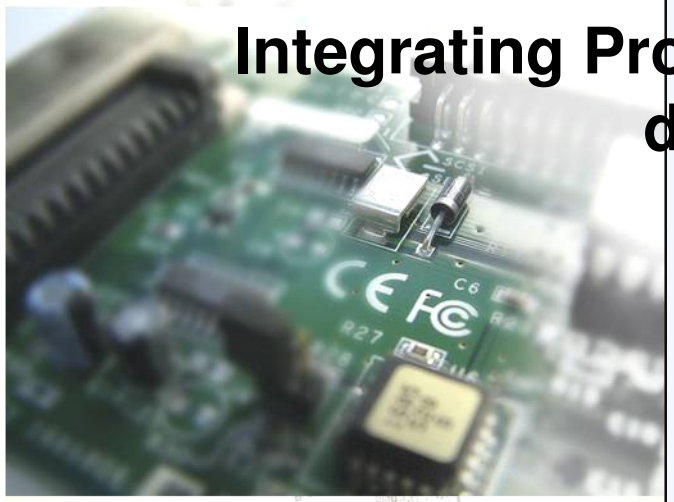


Is project management the perfect fit?

Integrating Project management with New product development for engineering design

Dr Dirk Pons

The Insider's guide to Project Management
PMINZ Conference 2006, Christchurch

Abstract

- *Evaluates project management (PM) for new product development (NPD)*
- *Covers PMBOK*
- *Implications for project managers.*

1 Introduction

New product development (NPD)

- Provides future business capability
- But:
  - large capital investments
  - risk
  - difficult decision-making (initial and through-out)

NPD Robust decision-making

- Senior executives:
  - Select between multiple candidates
  - Capital rationing
- Project managers:
  - Manage simultaneous projects
  - Long life cycles

What is tricky about NPD?

- Project management
  - Clear scope
  - Temporary coordinated effort
  - Strings of linear sequential work packages
  - Predictable outcomes
- New product development
  - Incomplete initial definition of success
  - Ongoing effort
    - Long life cycle
    - Product families
    - Ongoing working relationships
  - Complex work
    - conditional on other tasks
    - dynamic: scope changes
  - Uncertain outcomes

2 Objectives of this study

- Identify peculiarities of NPD.
- Assess suitability of PMBOK approach for NPD.
- Search the literature.

3 Method

1. Applied knowledge of dishwashers,
2. Identified project stages,
3. Examined the PMBOK® nine in the NPD context.

4 **Results**

4.1 **Project Integration Management**

The overall project management task that keeps the whole project together, but:

- management of multiple simultaneous projects is problematic
- Difficult to coordinate resources between multiple projects
- NPD may be too dominated by PM focus on planning and prescribing; need more trial-and-error, empathy and cooperation
- A degree of initiative and innovation is necessary from the project manager, occasionally even rule breaking.

4.2 **Scope Management**

- NPD requires that senior management:
  - set clear goals
  - keep goals relatively stable
  - have realistic expectations as to the certainty of the process
  - accommodate changes to the work breakdown structure as the project unfolds.

4.2 **Scope … continued**

- Stage-gate
  - Applies concurrent engineering
  - Sets mandatory activities
  - Stages: e.g. preliminary investigation, business case, develop, test, launch.
  - Decision gates at end of each stage.
- Some strong believers – but not everyone believes it is the best for NPD.
  - Surprisingly little research literature about its effectiveness.
  - Stage-gate tends to be risk-averse.
  - Prescriptive approach, ‘road-map’, but does all NPD need such determinism?
  - Management decisions are complex (multi-dimensional) and seldom fully rational (people select *sufficient* rather than ideal outcomes).
  - All decision-making is made under risk (uncertain outcomes) and politics (seeking power over the decision process, to advance own ends).

4.3 **Time Management**

- The project manager has to be vigilant about bias when estimating durations:
  - Self bias
  - Bias of others.
- No reliable way of determining percent complete.

