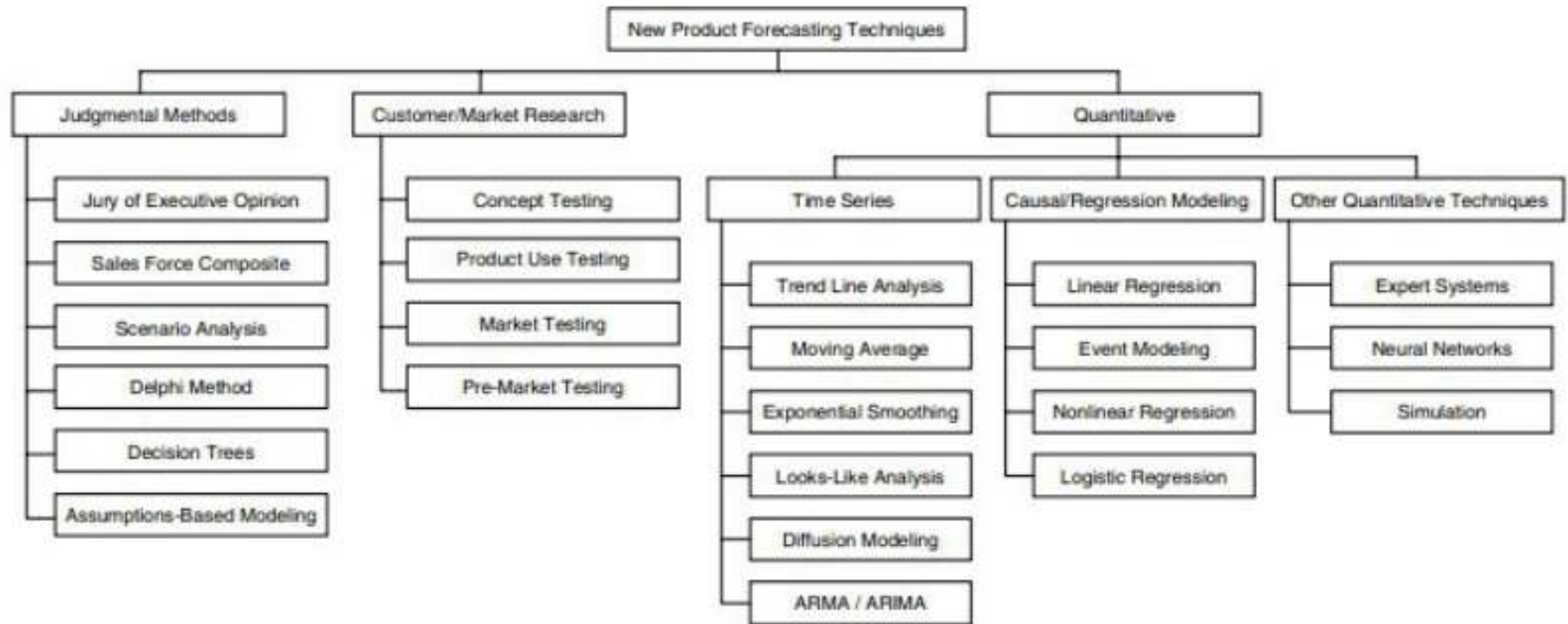




# New Product Forecasting

# New Product Forecasting Techniques



# Product-Market Matrix

## Product Technology

|        |         | Current                                                                 | New                                                                 |
|--------|---------|-------------------------------------------------------------------------|---------------------------------------------------------------------|
| Market | Current | <b>Market Penetration</b><br>(Cost Reductions,<br>Product Improvements) | <b>Product Development</b><br>(Line Extensions)                     |
|        | New     | <b>Market Development</b><br>(New Uses, New Markets)                    | <b>Diversification</b><br>(New-to-the-Company,<br>New-to-the-World) |

# New Product Forecasting Strategies

|        |         | Product Technology                                                 |                                                                           |
|--------|---------|--------------------------------------------------------------------|---------------------------------------------------------------------------|
|        |         | Current                                                            | New                                                                       |
| Market | Current | <i>Product Improvements</i><br><b>Sales Analysis</b>               | <i>Line Extensions</i><br><b>Product Line/<br/>Life Cycle Analysis</b>    |
|        | New     | <i>New Uses/Markets</i><br><b>Customer and<br/>Market Analysis</b> | <i>New-to-the-Company/World</i><br><b>Scenario Analysis<br/>(What If)</b> |

