**Nature of Projects (Slack et al)**

- An objective: in terms of product, quality, time, cost
- Complexity: projects will sometimes have 1000s of activities
  - However even for small projects these techniques can be helpful
- Uniqueness: two projects are rarely the same: occasionally they are similar

**Complexity / Uncertainty**

**The Five OM Imperatives**

- Time
- Cost
- Quality
- Flexibility
- Dependability
APICS ‘Laws’ of PM

• No major project is ever installed on time, within budget, or with the same staff that started it
• No system is ever completely debugged. Attempts to debug a system introduce new bugs which are even harder to find
• A carelessly planned project will take three times longer to complete than expected; a carefully planned one will only take twice as long
• One objective of fuzzy project objectives is that they let you avoid the embarrassment of estimating the corresponding costs

Critical Success Factors for successful project management (Slack et al based on Pinto & Slevin)

• Clearly defined goals
• Competent project manager
  – Relevant background and experience
  – Leadership and strategic expertise
  – Technical expertise in the area of the project
  – Interpersonal skills
  – Track record of achievement
• Top management support
• Competent project team members
• Sufficient resource allocation
• Adequate communication channels
• Control mechanisms
• Feedback capabilities
• Responsiveness to clients
• Trouble shooting mechanisms
• Project staff continuity

1 Understanding the project environment

• Customers
• Users
• Competitors
• National Culture
• Government / Politics
• Economy
• Sub-contractors
• Suppliers
• Resources
• Geography
• Other projects

2 Project Definition - the project proposal

• Purpose / objectives / aims
• Scope
• End result required
• Success criteria
• Constraints: Cost / Time / Quality / Resources
• Project specification - very detailed coverage of the above
• Project strategy - in broad terms how the project will proceed / milestones
3 Project Planning

- Gantt Chart
  - Advantages
    - Easy to explain
    - Good visual impression
  - Disadvantages
    - Cannot show many tasks
    - Does not show precedences
    - Does not show slack
  - Simple extensions can overcome some problems

Work breakdown

- activities / tasks defined
- durations and costs estimated
- activities may be broken down into subprojects
  - ‘foundations’ may be broken into lower level activities.
- precedences established
- This process is critical in thinking about how to do the project.
• Precedence diagrams - PERT / CPM

• Usual criteria:
  – minimum time or
  – complete project by a specified time

Dealing with Uncertainty (PERT)

• Some durations will be uncertain.
• Assume that each activity duration has the beta distribution
• Estimate these times:
  – Most likely
  – Pessimistic
  – Optimistic
PERT ctd..

• Estimate activity time by
  – Mean duration = (pess + 4 * ML + opt)/6
• Use these durations to determine critical path
• Estimate variances of activity duration by
  – Var = (pess – opt)² / 36
• Use these to estimate distribution of the total project duration

Criticisms of PERT

• Why the beta distribution?
  – Many distributions will be quite different
• Managers are uncomfortable with estimating optimistic / pessimistic times
• Assumes that activity durations are independent
• A non critical path may become critical
• Ignores corrective action by project manager
  Other ways of dealing with uncertainty have been developed but seem to have little application.

Resource Scheduling

• Each activity will have resource requirements
  – Labour by trade, equipment, space, daylight
• Based on the critical path, start everything as early as possible schedule, the resource profile may be unacceptable
• Heuristic methods can be used to reschedule activities so that resource constraints can be met
  – This may mean extending the overall duration
Reducing the Project Duration

• Rethinking the project requirements
• Rethinking what has to be done and how
• Speeding up some activities (at a cost)
  – Often called crashing
  – Need to identify the cost / benefit of reducing each activity duration. Only critical ones should be considered.

The Project Manager

• Unique demands
  • Acquiring resources
  • Acquiring and motivating personnel
  • Dealing with obstacles
  • Making goal tradeoffs
  • Maintaining a balanced outlook in the team
  • Communicating with all parties
  • Negotiating

The ‘real’ success factors on projects


Cooke-Davies distinguishes

– Project success
  • Measured against the overall objectives of the project
– Project management success
  • Measured against the usual criteria of cost, quality and timeliness

Research based on 136 projects, small – large

Side results

– little correlation between cost escalation and schedule delay
– Mean performance against budget is better than mean performance against schedule
Factors that correlate with on-cost performance

1. Allow changes to scope only through a mature scope change control process
2. Maintain the integrity of the performance measurement baseline

Factors that lead to individual project success

- The existence of an effective benefits and management process that involves the mutual co-operation of project management and line management functions

Risk Management
(based on Cadle and Yeats: Project Management for IS)

- Identify potential risks for the project
- Assess the likelihood of each on materialising
- Assess the probable impact of each risk
- Formulate measures to avoid each risk’s occurrence
- Develop fallback measure to ameliorate the risks if avoidance actions fail
- Identify individuals to ‘own’ each risk
- Maintain a risk register (documentation)