# NEW PRODUCT DEVELOPMENT (NPD) PROCESS

Durfee, NPDBD, Sept. 14, 2009 Lecture notes posted on www.npdbd.umn.edu

**Submit**

1. Project Preference form & resume
2. Signed C&IP signature pages (6 sheets)

**Today**

1. Web site access (Williams)
2. Lecture (Durfee)

**Wednesday**

1. Lecture: Project Mgmt (Adams)
2. Team meeting

# Task

- Form groups of approximately six

# Design Matters


"The Knowledge Economy as we know it is being eclipsed by something new -- call it the Creativity Economy"

# Task

- List 10 products (not services), introduced in the last 20 years, that have changed people's lives
- Deliverable: List of 10, pick two to report
- Time: 5 minutes

# Classic Failures

- Optimistic sales ramp up (< 3 yrs)
- Too far out there (Segway)
- Focus on features v. benefits

# Habits of Effective Product Development Teams

- Study the customer
- Creativity
- Quick and dirty prototyping
- Objective evaluation
- Cross-functional teams
- Established NPD process
- Manage risk, abandon if necessary

Adapted from S. Eppinger, Shocker lecture 2003

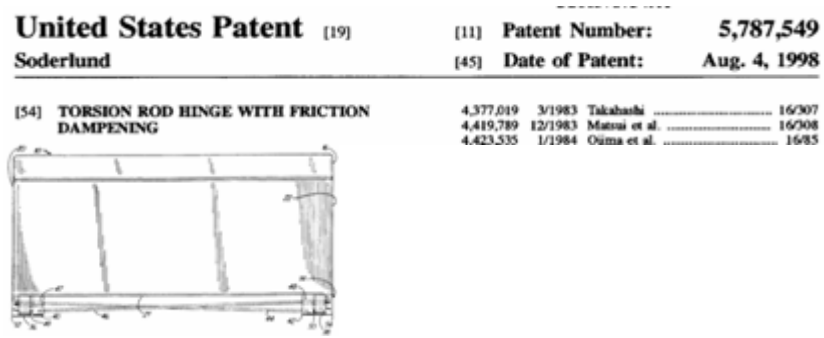
# New Product Categories

New to the world

Product improvement


New to the company

New application



United States Patent [19]
Soderlund

[11] Patent Number: 5,787,549
[45] Date of Patent: Aug. 4, 1998

[54] TORSION ROD HINGE WITH FRICTION DAMPENING

| | | | |
|---|---|---|---|
| 4,377,019 | 3/1983 | Takahashi | 16/307 |
| 4,419,789 | 12/1983 | Matsui et al. | 16/308 |
| 4,423,535 | 1/1984 | Ojima et al. | 16/85 |

Product line addition


Source: Crawford, *New Products Management*

# Another NP Index

- Market pull
- Technology push

Market driven = customer demands it
Technology driven = dot.bomb

Where are the six NPDBD projects?