# New Product Development Process



# New Product Development Teams

|                                          | Functional team                                | Multifunctional team                                                                                                          | Balanced matrix                                                                                            | Cross-functional team                                                                                    | Venture team                                                                                                   |
|------------------------------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Department representation                | Single department                              | Multiple departments                                                                                                          | Multiple departments                                                                                       | Multiple departments                                                                                     | Multiple departments                                                                                           |
| Accountable to                           | 100% department                                | Mostly department                                                                                                             | 50% department, 50% team                                                                                   | Mostly team                                                                                              | 100% team                                                                                                      |
| Appropriate product development projects | Cost improvements, simple product improvements | All types of product development projects                                                                                     | All types of product development projects                                                                  | All types of product development projects                                                                | New category entries, new-to-the-world products                                                                |
| Issues                                   | Focuses on single, specific product issue      | Addresses issue affecting multiple departments, but conflict can arise due to team members' loyalties to their own department | Team member confusion can arise due to uncertainty over equally splitting time between department and team | Team members work on team issues predominantly, although there are departmental responsibilities as well | Personnel removed from organization to address key corporate objective(s); department managers may resist this |

# Steps in New Product Forecasting Process

## New Product Forecasting Process

### Strategic Planning

Establish new product forecast assumptions  
Generate baseline market potential forecast

### Concept Generation

Review and verify new product forecast assumptions  
Revise new product forecast assumptions  
Generate baseline sales revenue potential forecast

### Pretechnical Evaluation

Review and verify new product forecast assumptions  
Revise new product forecast assumptions  
Generate baseline sales revenue potential forecast  
Issue baseline sales forecast  
Establish a calendar for the new product  
Approve the product protocol prior to technical development resources commitment

### Technical Development

Review and verify new product forecast assumptions  
Revise new product forecast assumptions  
Review and verify the NPD calendar  
Generate baseline unit sales forecast  
Adjust baseline unit sales forecast  
Approve baseline unit sales forecast

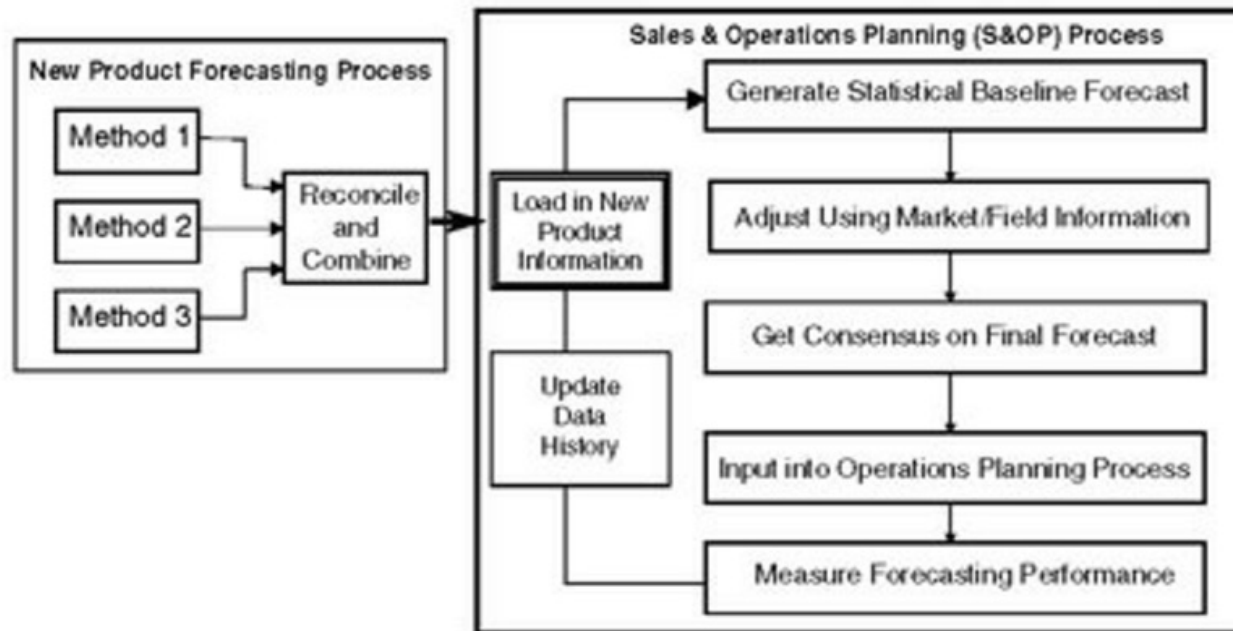
### Commercialization

Review and verify new product forecast assumptions  
Revise new product forecast assumptions  
Generate baseline unit sales forecast  
Adjust baseline unit sales forecast  
Apply supply chain constraints  
Approve unit sales forecast as part of S&OP process  
Construct launch control protocol

