	2mths	47
020	\$5M	13mths	\$1M	1mths	09
			\$0.5M	6mths	13

# Quantitative Analysis: Getting the Three Point Estimates

- NOW, interview risk/task managers
- Work with the impact table
- Determine three point estimates.
  - Best case                      no risks impact
  - expected case                some risks impact
  - worst case                     all risks impact
- Use lots of common sense



# Quantitative Analysis: Getting the Three Point Estimates

WBS #	Cost Budget \$M	Schedule Budget months	Cost impact \$M	Schedule impact months	Risk #
001	10	7	2	3	03
			0.5	4	23
			1	2	47
020	5	13	1	1	09
			0.5	6	13

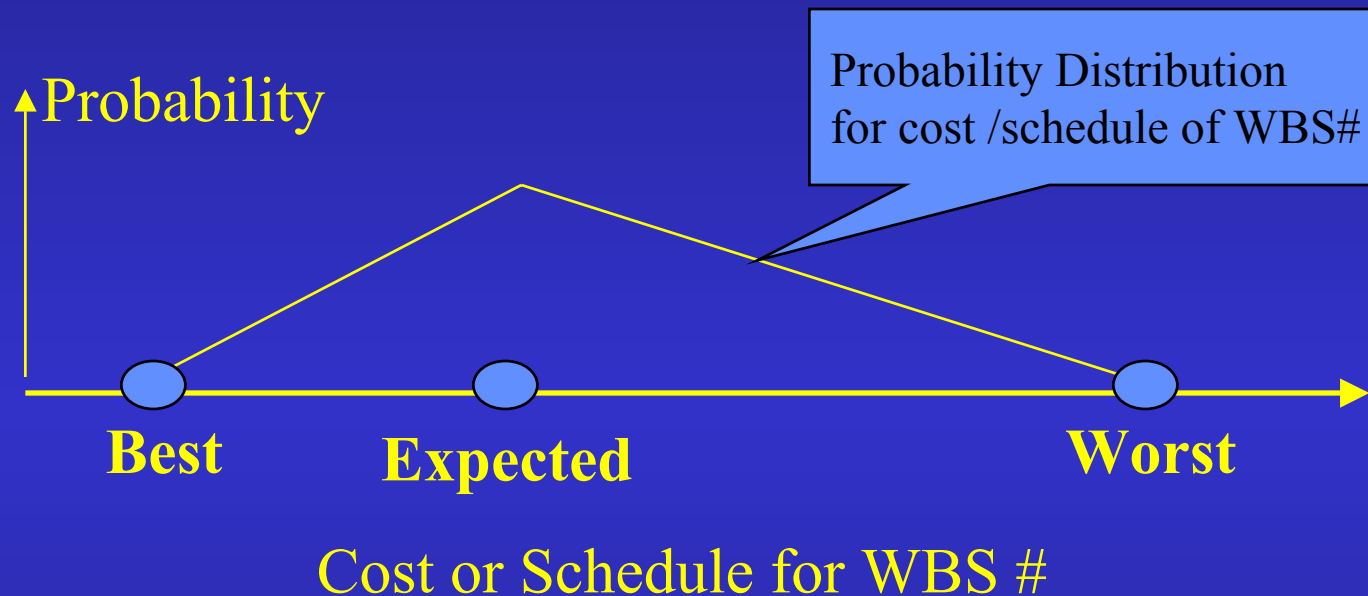
Best estimate for 001

	Impacted Cost Estimates			Impacted Schedule Estimates		
	Best	Expected	Worst	Best	Expected	Worst
001	10	12	13.5	8	10	10
020	5	6	6.5	10	13	16

# Finalize Three Point Estimates

- Note that the manager may already have some reserve in his plan.
- This needs to be taken into account in establishing the impacted estimates