# Investigative Reporting on Your Client

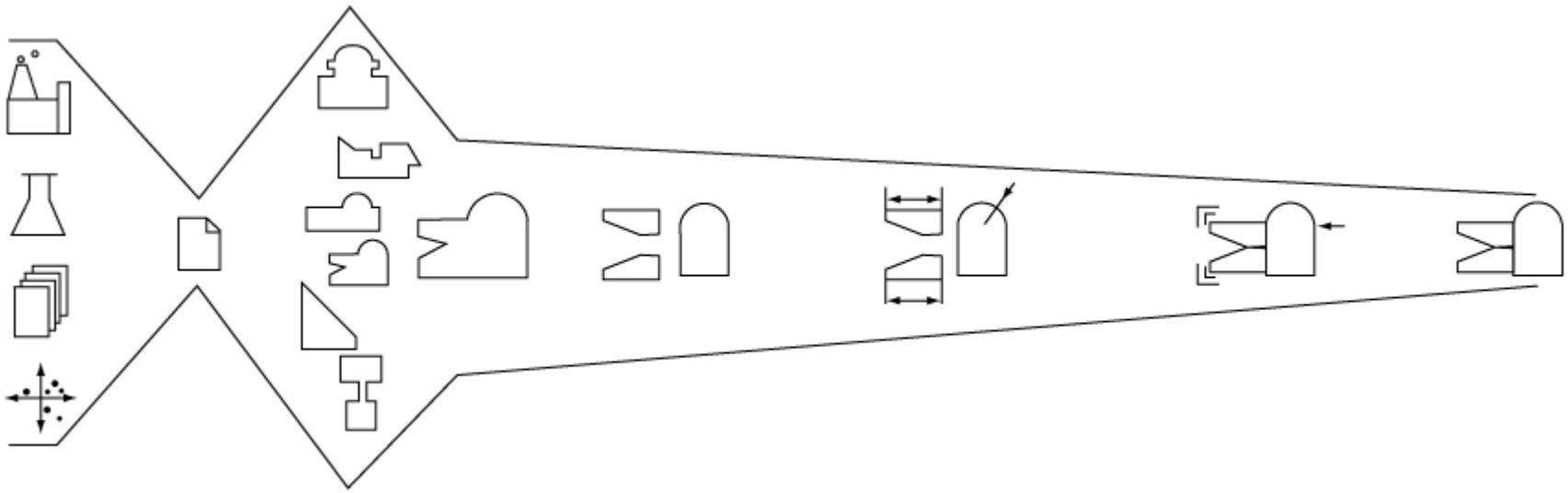
Medtronic

SEC Edgar

Value Line

UMN Library

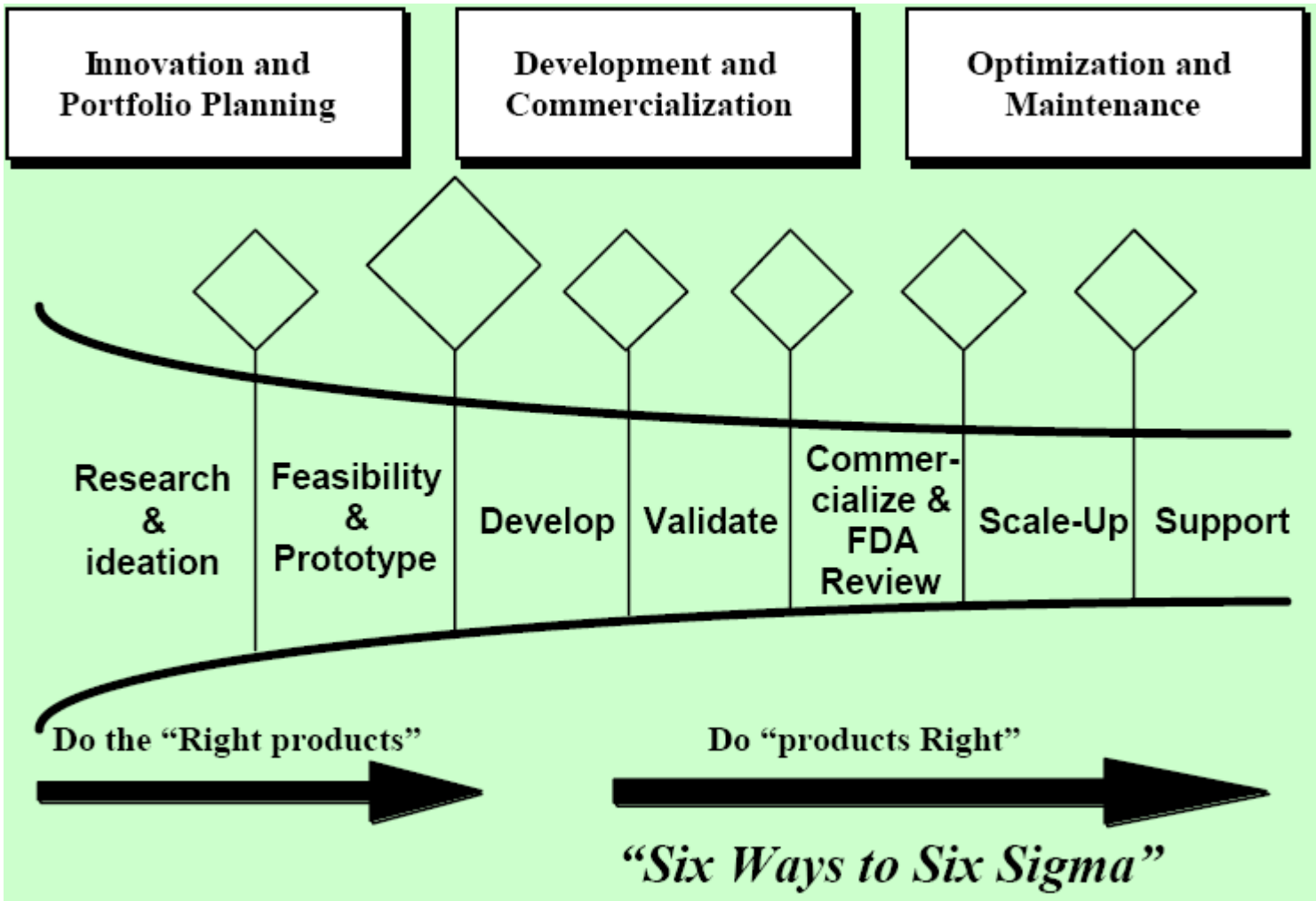
# Generic NPD Design Process



Planning | Concept Development | System-Level Design | Detail Design | Testing and Refinement | Production and Launch

Source: Ulrich & Eppinger, *Product Design and Development, Exhibit* 2-2

# Baxter Health Care NPD




Source: Axiom Business Concepts

# FDA Design Process

*www.fda.gov*

FDA

Center for Devices and Radiological Health

**DESIGN CONTROL GUIDANCE**

**FOR**

**MEDICAL DEVICE MANUFACTURERS**

This Guidance relates to
FDA 21 CFR 820.30 and Sub-clause 4.4 of ISO 9001

March 11, 1997

available in textbooks, periodicals, and journals. As a manufacturer applies design controls to a particular task, the appropriate tools and techniques used by competent personnel should be applied to meet the needs of the unique product or process for that manufacturer.