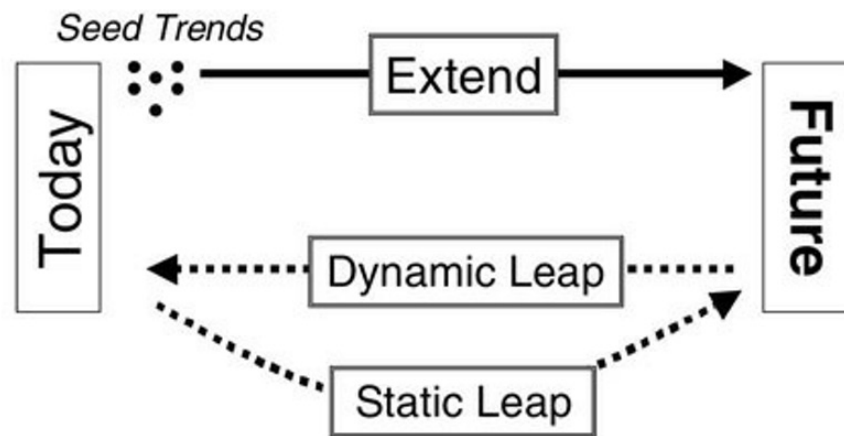
### Postlaunch

New product forecasting transitions to regular sales forecasting after first six periods of sales activity (usually after the first six months)  
New product forecast accuracy tracked during the first year and reported during the S&OP reporting process  
Track critical issues labeled in the launch control protocol  
Enact launch control protocol if trigger points are reached

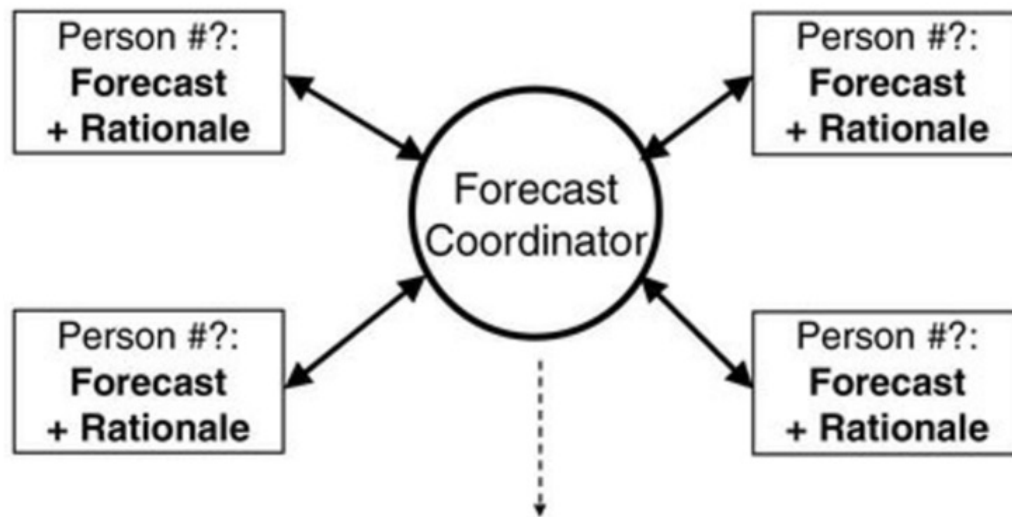
# New Product Forecasting and the SOP Process