4.3 **Time … continued**

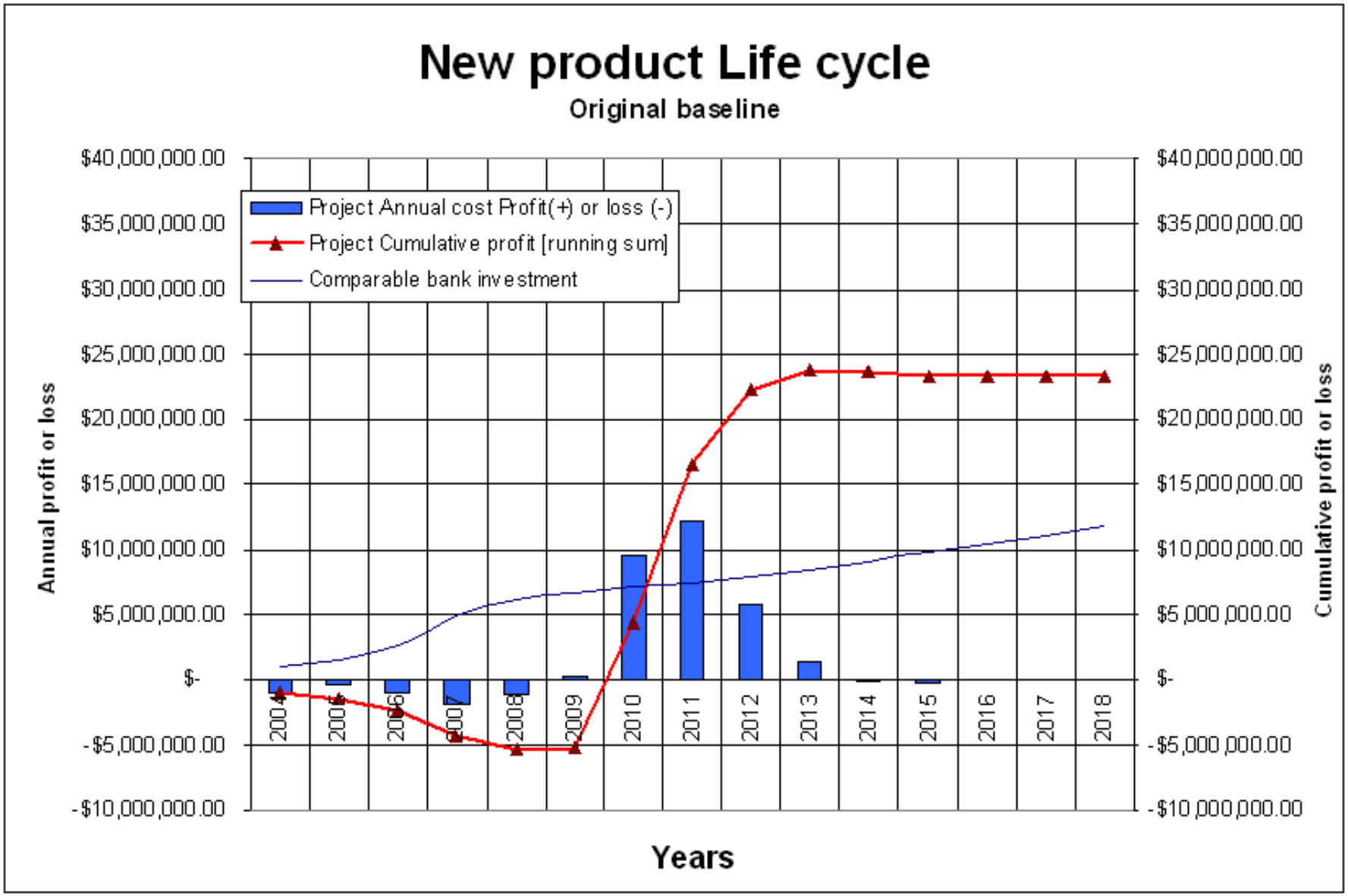
Estimation of effort is a *subjective* thinking process, i.e. biased:

- Familiarity/ availability bias (the most recent or most memorable information dominates)
- Stereotyping/representative (use of information typical to that category)
- Motivational (giving a reply to conform with others expectations)
- Overconfidence/pessimism

4.4 **Cost Management**

- A single-minded cost focus may distract designers away from creating other value in the product.
- PM software tends to see finances as costs, but NPD sees them as opportunity.

