

Selecting Projects: Maximize Productivity in Your Development Portfolio

Portfolio Management



ECO WORLD STYRIA – Graz, Austria
with: **Dr. Robert G. Cooper**
Product Development Institute Inc.
& McMaster University, Canada
E-mail: robertcooper@cogeco.ca

Contact in Germany, Austria, Switzerland:
five i's innovation consulting gmbh
Dr. Angelika Dreher
a.dreher@five-is-innovation.com
www.five-is-innovation.com



Topics in This Session: **Portfolio Management**

- Maximizing the value of your portfolio – seeking maximum productivity
- Doing the right projects – a focus on value-to-the-company and profitability
- Scorecards & the Productivity Index for better project prioritization
- Getting balance in your mix of projects
- Balancing projects with resource availabilities – not overloading the pipeline
- Pruning the portfolio to eliminate waiting time – doing fewer projects but higher value ones

Recall LRP NPD Principle #6:
Focused and effective portfolio management

A Dramatic Trend

- ❑ From 1995 to 2004, cycle times have decreased from 41.7 months to 24 months
 - An astounding 42% decrease in time-to-market in 10 years!
- ❑ How? What's going on here?
- ❑ Have we really become that much more efficient at NPD
- ❑ Or is some other factor at play here?
- ❑ Look what's happened to our NPD portfolios over the same 10 years
- ❑ A trivialization of NPD



We are picking the low hanging fruit

Source: Adams, M. & Boike, D., "PDMA foundation CPAS study reveals new trends", *Visions*, XXVIII: 3, July 2004, 26-29; and: *The PDMA Foundation's 2004 Comparative Performance Assessment Study (CPAS)*. For mid 1990s data, see: Griffin, A., *Drivers of NPD Success: The 1997 PDMA Report*. PDMA 1997. See also ref [1].

Breakdown of the Portfolio by Project Types – Then and Now

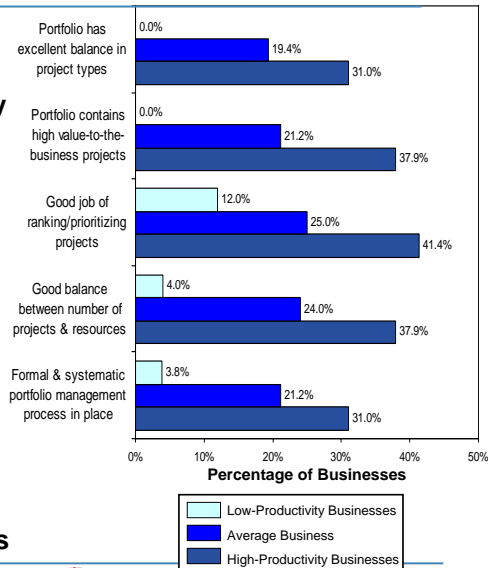
% of Projects in the Development Portfolio

Development Project Type	1990	2004	% Change
New to world, new to market – innovations	20.4%	11.5%	43.7% decrease
New product lines to the company	38.8%	27.1%	30.1% decrease
Additions to existing product line in company	20.4%	24.7%	20.8% increase
Improvements and modifications to existing company products	20.4%	36.7%	80.1% increase
Total	100.0%	100.0%	

Sources: APQC study, and Visions article, ref [1]

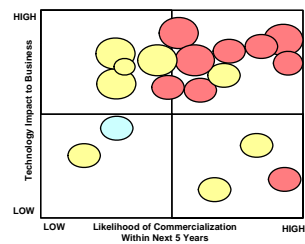
Some More Provocative Facts:

- ❑ Not only are portfolios unbalanced
- ❑ Portfolios contain too many low value-to-the-company projects
- ❑ And far too many projects for the limited resources available
- ❑ A small minority of businesses have a systematic & formal portfolio management process in place
- ❑ But hi-productivity businesses suffer much less from these deficiencies



The Answer: Portfolio Management Fundamental to Improving Productivity in NPD

- ❑ How shall we invest our R&D or Development funds and people?
- ❑ What is our investment portfolio?
- ❑ Portfolio Management:
 - Is about resource allocation
 - And balance in the portfolio
 - And about which NP projects shall the firm fund from among many opportunities (Go / Kill)?
- ❑ Key to maximizing NPD Productivity



$$\text{Productivity} = \frac{\text{Output}}{\text{Input}}$$

Portfolio Management helps effectively allocate scarce resources

Three Ways to Increase Productivity in the Portfolio

1. Strategic Portfolio Management

- Shift the balance of projects in terms of ...
 - Markets or business sectors
 - Product lines or categories
 - Technologies
- Away from small low-value areas & projects
- To areas that promise higher productivity