# Scenario Analysis



## Delphi Approach



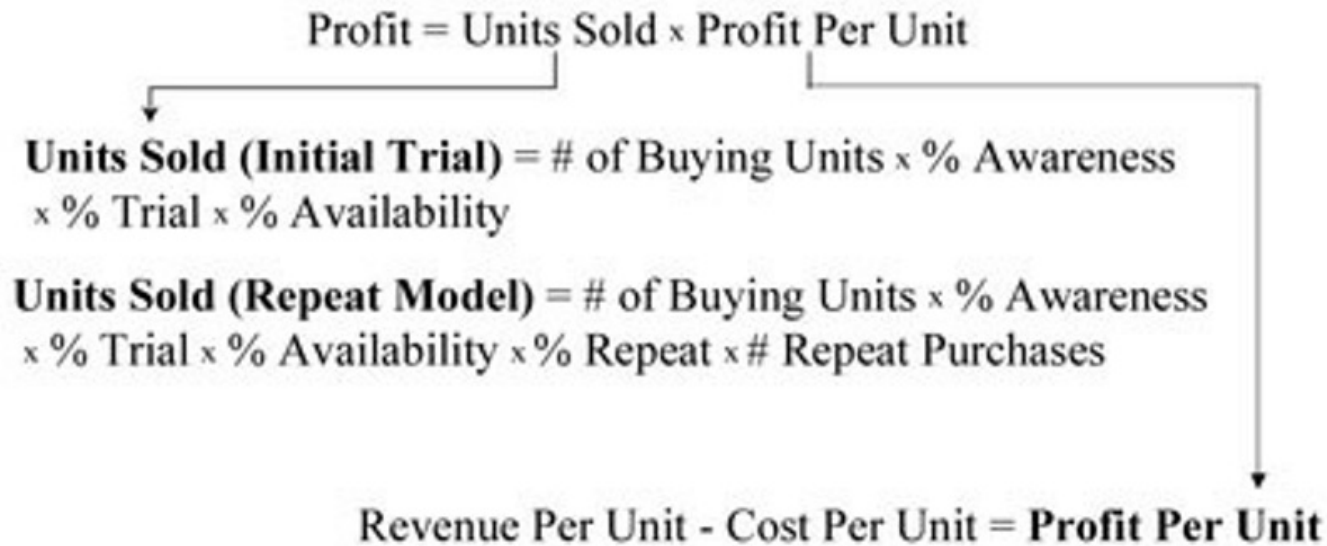
Goal = Consensus on the "Forecast"

# Assumption-Based Modeling Framework



# The ATAR Model

## (Awareness, Trial, Availability and Repeat) Purchases



# Ship-Share Model Example

|                                             |   |                                 |   |                           |   |                                          |
|---------------------------------------------|---|---------------------------------|---|---------------------------|---|------------------------------------------|
| Beginning<br>Retail<br>Inventory<br>400,000 | - | Consumer<br>Takeaway<br>118,235 | + | Factory<br>Shipments<br>? | = | Ending<br>Retail<br>Inventory<br>333,423 |
|---------------------------------------------|---|---------------------------------|---|---------------------------|---|------------------------------------------|

We know Beginning Retail Inventory = 400,000 units

We estimate Consumer Takeaway = 118,235 units

- ❖ Total Retail Unit Market Growth is 7%
- ❖ Company Unit Market Share is 6.8%

$$\text{Category Unit Sales} \times 1.07 \times .068 = 1,625,000 \times 1.07 \times .068 = 118,235 \text{ units}$$

We estimate Ending Retail Inventory = 333,423 units

- ❖ Retailers plan to decrease inventories 6% per month

$$\begin{aligned} \text{Prior Month Supply (3.0 months)} \times .94 &= 2.7 \text{ months supply} \\ 118,235 \times 2.7 &= 333,423 \text{ units} \end{aligned}$$

