PERT with MS Project®
A guide to the practical implementation of PERT

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Abstract

- *Describes how to apply PERT with MS Project software.*

- *PERT provides a mechanism to explicitly include uncertainty in task durations in a project plan.*

- *It is relatively easy to implement.*

- *Describes its limitations.*

- *PERT can be an effective way to determine the likely duration.*

1   Introduction

- Programme evaluation and review technique (PERT) is a method for accommodating uncertainty in task durations.

- It achieves this by assigning three values to each duration: an optimistic, typical, and pessimistic.

- Then it uses these values to calculate the most likely total project duration.

2   How does uncertainty in task duration arise?

- Deterministic time estimates: do not accommodate uncertainty.
- How do schedule uncertainties arise in your projects?

- Your thoughts?

3   Making reliable estimates

- Cannot assume that all these uncertainty factors are (un)favourable.
  - The more factors the *less likely they will all simultaneously be (un)favourable.*
  - What you gain on the swings you loose on the roundabouts (hopefully).
- Can give a range of estimates instead:
  - explicitly include the uncertainty
  - Basis of PERT

4   How does PERT work?

- You identify a range of time estimates
  - Optimistic
  - Expected
  - Pessimistic
- PERT does the stats and works out the mean
  - PERT fits a distribution (beta)
  - You can adjust the weights
  - PERT calculates the moments of the distribution
- MS Project shows the results
- (Optional) You can work out confidence intervals

5 What is worst-case anyway?

- **Is it the most utterly worst case conceivable?**
  - Is 10 yrs enough? 100 yrs?
  - Or is it just the worst case that the project manager has personally experienced on uneventful similar projects?
- **There are no perfect solutions to these questions.**
  - We are better off simply acknowledging that all methods that seek to quantify risk are inherently ambiguous.
  - We should therefore simply select a meaning and declare it as part of the analysis.
  - Then others can adapt it for their own planning and decision-making.

6 Using MS Project for PERT

This part of the presentation is a live demonstration. No prior knowledge of MS Project is required, though it is obviously helpful if you want to get further.

Presentation includes:
- Brief summary of PM Project user interface.
- Show you how to activate PERT menus.
- Demonstrate a simple project
  - Create WBS
  - Link the tasks
  - Provide three PERT estimates for each task
  - Check/set PERT weights
  - Calculate PERT
  - View the PERT results

- These steps are detailed in the written conference paper (see proceedings).

7   Limitations

- PERT is unable to accommodate the fact that *the critical path itself may change*.
- The calculated worst- and best-case durations for the *whole project* are unreliable.
  - This can be accommodated by calculating confidence intervals around the mean overall project time as shown in the written paper.
- The PERT algorithm, which uses the beta distribution, is only an *approximate* probabilistic computation method.
  - Better options may be fuzzy theory and Monte Carlo

8 Conclusions

- PERT provides a mechanism to explicitly include uncertainty in task durations in a project plan.
- It is relatively easy to implement.
- Providing its limitations are acknowledged it can be an effective way to determine the likely duration.

Practical implications for Project Managers

- Learn where schedule uncertainty arises in your projects.
- Learn how to use PERT
  - Gain experience with your preferred PM software.
  - PERT is easy to implement.
    - At least to a basic level
    - More sophisticated analyses would require more stats knowledge
- PERT is approximate
  - Quick and easy stats method
  - Don't rely on whole project duration from PERT.
- PERT is useful in confronting the reality of uncertainty
  - Helps overcome aversion to ambiguity.
  - Can initiate a discussion of risk perceptions.
  - Provides a de-bias function.

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