*III. APPLICATION OF DESIGN CONTROLS*

Design controls may be applied to any product development process. The simple example shown in Figure 1 illustrates the influence of design controls on a design process.

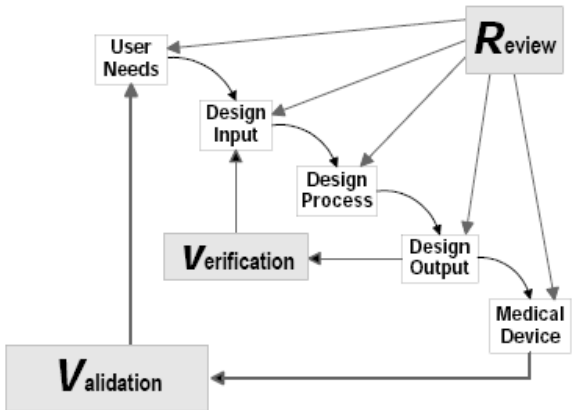



Figure 1 – Application of Design Controls to Waterfall Design Process (figure used with permission of Medical Devices Bureau, Health Canada)

The development process depicted in the example is a traditional waterfall model. The design proceeds in a logical sequence of phases or stages. Basically, requirements are developed, and a device is designed to meet those requirements. The design is then evaluated, transferred to production, and the device is manufactured. In practice, feedback paths would be required between each phase of the process and previous phases, representing the iterative nature of product development. However, this detail has been omitted from the figure to make the influence of the design controls on the design process more distinct.