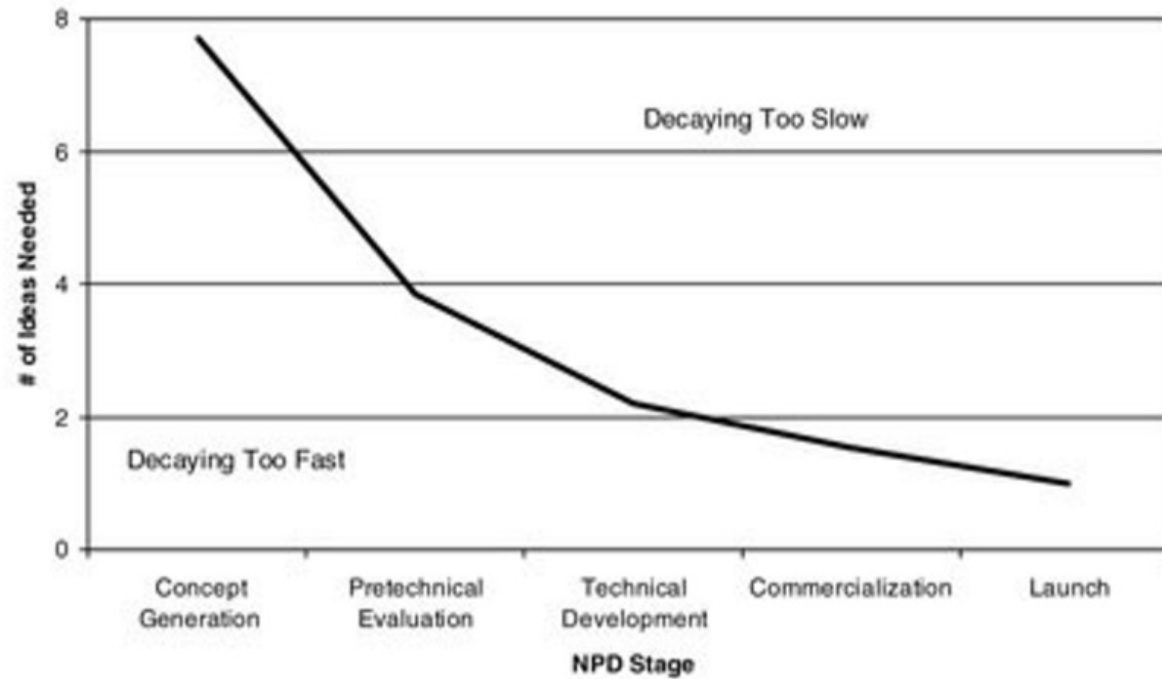
Factory Shipments = 51,658 units

# Evaluating the NPD Process

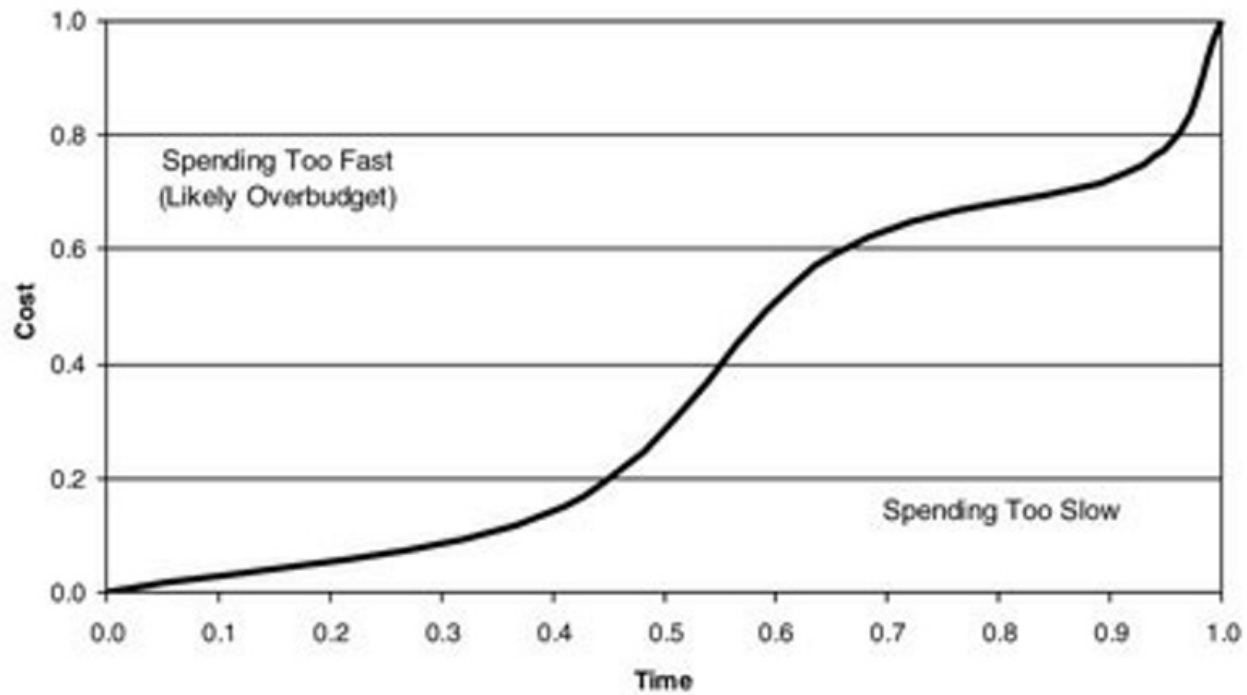
| NPD Stage | Risk | Cost                            | Time | No. of Ideas Needed |
|-----------|------|---------------------------------|------|---------------------|
| CG        | 0.50 | \$700,000                       | 5    | 7.71                |
| PTE       | 0.57 | \$4,100,000                     | 6    | 3.86                |
| TD        | 0.70 | \$2,600,000                     | 12   | 2.20                |
| C         | 0.65 | \$5,900,000                     | 4    | 1.54                |
| Totals    |      | \$13,300,000                    | 27   | 1.00                |
|           |      |                                 |      |                     |
|           |      | Prcbability of 1 Success =      |      | 0.1297              |
|           |      | # of IdeasNeeded f or Success = |      | 7.71                |