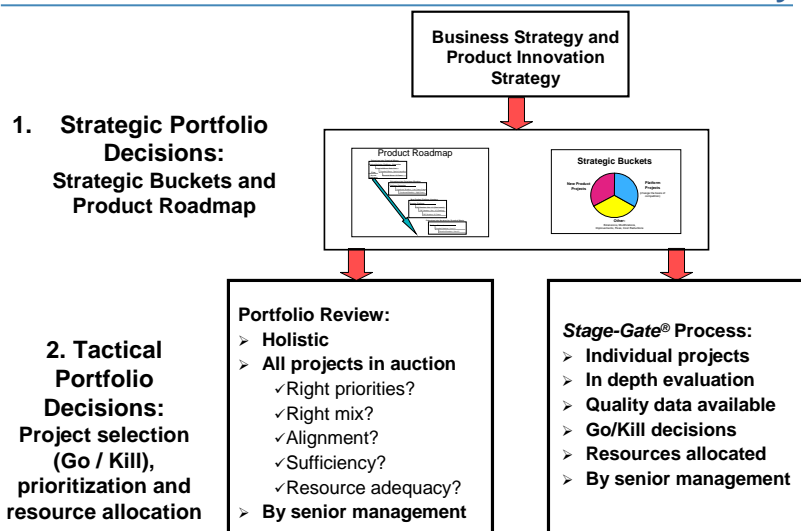
2. Tactical Portfolio Management – project selection and prioritization

- Selecting the best projects within each area
- Prioritizing projects – highest value projects at the top of the list
- To maximize the Productivity Index overall

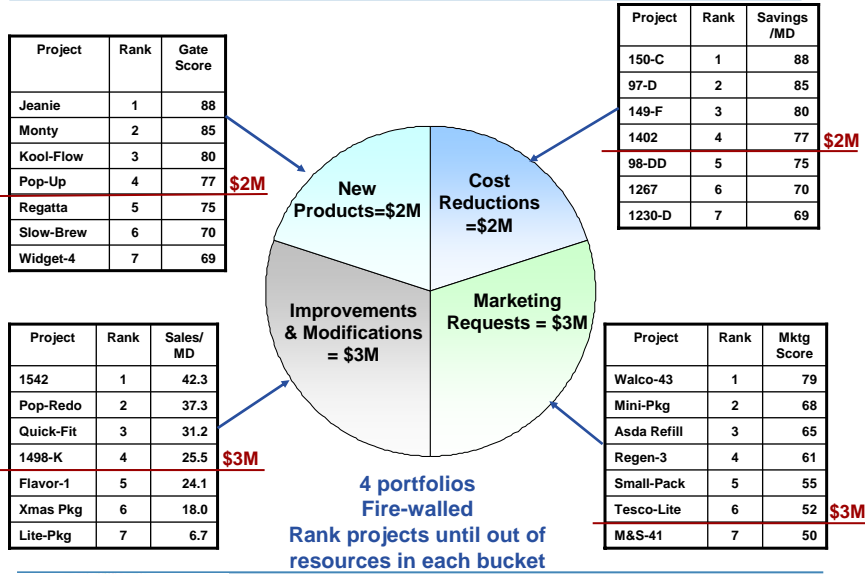
3. Putting a limit on the number of projects

- To avoid pipeline gridlock
- And to accelerate projects to market – reduce time

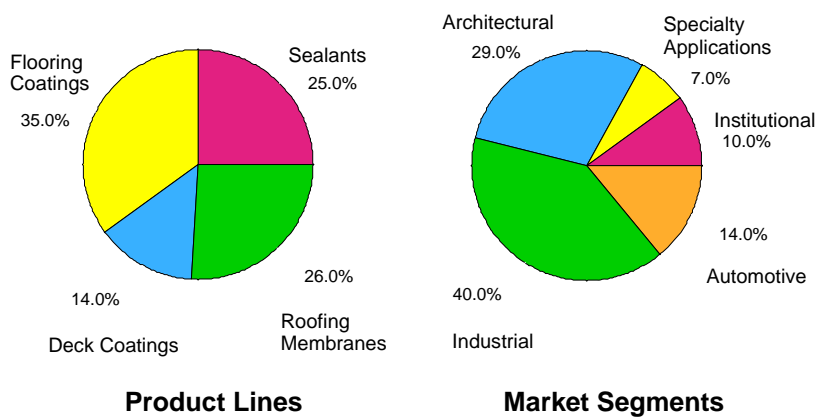
Strategic and Tactical Portfolio Management – Both Are Used to Increase Portfolio Productivity