# Stage-Gate NPD Process

Ideas

Gate 1

Idea screen

Stage 1

Scoping

Gate 2

Second screen

Stage 2

Build Business Case

Gate 3

Evaluate

Stage 3

Development

Gate 4

Evaluate

Stage 4

Test & Validate

Gate 5

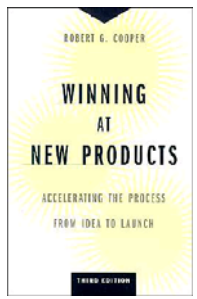
Evaluate

Stage 5

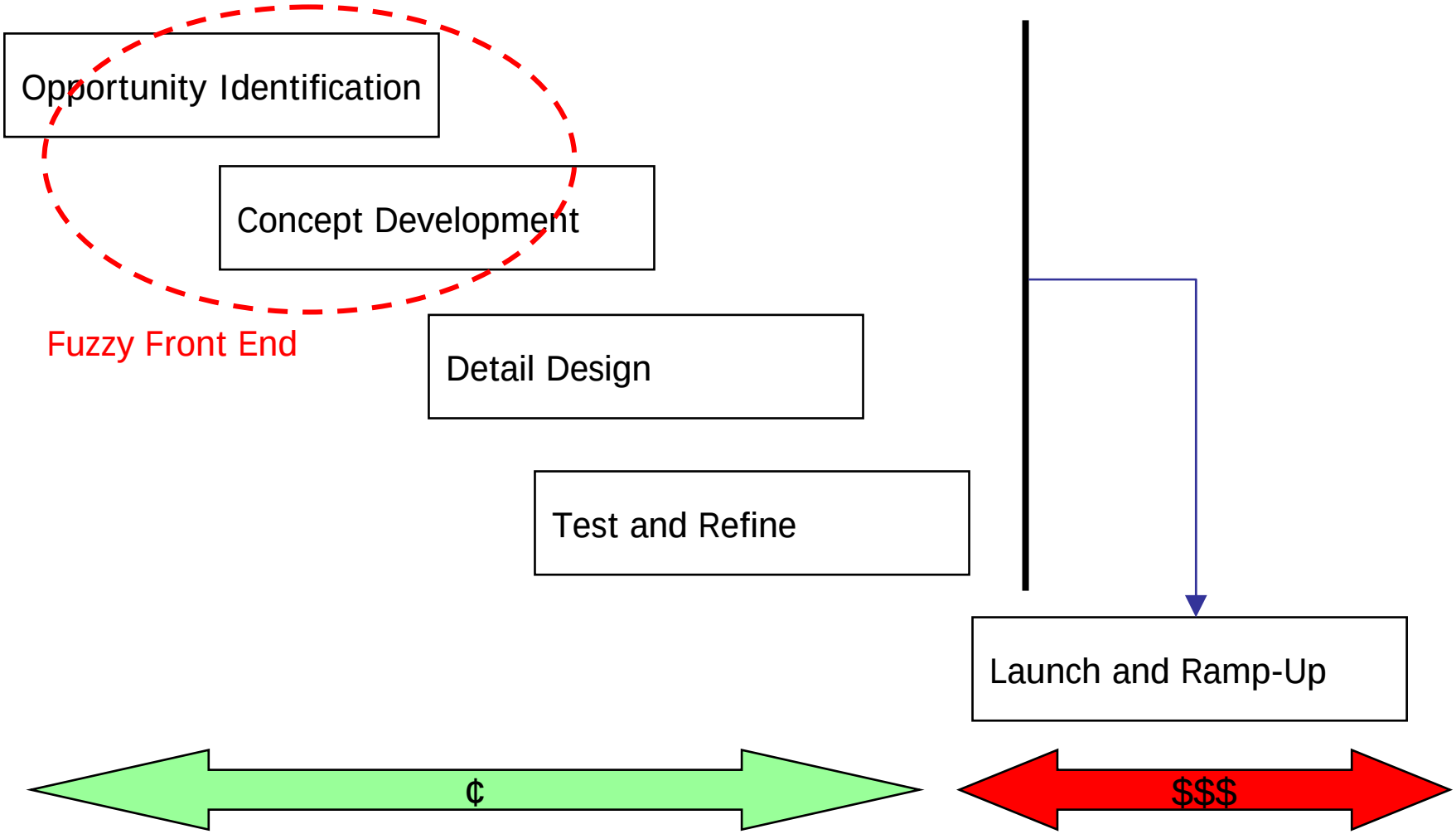
Launch

Post-Launch Review

Source: [www.stage-gate.com](http://www.stage-gate.com) and Cooper, Winning at New Products



# Generic Product Development



# Opportunity Identification

- Discover a need
- Invent a new technology
- Understand the competition
- Find a gap

1. Define the problem
2. Understand the users
3. Research the current solutions

# Task

- Examine the collection of cell phones being used in your group. List what's right and what's wrong with them. List the ideal features of a cell phone
- Deliverable: List of 5 ideal features, pick two to report
- Time: 6 minutes

# The 3 F's

- Market Feasibility

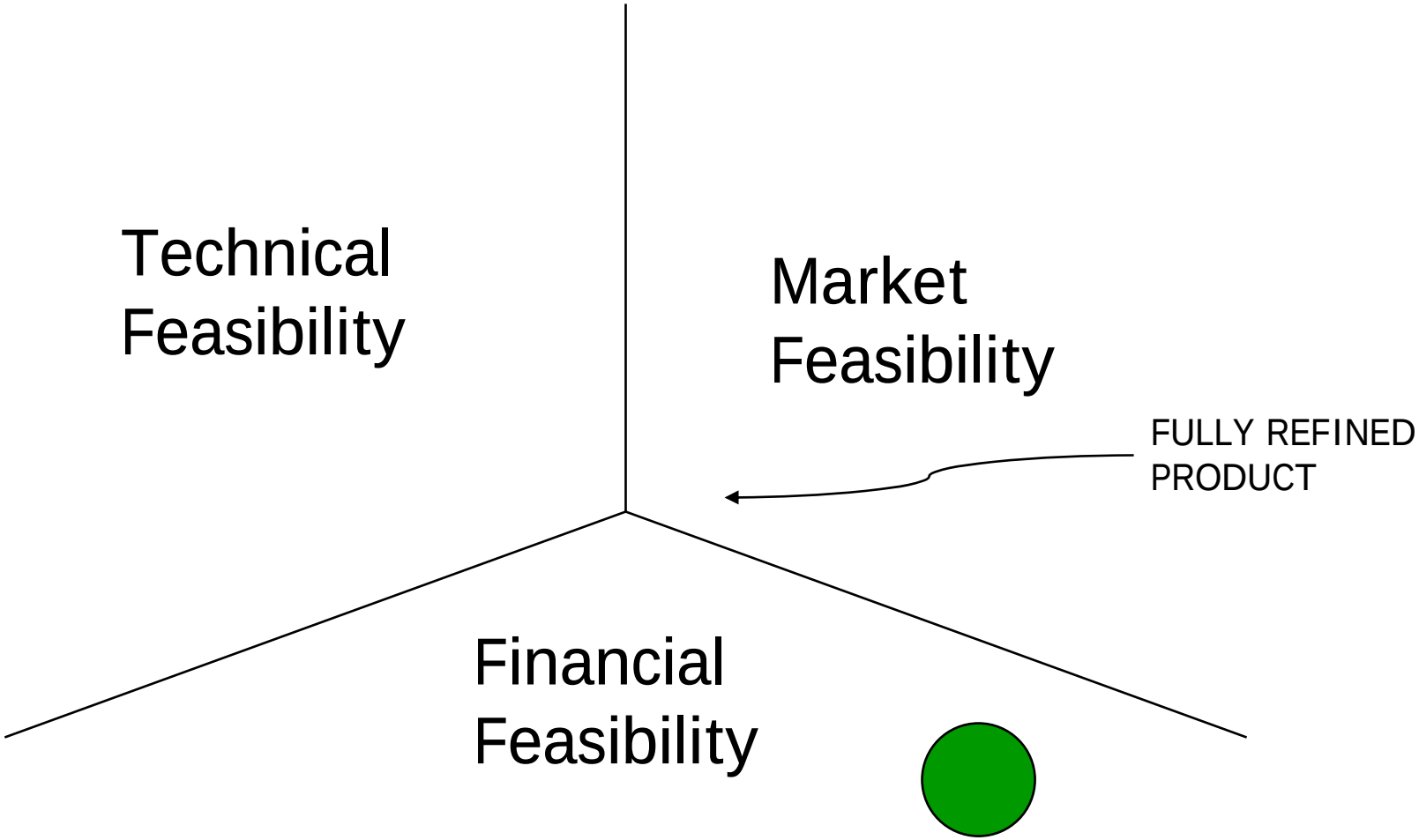
  Does anyone want it?