| NPD Stage       | No. of Ideas | Cost Considerations |                  |                       | Time Considerations |                  |                       |
|-----------------|--------------|---------------------|------------------|-----------------------|---------------------|------------------|-----------------------|
|                 |              | Expected Cost       | Percent of Total | Cumulative Percentage | Expected Time       | Percent of Total | Cumulative Percentage |
| CG              | 7.71         | \$5,398,111         | 15%              | 15%                   | 38.56               | 41%              | 41%                   |
| PTE             | 3.86         | \$15,808,753        | 44%              | 59%                   | 23.13               | 25%              | 65%                   |
| TD              | 2.20         | \$5,714,286         | 16%              | 75%                   | 26.37               | 28%              | 93%                   |
| C               | 1.54         | \$9,076,923         | 25%              | 100%                  | 6.15                | 7%               | 100%                  |
|                 |              |                     |                  |                       |                     |                  |                       |
| Total           |              | \$35,998,072        |                  |                       | 94.22               |                  |                       |
| One-Shot Totals |              | \$102,564,103       |                  |                       | 208.21              |                  |                       |
| Difference      |              | -\$66,566,030       |                  |                       | -113.99             |                  |                       |

# The Decay Curve



# The Expenditure Curve



## Pessimistic, Likely, and Optimistic Values for a Given Assumption-Based Model

|                  | Pessimistic case | Likely case<br>(base case) | Optimistic case |
|------------------|------------------|----------------------------|-----------------|
| Market size      | \$3,000,000,000  | \$3,000,000,000            | \$3,000,000,000 |
| Percent core use | 0.70             | 0.40                       | 0.80            |
| Market share     | 0.20             | 0.10                       | 0.30            |
| Buying intent    | 0.25             | 0.20                       | 0.30            |
| Market coverage  | 0.85             | 0.80                       | 0.95            |

Assumptions-Based Model Equation:

$$\text{\$ Sales} = \text{Market Size} \times \% \text{ Core Use} \times \% \text{ Market Share} \times \% \text{ Buying Intent} \times \% \text{ Market Coverage}$$

## An Example of Model Sensitivity with Regard to Financial Outcome

|                  | Pessimistic case | Optimistic case | Likely case<br>(base case) |
|------------------|------------------|-----------------|----------------------------|
| Percent core use | \$51,000,000     | \$102,000,000   | \$89,250,000               |
| Market share     | \$44,625,000     | \$133,875,000   | \$89,250,000               |
| Buying intent    | \$71,400,000     | \$107,100,000   | \$89,250,000               |
| Market coverage  | \$84,000,000     | \$ 99,750,000   | \$89,250,000               |

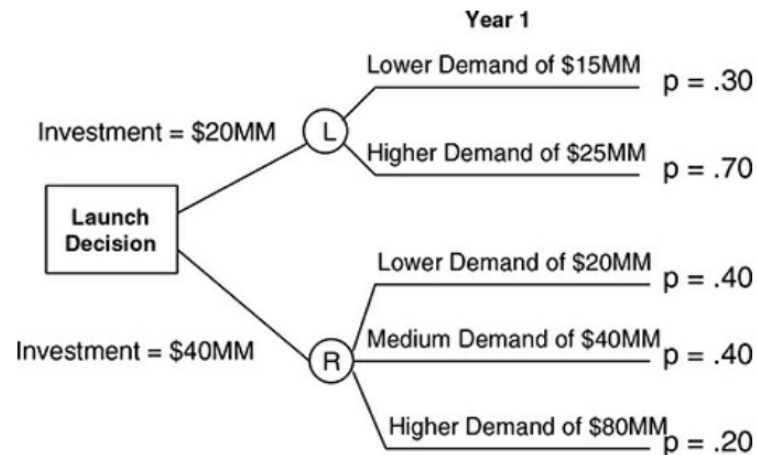
## An Example of Evaluating Potential Shortfall, Upside, and Total Risk