Using Strategic Buckets

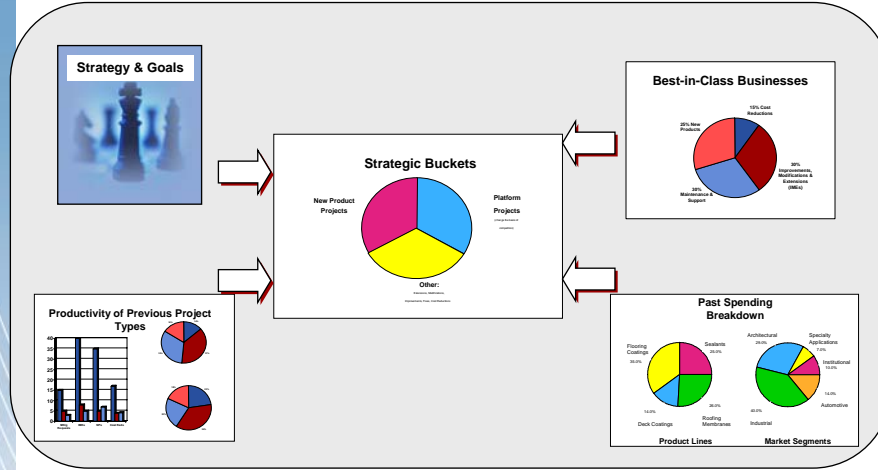


Can Use Other Dimensions to Split Resources

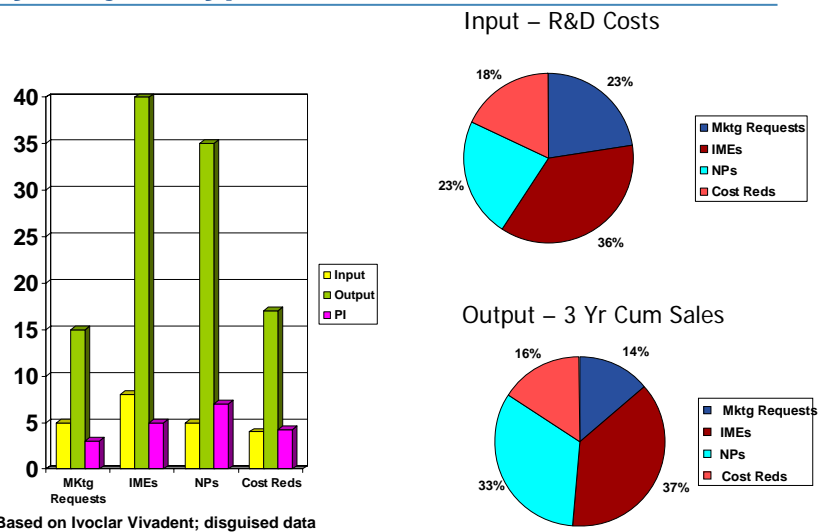


Focus your resources into high productivity buckets

Inputs to the Strategic Buckets Decision

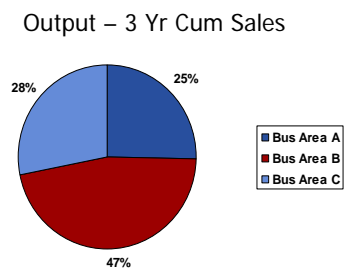
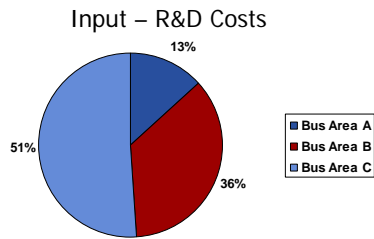
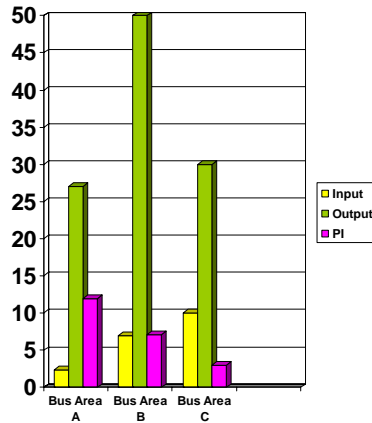