- Technical Feasibility

  Can we make it?

- Financial Feasibility

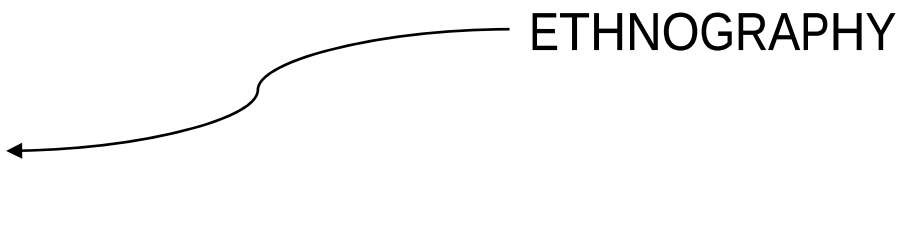
  Will $ be made?


Technical
Feasibility
Market
Feasibility
FULLY REFINED
PRODUCT
Financial
Feasibility

# Market Feasibility

# Understand the Customer

- Voice of the Customer (VOC)
- Who?
  - Market segmentation
  - Personas
- How
  - Observation
  - Interviews
  - Survey
  - Focus Group



# Customer-Driven Design

1. Understand needs
2. Gather reaction to concept
3. Gather reaction to prototype

# Task

- The team is conducting interviews with customers in the pill reminder target market. Create the interview script
- Deliverable: Report two questions
- Time: 5 minutes

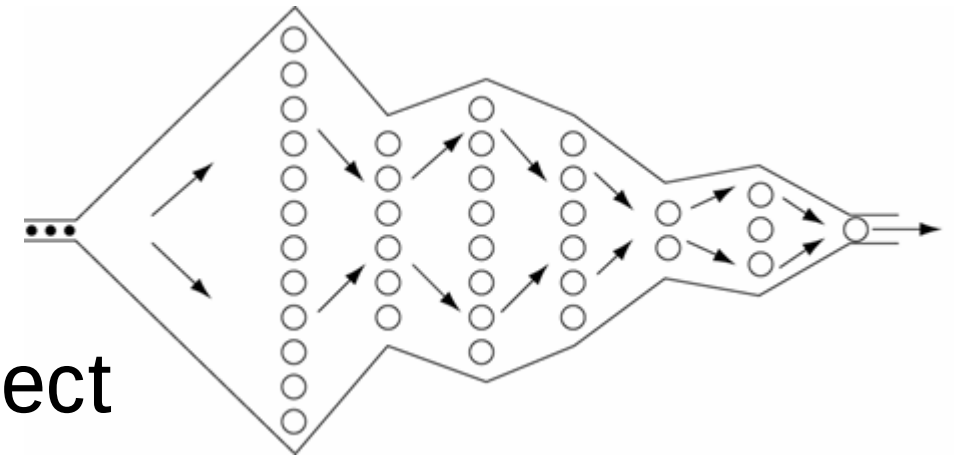
# Technical Feasibility

# Idea Generation

- External
  - Patents
  - Reverse engineering
  - Trade magazines, trade shows, stores
  - Experts
  - Users
- Internal
  - Brainstorming (many methods)
  - Solo storming

# Concept Screening

- Define the metrics
- Include all stakeholders
  - Internal screen
  - Customer screen
- Be objective
- Step back and reflect



Ulrich and Eppinger, *Product Design and Development,* Exhibit 7-4

# Engineering Design

- Analysis-based design
  - Use equations to ball park
  - Use computer simulations to fine-tune
  - Show that you know physics and engineering
- Get in the ball park with the prototype
  - But don't obsess over the details

VIRTUAL PROTOTYPING

# Build Prototypes

- Quick and dirty is good
  - Fast
  - Cheap
- Learn from the prototypes
  - Internal communication
    - Solo/Team
  - External communication
    - Customer
    - Boss

If you have many prototypes, you will impress your client!