4.4 Cost … continued



4.5 **Quality Management**

- NPD involves mixed bags of ‘quality’.
- Perceptions of quality vary with stakeholders.
- Project manager customers should determine the required quality of the deliverables, in such a way that comparison of actual vs intended quality can be done.
- PMBOK is less relevant for NPD.
- Quality function deployment (QFD, or ‘house of quality’) is popular in this industry.

4.5 Quality … continued

- Lean project management
  - Lean manufacturing (Toyota) characterised by:
    - reduction of inventory with just-in-time production, ‘kanban’
    - continuous improvement, ‘learning’, suggestion systems, ‘kaizen’
    - minimisation of inefficiencies,
    - waste reduction
    - worker empowerment, teams, cells,
    - control of workflow, balancing production lines
    - partnerships with suppliers, banks
    - concurrent engineering
  - Lean PM
    - ALAP schedule (JIT)
    - Removes organisational slack
    - Complex and dynamic projects (e.g. NPD) may suffer.
    - Currently poorly defined, vague, not really new, somewhat faddish
  - Possibly lean PM might work fine for:
    - Routine projects (using existing knowledge and techniques)
    - Configuration (variant) design (not radical design?)
    - Production, e.g. regular construction (but have to change to partnering relationships)
  - NPD already uses concurrent engineering

4.6 **Human Resource Management**

Team structure:

- Matrix management is popular.
- But Matrix is problematic for R&D projects.
- Research tentatively suggests that cross-functional new product development teams may be more effective.

4.6 **HR … continued**

- Worker motivation requires members are NOT:
  - overly stressed,
  - neglected by the organisation,
  - unsure of the rewards they will receive.
- Motivation of team members does not feature strongly in the PMBOK:
  - assumes they are subcontractors?
  - in NPD they are employees
- Senior managers probably need to be more aware of their influence on the motivation of employees, e.g. through selection of appropriate rewards:
  - financial and
  - encouragement.

4.6 **HR … continued**

PM leadership style:

- Only recently identified as important for success.
- Project manager must have skills in all of
  - technical,
  - project management and
  - interpersonal areas.
- A participative leadership style in the project leader has also been associated with NPD success.

4.7 **Communications Management**

- Teams with better communication, specifically the ability to share knowledge inside and outside the group, have been associated with better performance.
- A little conflict in a project team can be beneficial, but not too much.

4.8 **Risk Management**

- Risk management seeks to treat the hazards that could adversely affect project outcomes.
- This can be integrated with other perspectives on risk management such as AS/NZ standard 4360.
- NPD managers have to select risk treatment strategies depending on the tolerable level of risk for the organisation.

4.9 **Procurement Management**

- NPD projects have some unique challenges:
  - numerous work packages, that are
  - geographically distributed.
- NPD organisations must have:
  - effective communication
  - effective procurement processes.
  - sometimes collaborative design can be an advantage:
    - design partnership with suppliers
    - CAD
    - Part document management
    - PM software

5 Conclusions

- The PMBOK nine provide a largely effective support of NPD.
- However the large uncertainties in project path sometimes decrease the effectiveness of project management.

Practical implications for NPD Project Managers

- Senior executives need to have realistic expectations of the uncertainty of the NPD process:
  - work on helping them admit the existence of uncertainty
  - Stage-gate may be unrealistic
- Use Project management to provide basic support for NPD:
  - Scope
  - WBS
  - Expenses
- Use concurrent engineering
- Manage your team as humans:
  - Matrix is suspect
  - Member Motivation killers
    - Excess Stress
    - Neglected by organisation
    - Unsure of rewards
  - Your own PM leadership style (Participative seems better in NPD)
- Communicate well, since NPD projects are more collaborative rather than a subcontracting relationship.
- Enjoy the creative problem-solving!

Author contact details

Dr Dirk Pons

PhD, M IPENZ, Tohunga Wetepanga, MSc Medicine (Biomed Eng), BSc Engineering (Mech)

Engineering School
Christchurch Polytechnic Institute of Technology
PO Box 540
Christchurch
NEW ZEALAND
www.cpit.ac.nz
email: ponsd@cpit.ac.nz
Tel +64 3 940 9085 (receptionist)
Tel +64 3 940 8127 (direct dial)
Fax + 64 3 940 8059