



PROJECT MANAGEMENT CENTER FOR EXCELLENCE

A.J. CLARK SCHOOL OF ENGINEERING
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PROJECT MANAGEMENT FOR R&D AND INNOVATION

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Challenges in a Research and Development (R&D) Project

- R&D has high uncertainty both in outcomes and methods
- PMI: A project is "*a temporary endeavor undertaken to create a unique product, service or result*" *
 - ... and we may have to invent the method as we go along
 - ... and the scope and outcome may be poorly understood
 - ... and we may be successful even if we don't achieve the outcome, or fail even if we do

*Project Management Institute. (2013). A guide to the project management body of knowledge (PMBOK guide). Fifth Edition. Newtown Square, Pa.: Project Management Institute, Inc.



Categories of R&D

Category	Description
Basic Research	Systematic study directed toward greater knowledge or understanding of the fundamental aspects of phenomena and of observable facts.
Applied Research	Translates basic research into solutions. Systematic study to gain knowledge or understanding necessary to determine the means by which a recognized and specific need may be met.
Advanced Technology Development	Focused on development and integration of hardware for field experiments and tests with a goal of providing proof of technological feasibility and assessment of operability and producibility.
Demonstration/ Validation	Includes all efforts necessary to evaluate integrated technologies in a realistic operating environment to assess performance and cost impact of the technology.
Engineering and Manufacturing Development	Translates integrated technologies into product designs through engineering and manufacturing development.

Adapted from Wingate, L. M. (2015). *Project management for research and development: Guiding innovation for positive R&D outcomes*. Boca Raton, FL: CRC Press.



Distinctive Characteristics of R&D Projects

- Uncertainty/Risk
- Instability/Change
- People
- Dual Control
- Transition and relationship to the enterprise



R&D Management Techniques

(Slide 1 of 3)

- *#1: Even if you don't know how you're going to get there, define "there"*
 - Align the team
- *#2: Plan your route like an explorer*
 - Trajectory towards the goal
 - Decompose the work and identify the complexity and unknown
 - Recognize that you may never get to the goal



R&D Management Techniques

(Slide 2 of 3)

- ***#3: Measure the unmeasurable***
 - *Direct and indirect metrics*
 - *Aggregate across efforts as appropriate*
 - Take an enterprise view
- ***#4: Plan for risks and reflection***
 - Identify natural points for reflection and reassessment and plan time for these efforts
 - Expect that major shifts may occur



R&D Management Techniques

(Slide 3 of 3)

- ***#5 Know when good ideas are bad***
 - Control “bright ideas”: tangential work, cycling and drift
- ***#6: Consider the people***
 - Allow slack time, bootlegging (within limits)
 - Risky breakthroughs vs. gold-plating
- ***#7: Invite review***
 - *Fresh perspective at reflection points*
 - *Builds buy-in from stakeholders, transition paths*



Summary

- Silicon Valley mantra: “Fail fast, fail often.”
- R&D project management:
“Sometimes stumble, sometimes go off-trail, but succeed bit by bit.”