# IP is Critical

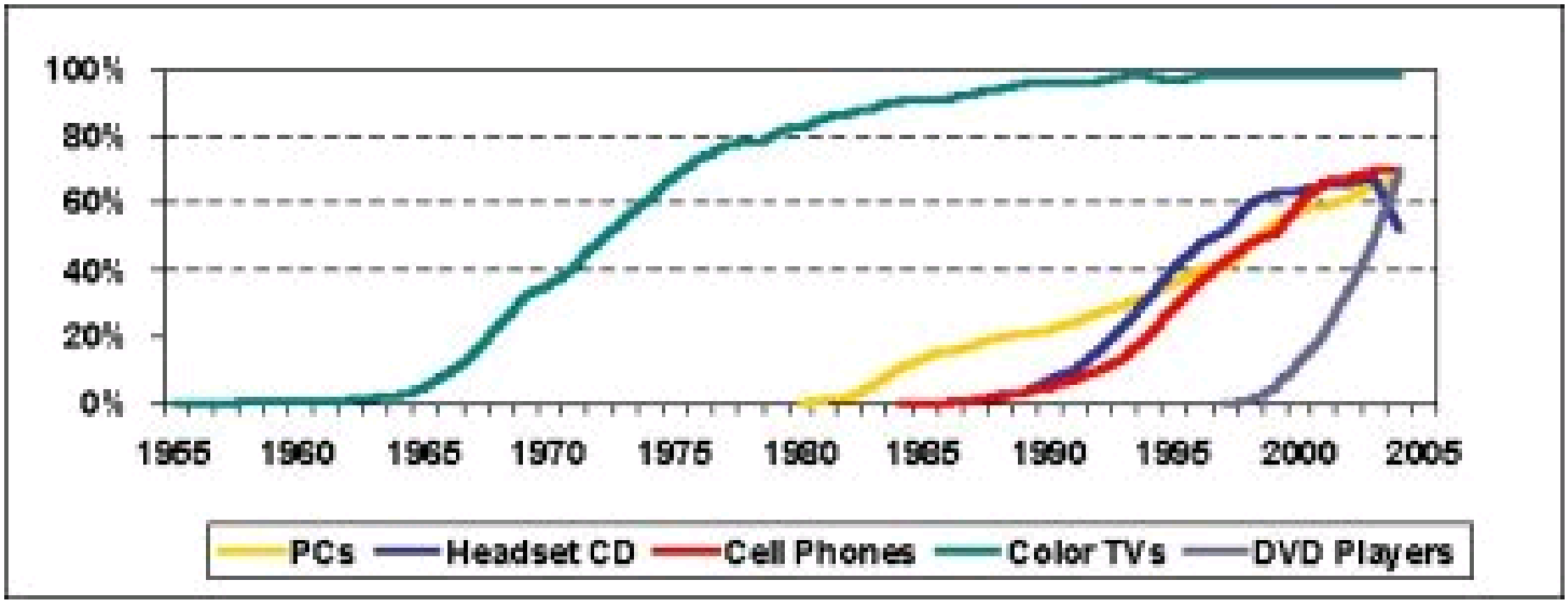
- Value of company is in its intellectual property and the ability of staff to generate IP, not in the products
- VCs look at people more than at concept
- IP, utility patents
  - Technology disclosure
  - Provisional patent
  - Patent application
  - Issued patent

# Financial Feasibility

# When Forecasting

- Use client's process
  - Provide a framework
- The art of assumption
  - Be explicit
- Provide a range
  - Likely, Optimistic, Pessimistic
- Be realistic about market share, sales volume
- Cite sources for data (be credible)

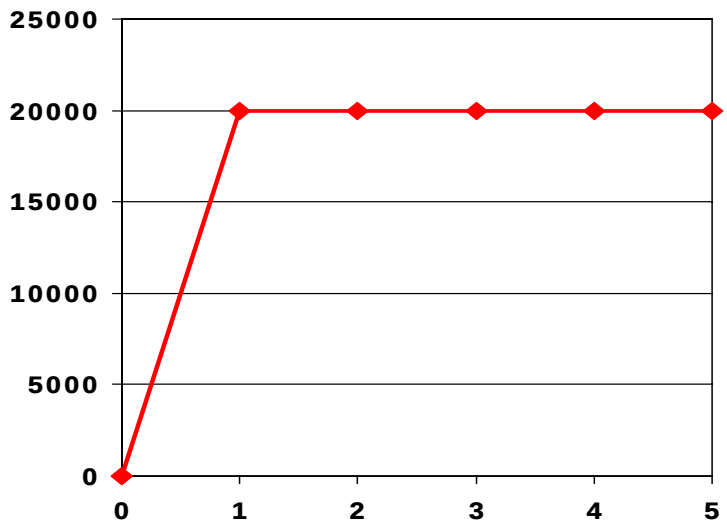
# Adoption Rate of Consumer Electronics




Source: Consumer Electronics Association, http://www.ce.org/Research/Sales_Stats/

# NPDBD Pro Forma Financials

| | Y1 | Y2 | Y3 | Y4 | Y5 |
|---|---|---|---|---|---|
| Sales (units) | 20,000 | 20,000 | 20,000 | 20,000 | 20,000 |