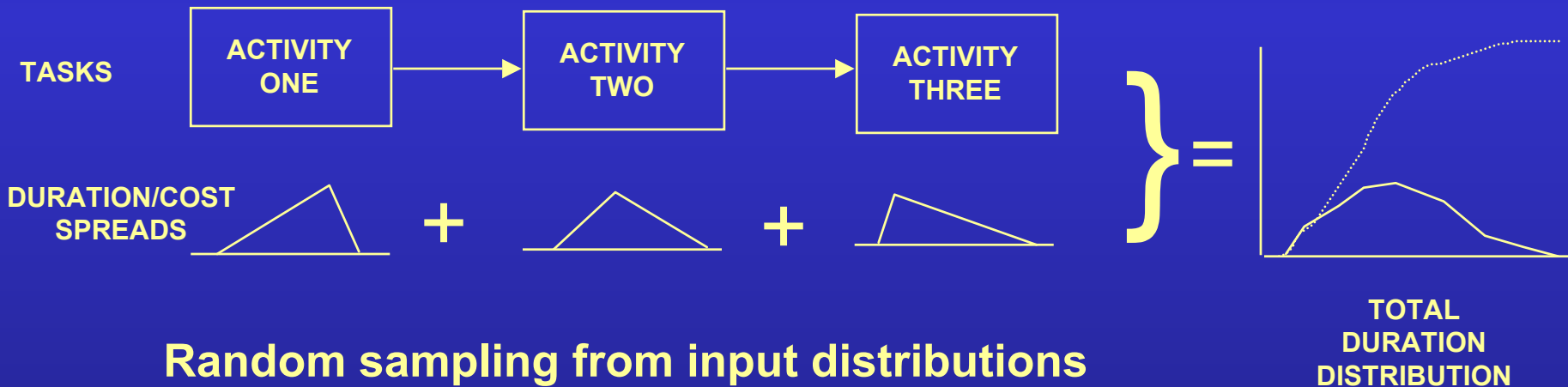
# Quantitative Analysis



- Run Monte Carlo Simulation
- Randomly combine the distributions
- Run many different times (>100)

# Monte Carlo Technique

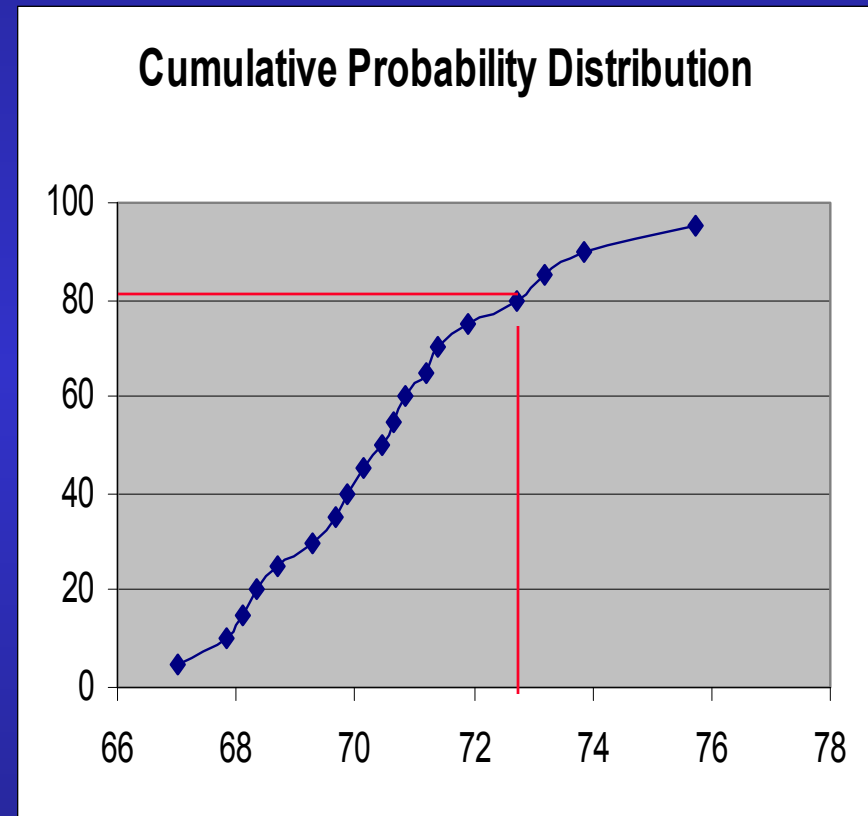
- How does Monte Carlo simulation work?