Determine Your Productivity: By Project Types



Based on Ivoclar Vivadent; disguised data

Productivity By Business Areas



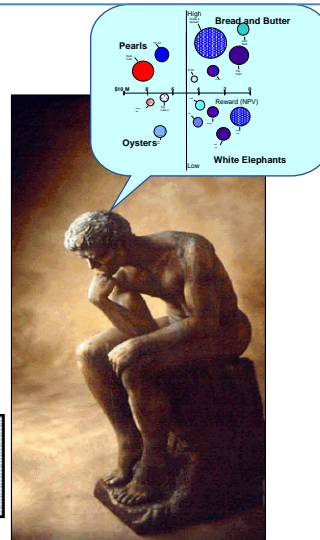
Strategic Buckets: Recap

- **Requires that you have:**
 - A Business Strategy
 - A Product Innovation & Technology Strategy
 - Goals
 - Defined arenas of strategic focus
 - Relative priorities of these
- **A defined management process that moves from...**
 - Strategy through to
 - Spending decisions (splits by bucket)
- **Dimensions (splits) can be anything that's relevant to you:**
 - Markets, segments, business areas or industry sectors
 - Geography (regions of the world)
 - Project types (new products, improvements, cost reductions, etc.)
 - Product lines, product types, product categories, product groups
 - Technologies, technology types

Now Tactical: Project Selection & Prioritization The Goal

- ❑ Maximize the productivity of the portfolio
- ❑ Rank the projects:
 - Best to Worst
- ❑ Pick your winners – focus your resources
- ❑ Get these done as quickly as possible

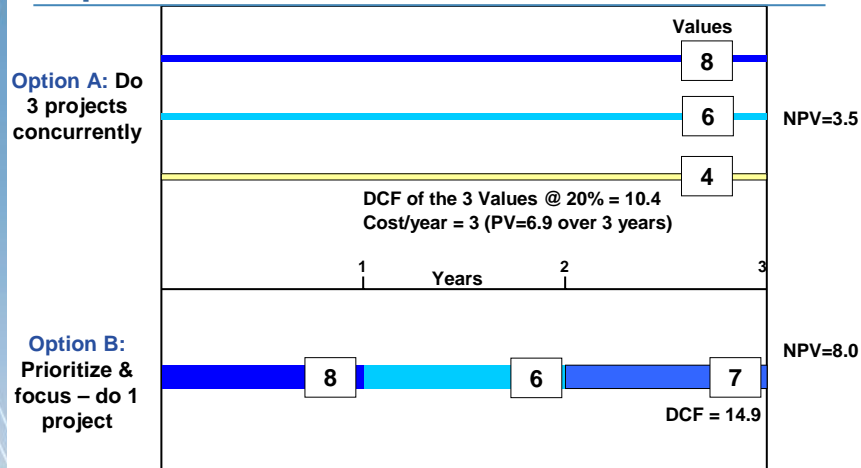
Do fewer projects... but better ones
(high value-to-the-corporation projects)



Impact of Making Better Prioritization Decisions

- ❑ **Situation:**
 - Three potential projects
 - Each project requires a total of \$3M in person time to do
 - You have \$3M person-days of resources per year
- ❑ **Options:**
 - A. Approve and start all three projects
 - Total cost: \$9M
 - Takes 3 years at \$3M/year to complete & launch all three
 - B. Or pick the best one – do it (put the others on hold)
 - Launch one at end of year 1
 - Another one at end of year 2
 - By year 3, more attractive projects are found
 - Kill the remaining original one... because you find a better “new idea” by then
 - Do one “new idea” project – assume it has equal in value to these first two projects
- ❑ **What is the NPV of each approach?**