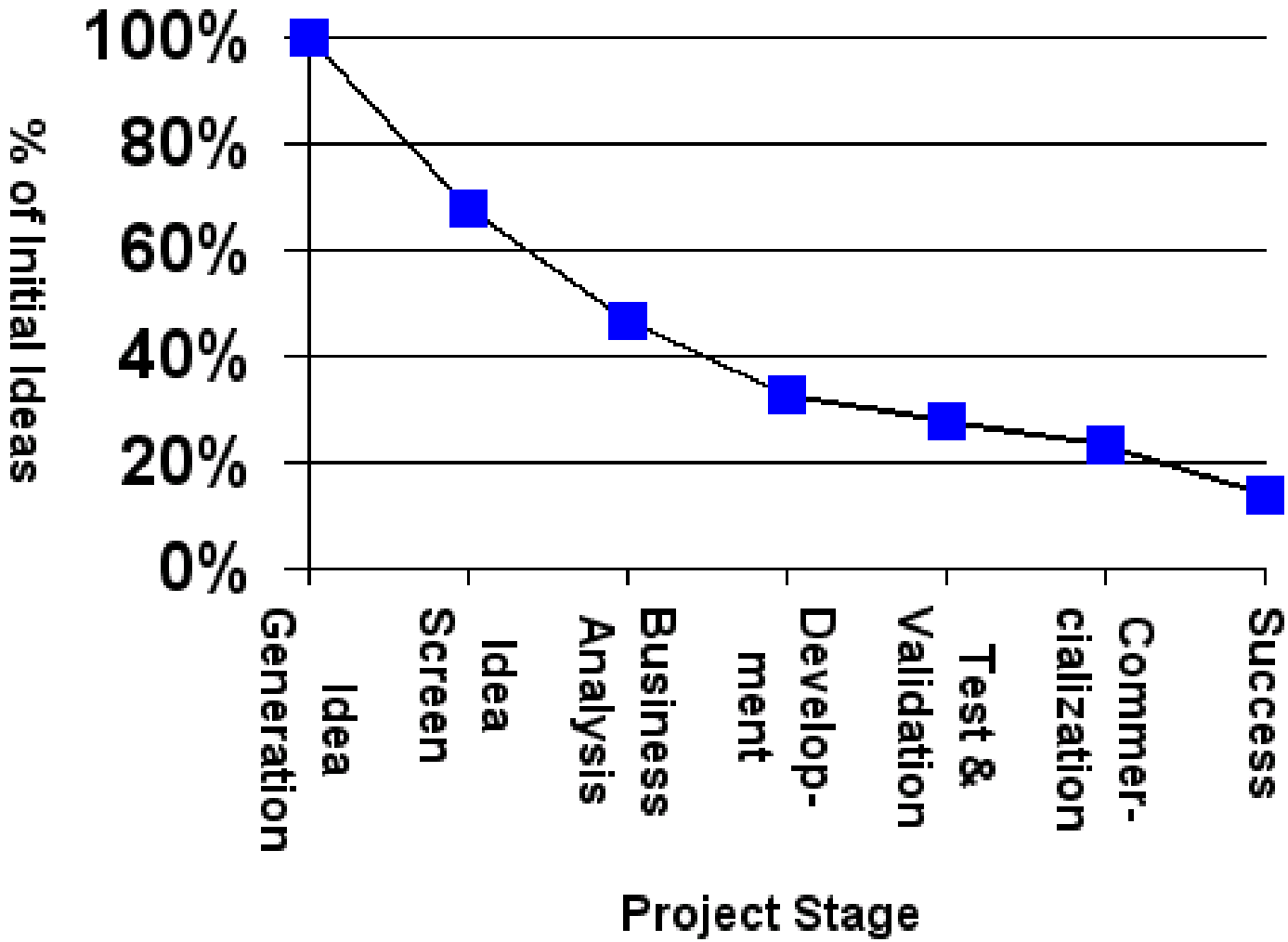


# Measuring NPD Success

- ROI, NPV
- Sales, growth rate
- Growth in related products
- Warranty and returns
- Customer satisfaction

Post-launch evaluation

# About 40% of new products fail post-launch




Source: www.pdma.org

# Top Ten Risky Assumptions

1. We will rapidly gain market share
2. We don't have to worry about the competition
3. Product will launch on time and on budget
4. Retailers will be desperate to stock our product
5. It is for everybody
6. Product will sell itself
7. Customers will find us
8. Customers will immediately see that our product is superior
9. Product will sell because it is technologically superior
10. I like the product so the customer will like it!

# Take-home messages

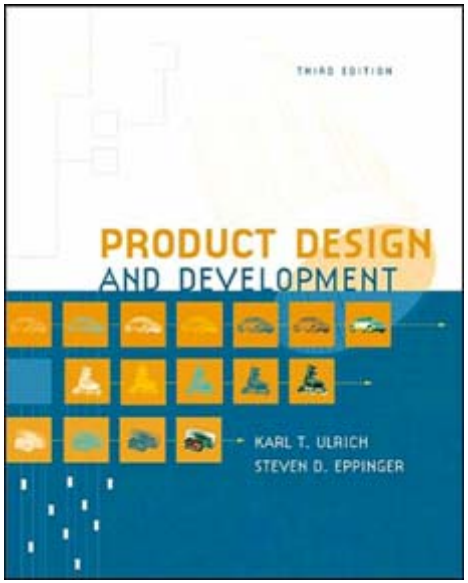
- NP development is complex and uncertain
  - *learn to manage risk*
- NP development is an iterative process
  - *prototype and evaluate early and often*
- NP development is interdisciplinary
  - *have the right team*
- NP development needs structure
  - *have a process*

