

PRODUCT MANAGEMENT

Week # 10

Mar 28, 2019



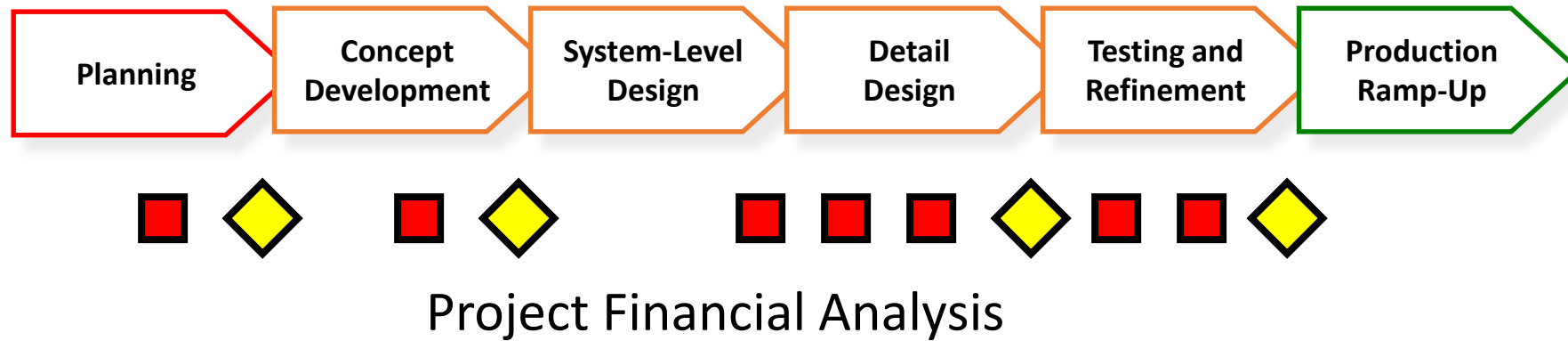
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Product Profitability Assessment

- Financial Analysis - Introduction
- Product Development Cash Flow
- Financial Modelling
- Sensitivity and Trade-off analysis