# Results of Summation

## Cumulative Probability Distribution

- 5%            66.99
- 15%          68.11
- 25%          68.70
- 35%          69.67
- 45%          70.13
- 55%          70.66
- 65%          71.20
- 75%          71.91
- 85%          73.19
- 95%          75.72

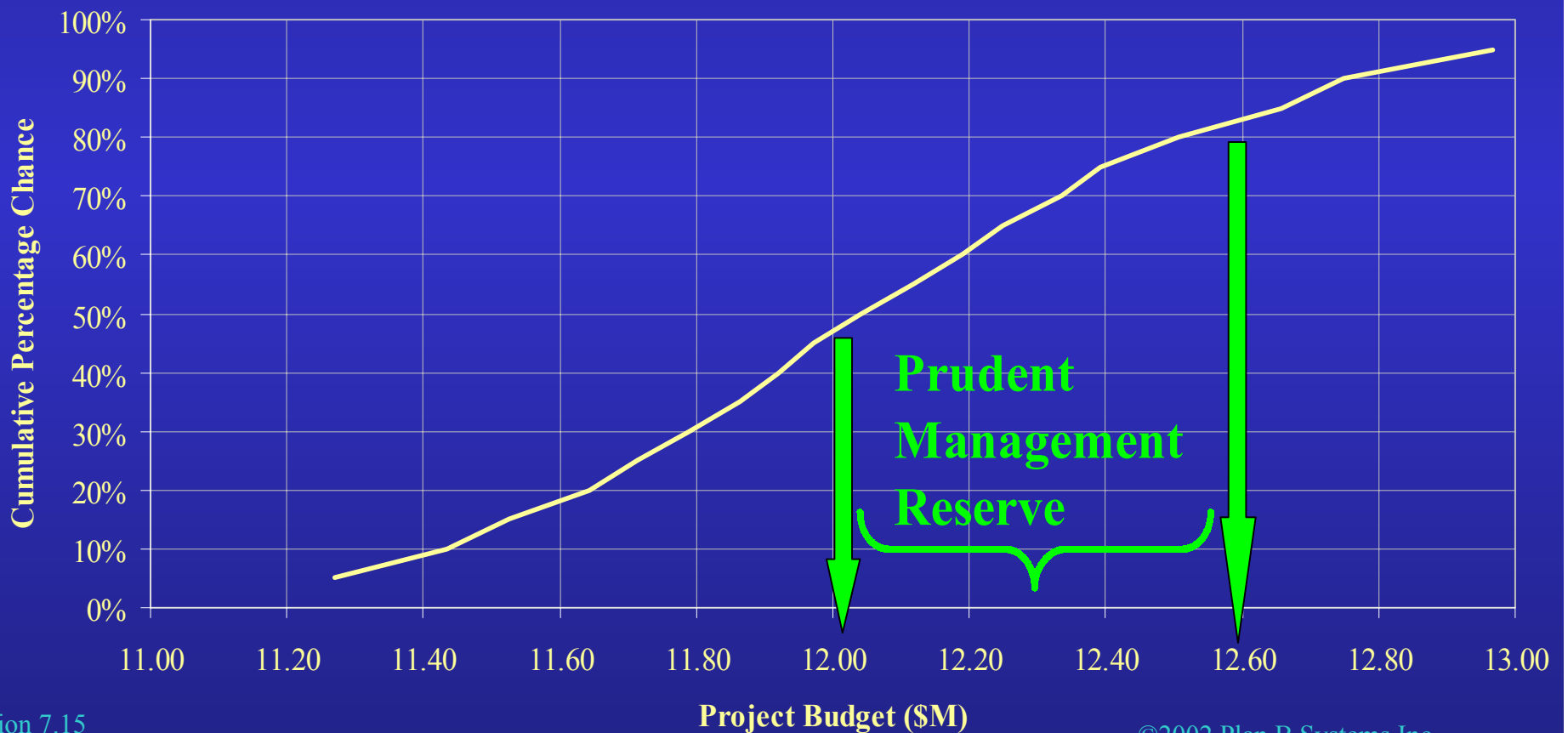


# Qualitative Analysis

- Outputs are
  - Cost Probability Distributions for project
  - Schedule Probability Distributions for critical milestones