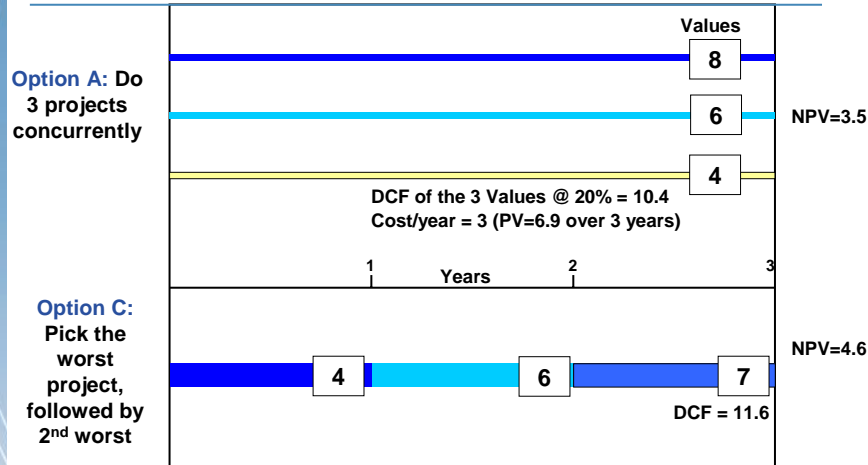
Impact of Prioritization



NPV is 2.28 times with the same person-days input

Prioritization increases Productivity by 128%

The Worst Case Scenario with Prioritization

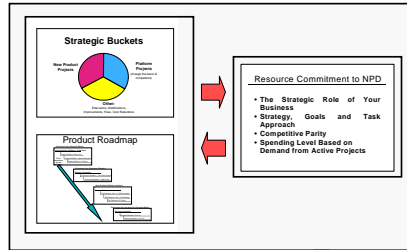


Productivity is Still Better by 33% !

The failure to prioritize means loss of productivity in a major way

Project Prioritization: Use Both Portfolio Reviews & Gates

1. Strategic Portfolio Decisions: Strategic Buckets and Strategic Product Roadmap



Resource Commitment to NPD

2. Tactical Portfolio Decisions: Project selection (Go/Kill), prioritization and resource allocation

Portfolio Review:

- > Holistic
- > All projects in auction
 - ✓ Right priorities?
 - ✓ Right mix?
 - ✓ Alignment?
 - ✓ Sufficiency?
 - ✓ Resource adequacy?
- > By senior management

Stage-Gate® Process:

- > Individual projects
- > In depth evaluation
- > Quality data available
- > By senior management
- > Go/Kill decisions
- > Resources allocated

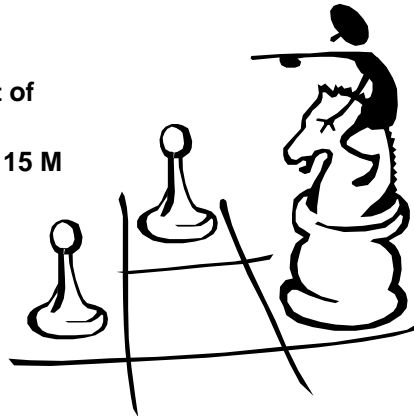
Ranking Projects Using NPV (Six Projects: Major Materials Company)

Project	PV (present value of future earnings)	Develop- ment Cost	Commer- cialization Cost	NPV (net present value)	Ranking Based on NPV	Decision
Alpha	36	3	5	28	4	Hold
Beta	64	5	2	57	2	Go
Gamma	11	2	1	8	5	Hold
Delta	3	1	0.5	1.5	6	Hold
Echo	56	5	3	48	3	Hold
Foxtrot	70	10	2	58	1	Go

Note: Total Development Budget of \$15 M

Your Portfolio Decision Is:

- Undertake 2 projects
 - Foxtrot
 - Beta
- Consumes the entire budget of \$15 M
- Yields a portfolio value of \$115 M
- For an overall Portfolio Productivity Index of 7.67
- Which is quite good!



Method 2: The Productivity Index

- Take what you are trying to maximize
 - Example: NPV
- Divide by what the constraining resource is
 - Example: People (expressed as person-days)
 - Or Development funds (\$000)
- And rank your projects by this index until out of resources

$$\text{Productivity Index} = \frac{\text{Output}}{\text{Input}} = \frac{\text{NPV}}{\text{Person-Days}}$$

NPV= forecasted NPV of the project

Person-Days = resources required to complete the project

Development Cost = cost to complete the project (the “go forward” costs)