# The NPDBD Mantra

Market Feasibility

Technical Feasibility

Financial Feasibility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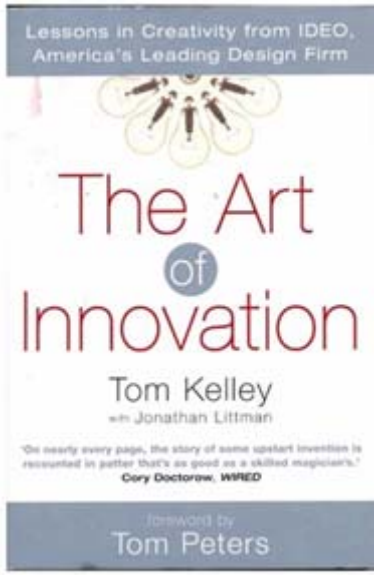
AND DEVELOPMENT
KARL T. ULRICH
STEVEN D. EPPINGER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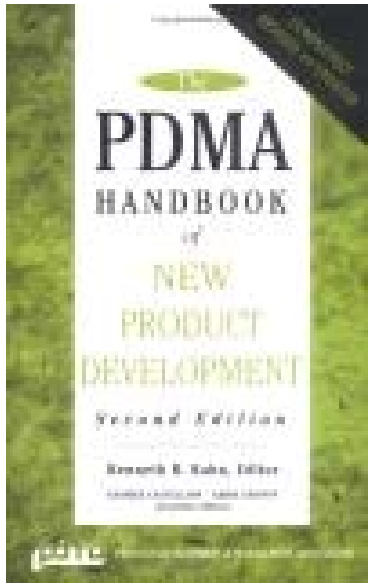
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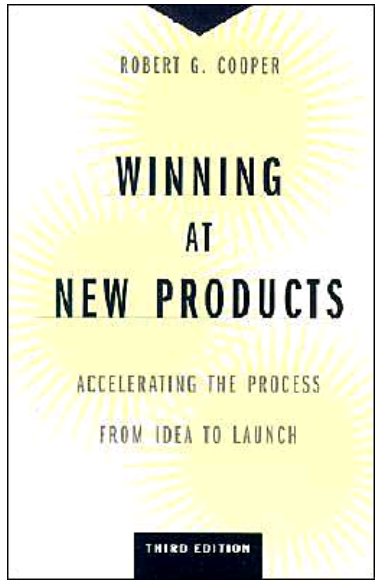
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ACCELERATING THE PROCESS
FROM IDEA TO LAUNCH
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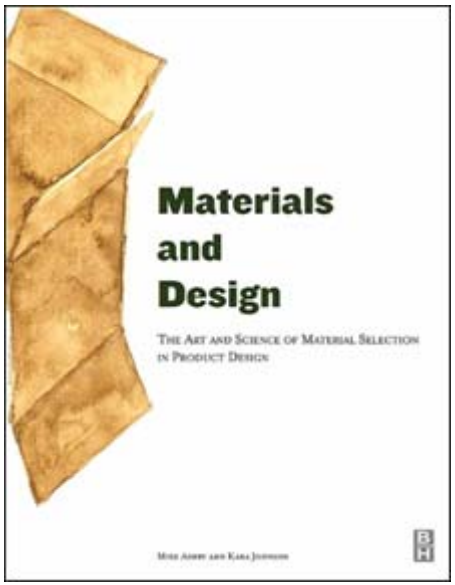
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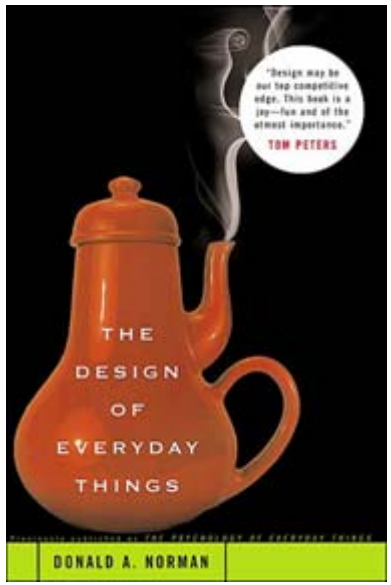
THE
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OF
EVERYDAY
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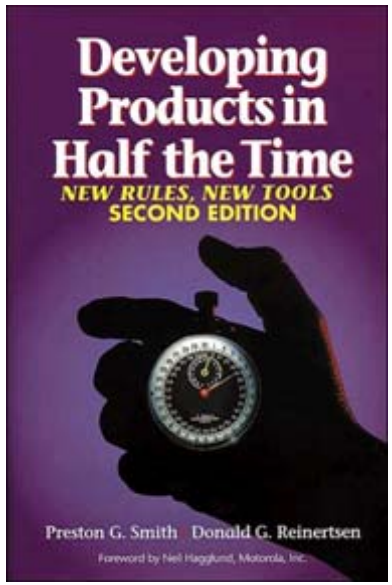
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