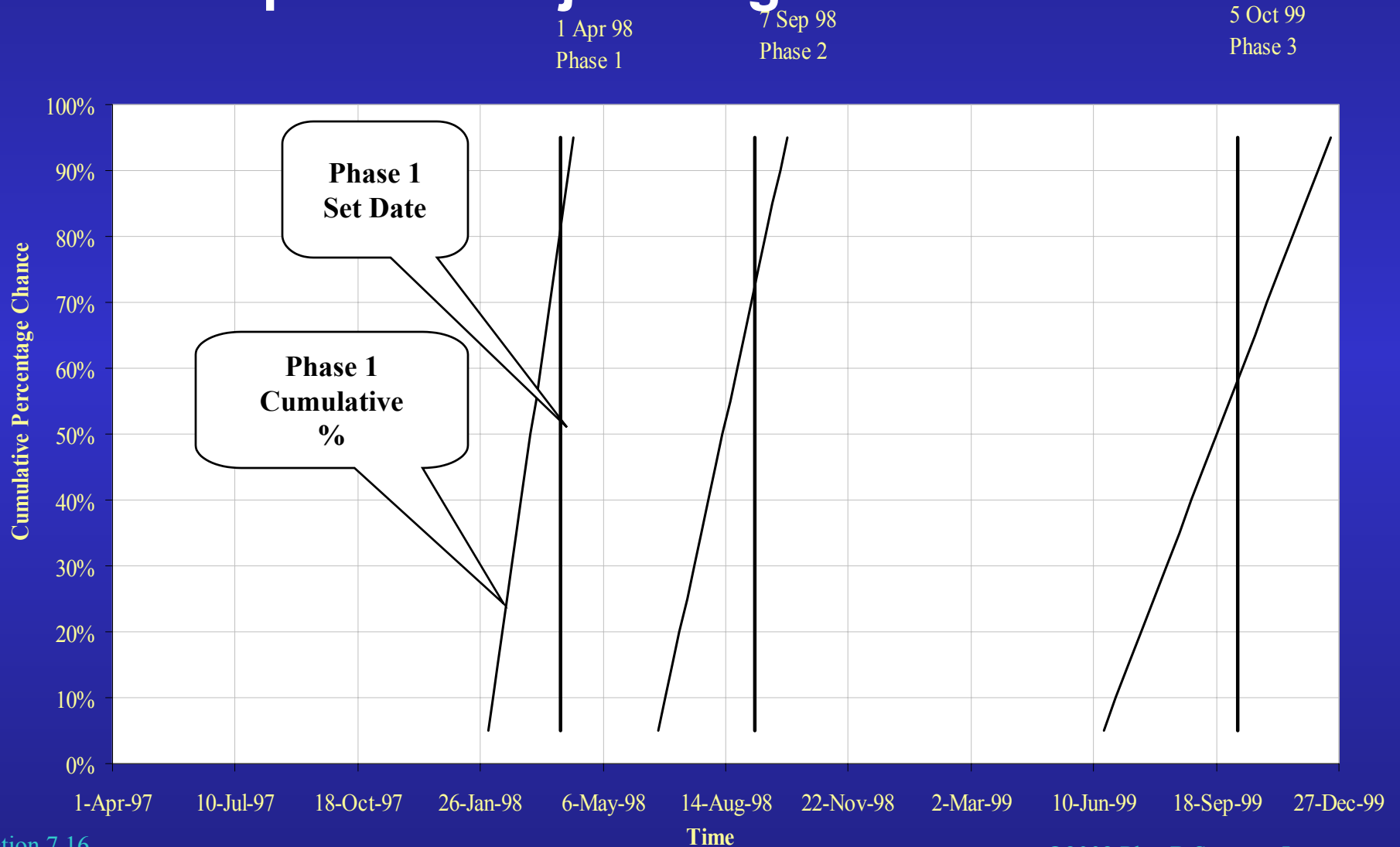
# Quantitative Cost Risk Analysis

Prerequisite: Project Cost Breakdown by WBS



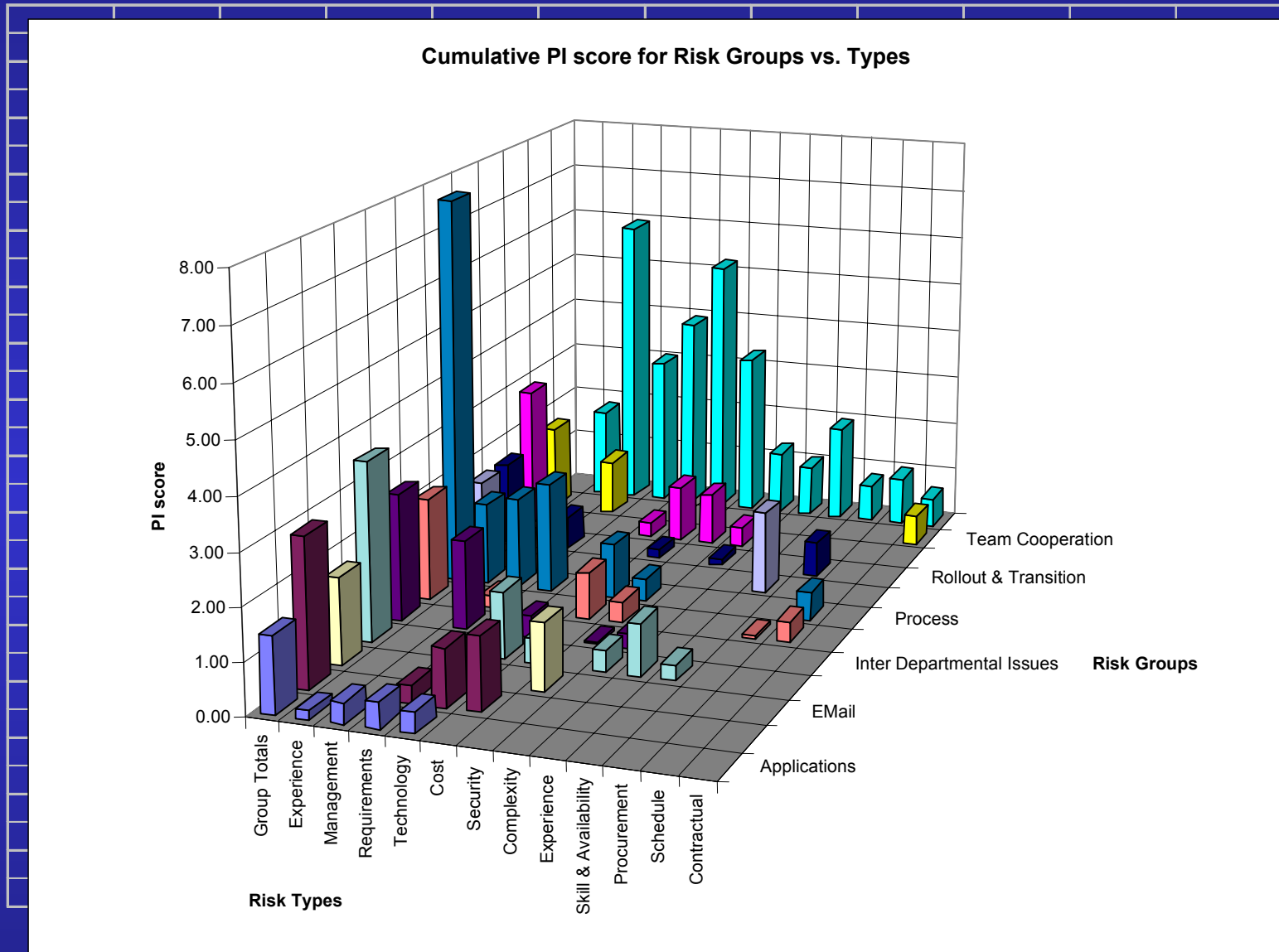
# Schedule Risk Analysis

Prerequisite: Project Logic Network/PERT





# Pareto Analysis



# Qualitative Analysis

Provides assessment of:

- Adequacy of management reserves
- Achievability of critical milestones

Integrates risk management into project planning, not just project management