Or

$$= \frac{\text{NPV}}{\text{Development Cost}}$$

Productivity Index = NPV/Dev

Note: Same Total Development Budget of \$15 M

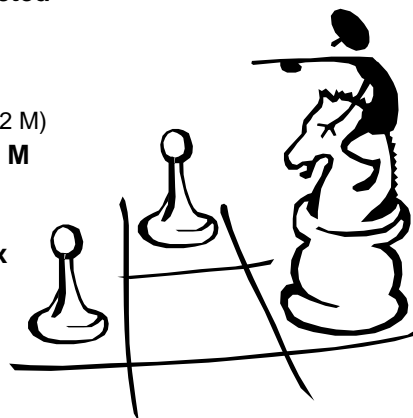
Project	NPV	Development Cost	Productivity Index=NPV/Dev v Cost	Sum of Dev Costs
Beta	57	5	11.4	5
Echo	48	5	9.6	10
Alpha	28	3	9.3	13
Foxtrot	58	10	5.8	23
Gamma	8	2	4.0	25
Delta	1.5	1	1.5	26

Limit reached

Determine the Productivity Index for every NPD project
Use it to rank (prioritize) your projects

Your New Portfolio Decision

- With Productivity Index, the decision is different
- More efficient projects are selected
 - Beta
 - Echo
 - Alpha
 - And Gamma (to use up the last \$2 M)
- The portfolio value is now \$141 M
 - An increase of \$26 M
 - With no increase in spending!
- The Portfolio Productivity Index is now 9.40
 - Up from 7.67



PI Example

The Challenge: Dealing with Risks

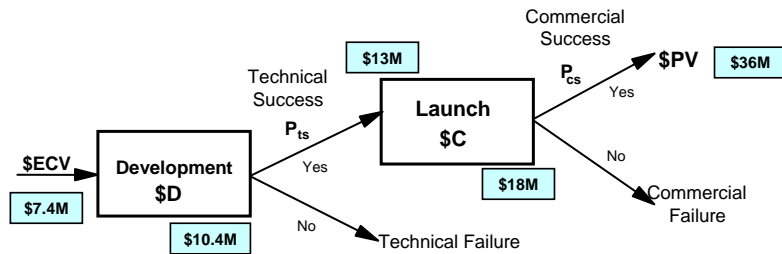
- ❑ Not every project has a 100% chance of commercial success
- ❑ Any many won't achieve their sales & profit projections
- ❑ Some won't even be developed
 - Hit technical roadblocks
- ❑ How to handle risks and uncertainties
- ❑ Several options:
 1. Risk adjusted discount factor in your NPV calculations
 - Use different values of i for different project types
 2. Probability-adjusted NPV
 - Adjust the values of some inputs to the NPV calculation
 - By their probability of occurring
 - Example: multiply Sales by a probability ($< 100\%$)
 3. Options Pricing (Real Options or **Expected Commercial Value**)

Method 3: Expected Commercial Value

- ❑ Value of the project if successful is...
 - \$36 m
 - Based on DCF of future incomes stream
- ❑ Development cost: \$3 m
- ❑ Commercialization cost (marketing roll-out, production equipment): \$5 m
- ❑ But...
 - Only 50% chance of commercial success if we Launch
 - But 80% chance of success of technical success (getting thru Development OK)
 - No costs (other than \$3m and \$5m) if not successful
- ❑ What is the value of the project?

Use Decision Tree Analysis to determine the ECV

Details: Determination of Expected Commercial Value of Project



$$ECV = [(PV * P_{cs} - C) * P_{ts} - D]$$

Three Methods to Estimate Probabilities:

- Delphi (modified)
- Data Tables
- Scoring Model
 - See *Portfolio Management for New Products*, pp 231-232

Method 4: Scoring Model

- ❑ Based on theory that qualitative factors predict NP project success and project value
- ❑ Relies on those factors that are correlated with success & value... examples:
 - Competitive & product advantage
 - Market attractiveness
 - Leveraging core competencies
- ❑ A scoring system based on these factors
 - A point count system
 - Use scorecards

Make sure you choose factors that really do discriminate between profitable and unprofitable projects – and you can prove it!

A Best-In-Class Scoring Model NP Projects – Gate 3

1. Strategic:

- Alignment with Business's strategy
- Strategic importance of project

2. Product Advantage:

- Unique product benefits to users
- Differentiation vs. competitors' products
- Meets customer needs better
- Value for money

3. Market Attractiveness:

- Market size
- Market growth
- Competitive situation

4. Leverages Core Competencies:

- Marketing & distribution leverage
- Technological leverage
- Manufacturing / Operations leverage

Score factors in red 0-10
By gatekeepers
At Gate meeting
Use a scorecard – see end

Gate 3 “Should Meet” Criteria (continued)