|                  | Potential shortfall<br>from the base case<br>if the pessimistic<br>case were to occur | Potential upside<br>from the base<br>case if the<br>optimistic case<br>were to occur | Potential risk (in<br>terms of financial<br>revenue range) |
|------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------|
| Percent core use | -\$38,250,000                                                                         | \$12,750,000                                                                         | \$51,000,000                                               |
| Market share     | -\$44,625,000                                                                         | \$44,625,000                                                                         | \$89,250,000                                               |
| Buying intent    | -\$17,850,000                                                                         | \$17,850,000                                                                         | \$35,700,000                                               |
| Market coverage  | -\$5,250,000                                                                          | \$10,500,000                                                                         | \$15,750,000                                               |

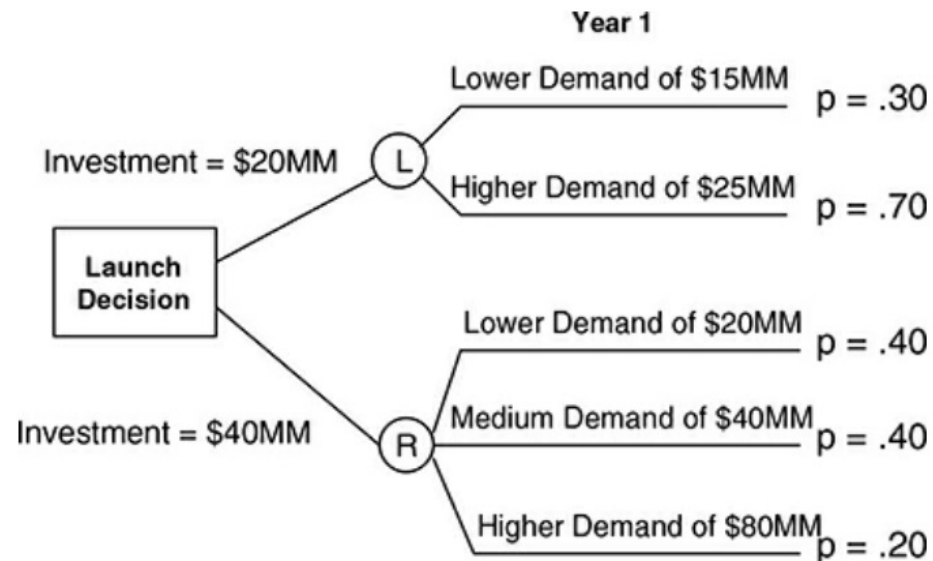
# An Example of Simulation Data Using the @Rand Function of Excel

|           | Market size<br>(constant) | Percent<br>core use | Market<br>share | Buying<br>intent | Market<br>coverage | Financial<br>revenue |
|-----------|---------------------------|---------------------|-----------------|------------------|--------------------|----------------------|
| Base case | \$3,000,000,000           | 0.70                | 0.20            | 0.25             | 0.95               | \$89,250,000         |
| Run 1     | \$3,000,000,000           | 0.43                | 0.15            | 0.22             | 0.91               | \$40,454,556         |
| Run 2     | \$3,000,000,000           | 0.74                | 0.13            | 0.26             | 0.83               | \$64,462,989         |
| Run 3     | \$3,000,000,000           | 0.57                | 0.26            | 0.24             | 0.89               | \$94,740,045         |
| Run 4     | \$3,000,000,000           | 0.69                | 0.15            | 0.21             | 0.91               | \$60,113,354         |
| Run 5     | \$3,000,000,000           | 0.47                | 0.25            | 0.26             | 0.91               | \$85,676,052         |
| ***       | ***                       | ***                 | ***             | ***              | ***                | ***                  |