5. Technical Feasibility:

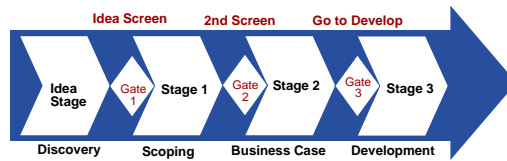
- Size of technical gap
- Technical complexity
- Track record & technical uncertainty

6. Risk Versus Return:

- Expected profitability (magnitude: NPV)
- Return (IRR)
- Payback period
- Certainty of revenue, cost and profit estimates
- **Should Meet items (factors in bold) are scored (1-5 or 0-10) on a scorecard**
- **Factor scores must clear minimum hurdles**
- **Also added (weighted or unweighted) to yield Project Attractiveness Score (Monty example)**

Use Scorecards at Gate meeting to help make Go/Kill decisions
Also use it to rank (prioritize) your projects

Using the Gates for Maximum Productivity



Use the Gates

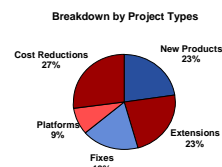
- To scrutinize projects in depth
- Employ the NPV, PI and scorecard score – meet hurdles?
- Compare new project to the portfolio of ongoing projects
 - Impact on portfolio – positive or negative
 - Relative ranking (use PI & scorecard score)
- Prune out the weak ones
- Resource the strong projects

Commit resources to projects at the Gates
 A Gate is “an irrevocable commitment of resources to a project & team”

Using the Portfolio Reviews for Maximum Productivity

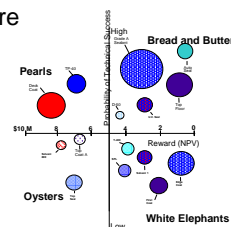
Use Portfolio Reviews

- To manage the entire portfolio
- Rank & prioritize projects – the prioritized list
 - Prioritized List of Active & On-Hold Projects
 - Based on scorecard & PI (with loadings)
- To check for balance and alignment
 - Various pie charts
 - Bubble diagram
- Make changes to the portfolio
- Or signal changes to the gating procedure



Prioritized List of Active and On Hold Projects

Project	Rank (Priority Level)	Total Project Score	Portfolio Balance Factor	Adjusted Total Project Score
Size-44	1	80	1.10	88
Encapsulation	2	82	1.00	82
Legume N-2	3	70	1.10	77
Spread-Ease	4	75	1.00	75
Chemical-Base	5	80	0.90	72
Projects on Hold				
ND-Fix	1	80	1.00	80*
Slow Release	2	70	1.10	77*
Mulk-Propose	3	75	.90	68
etc.	etc.			



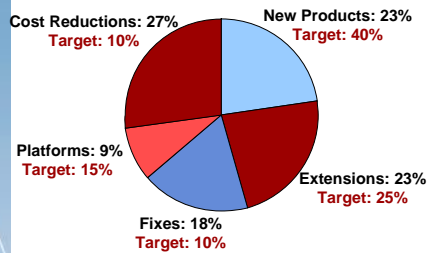
Look for the Right Prioritization of Active Projects

- Do you have the correct project ranking to yield maximum Productivity?
- Are the right projects Active (versus on Hold)

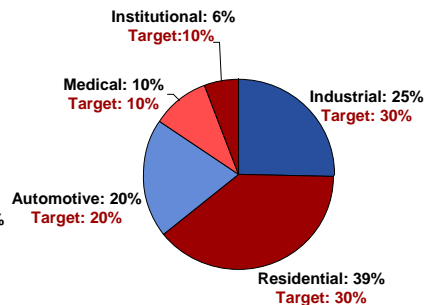
Project Name	Gate Score (0-10)	Stage	Productivity Index NPV/MD	Resources Required (Loading - MD)	Sum of Loadings (MD)	Rank
Murray	8.3	3	206	120	120	1
Timor	8.3	4	194	140	260	2
Bering	7.5	3	180	90	350	3
Elk	7.8	2	142	180	530	4
Berlin	7.0	4	148	100	630	5
Columbia	8.0	Hold at Gate 3	150	120	-	hold
Snap	7.0	Hold at Gate 2	160	80	-	hold
Moose	7.5	Hold at Gate 2	108	130	-	hold
Banda	7.3	Hold at Gate 3	129	110	-	hold