## Graphic Results



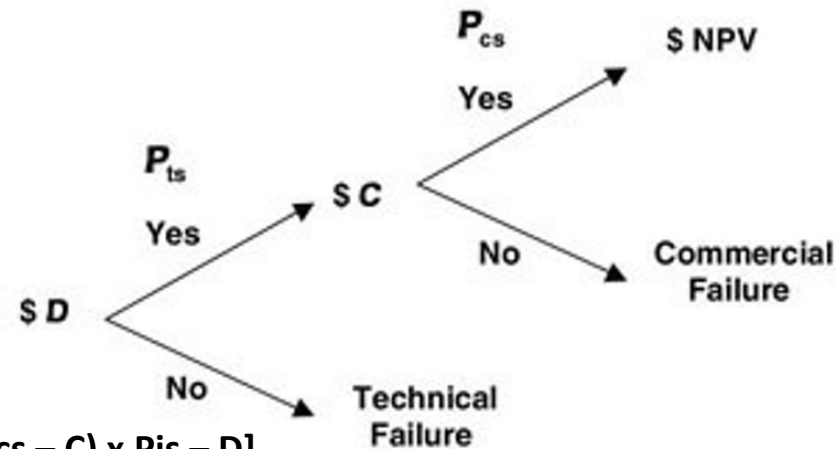
## Expected Return After Year 1



$$E \text{ (Local Option)} = (.3 \times \$15\text{MM}) + (.7 \times \$25\text{M}) - \$20\text{MM} = \underline{\$2 \text{ Million}}$$

$$R \text{ (Regional Option)} = (.4 \times \$20\text{MM}) + (.4 \times \$40\text{MM}) + (.2 \times \$80\text{MM}) - \$40\text{MM} = \underline{\$0 \text{ Million}}$$

# ECV (Expected Commercial Value)



$$\text{\$ ECV} = [(\text{NPV} \times P_{cs} - C) \times P_{ts} - D]$$

Where

$\text{\$ ECV}$  = Expected Commercial Value

$\text{\$ D}$  = Development Costs remaining in the project

$P_{ts}$  = Probability of Technical Success

$\text{\$ C}$  = Commercialization (Launch) Costs

$P_{cs}$  = Probability of Commercial Success

$\text{\$ NPV}$  = Net Present Value of the Project's Future Earnings

| Project | NPV   | $P_{ts}$ | $P_{cs}$ | $\text{\$ D}$ | $\text{\$ C}$ | ECV  |
|---------|-------|----------|----------|---------------|---------------|------|
| a       | 50    | 0.6      | 0.75     | 5             | 3             | 15.7 |
| b       | 66.25 | 0.5      | 0.8      | 10            | 2             | 15.5 |

## Customer/Market Research

- **NPD should not rely solely on internal sources and company personnel judgment**
- **Three different types of testing may occur with customers throughout the NPD process**

# Concept Testing

## ➤ Four Types

### ➤ Narrative Statement

- Provide customers with a written product description

### ➤ Pictorial

- Picture

### ➤ Prototype

### ➤ Virtual Reality or Reality of the Product

# Concept Testing

## ➤ Lead User Analysis

- Focus on Customers designated as “Lead Users”

## ➤ Market Testing

- Pilot in a Region
- Direct Marketing
- Minimarket Trial
- Full Scale (Geographic Region)

# Conjoint Analysis

## ➤ Forecast Customer Preferences

- Quantitatively Calculates a Metric of Desirability (Utility) for each Attribute

## ➤ Customer Conjoint Analysis Data

| Dimensions |        |                  | Customer provided<br>rankings of<br>combinations | Desirability scores |
|------------|--------|------------------|--------------------------------------------------|---------------------|
| Zoom       | Pixels | Water resistance |                                                  |                     |
| 5X         | 2MM    | WR               | 10                                               | 3                   |
| 10X        | 2MM    | WR               | 8                                                | 5                   |
| 2X         | 2MM    | WR               | 12                                               | 1                   |
| 5X         | 2MM    | WP               | 9                                                | 4                   |
| 10X        | 2MM    | WP               | 7                                                | 6                   |
| 2X         | 2MM    | WP               | 11                                               | 2                   |
| 5X         | 5MM    | WR               | 4                                                | 9                   |
| 10X        | 5MM    | WR               | 2                                                | 11                  |
| 2X         | 5MM    | WR               | 6                                                | 7                   |
| 5X         | 5MM    | WP               | 3                                                | 10                  |
| 10X        | 5MM    | WP               | 1                                                | 12                  |
| 2X         | 5MM    | WP               | 5                                                | 8                   |

<https://run.conjoint.ly/tasks>