Check Balance Against Your Buckets: Actual Versus Targeted Resource Allocation

Breakdown by Project Types



Breakdown by Market Sector

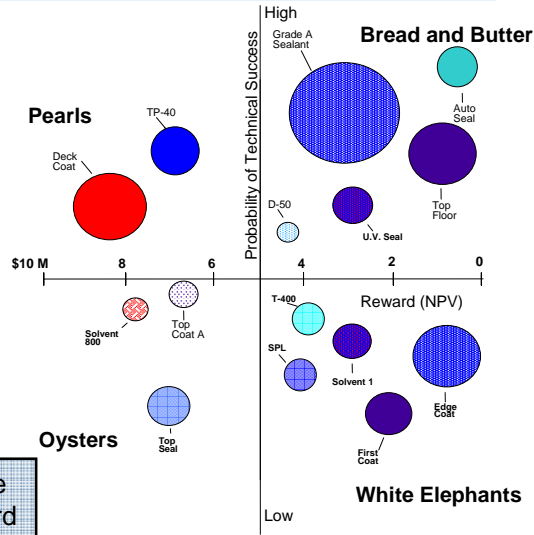


Your strategic buckets exercise yields **target splits**, shown in red – what should be
The pie chart slices show your expenditure breakdowns to date – what is

Look for imbalances that signal corrective actions

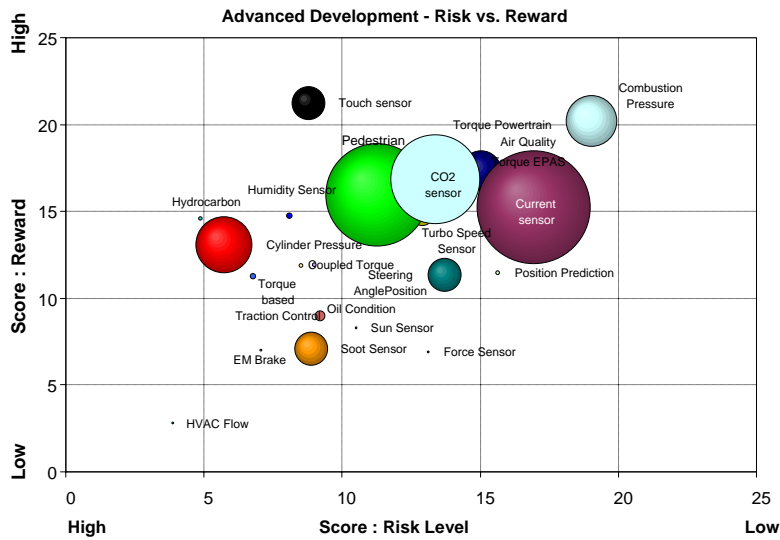
Check for Balance and Risk Profile: Risk-Reward Bubble Diagram

Plot all your projects
Circle size = annual
resources to each project

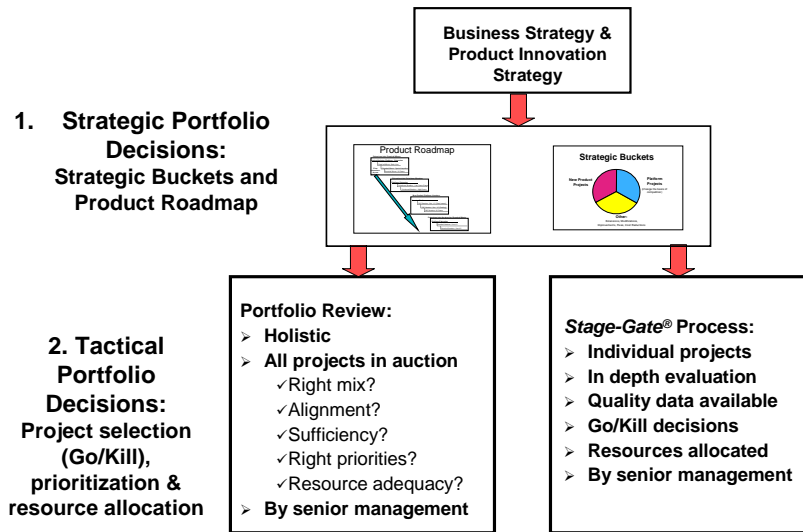


Look for the right balance
in terms of risk and reward

Another Version of Risk Reward Bubble Diagram (based on scorecard scores)



The Result: An Effective Portfolio Management System to Maximize Your Portfolio Productivity



References

Books:

Portfolio Management for New Products, By Cooper, Edgett & Kleinschmidt (Perseus Books, Reading, Mass) hardcover, 2002. The most comprehensive book on the topic available... provides an in-depth look at the best portfolio methods, and their use in industry.

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