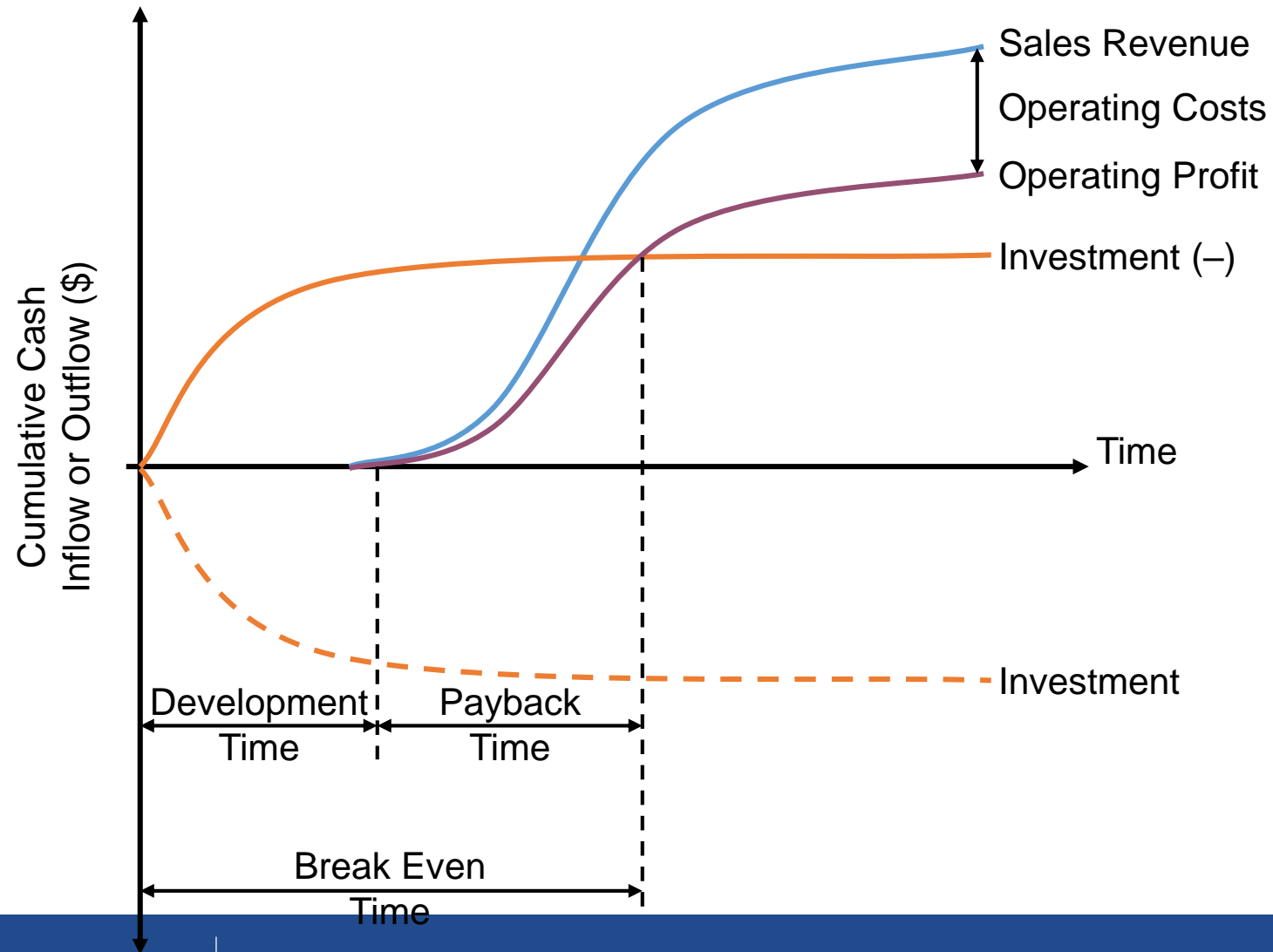
Product Development Process



◆ Go/No-Go Decision Gates

■ Sensitivity and Trade-off Analysis

Product Development Cash Flow



Profitability analysis

Profitability analysis is the assessment of the impact of various marketing strategies and programs on the profit contribution that can be expected from a product or product line

Cost elements

- Variable costs vary with sales volume, whereas fixed costs remain the same regardless of volume levels.
- The percentage variable contribution margin indicates the percentage of each additional sales dollar (unit of Revenue) that will be available to help the firm cover its fixed costs and increase profits.
- Direct fixed costs are incurred by a specific product or service
- indirect fixed costs, are incurred to support the total business

Economic Analysis : When should it be performed?

- At the Stage gates where Go/No Milestones when decisions are to be taken like
 - Should we try to develop a product to address the market opportunity
 - Should we proceed with the implementation of the selected concept?
 - Should we launch the product we have developed?
 - All the decisions arise at the end of each phase of development

Questions to be answered using Financial Modelling

- Will the project be profitable enough to pay back the initial investment?
- What if our financial projections are wrong?
- What is the worst case for breakeven?
- Is it worth it to invest in more expensive [tooling, design, packaging, recycling]?
- Can we sell machines at a loss in order to get a stream of ongoing revenue from sales of [consumables, renewables, service]?
- What is the cost (value) of recycling?
- What if a new competitor joins the market?

Economic Analysis Process

1. Build a baseline financial model
2. Perform sensitivity analysis to understand the relationship between financial success and key assumptions and variables of the model
3. Use the sensitivity analysis to understand project trade-offs
4. Consider the influence of the qualitative factors on project success

Net Present Value

Net present value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows over a period of time. NPV is used in capital budgeting and investment planning to analyze the profitability of a projected investment or project.

$$NPV = \sum_{\text{periods}} \frac{\text{period cash flow}}{(1 + \text{discount rate})^{\text{period}}}$$

$$NPV = \sum_{i=1}^N \frac{C_i}{(1 + r)^i}$$



Step-1 : Build a Baseline Financial Model

Constructing the baseline model consists of estimating the timing and magnitude of future cash flows and then computing the NPV of those cash flows

Estimate the timing and magnitude of future cash inflows and outflows

Timing and magnitude of cashflows is estimated by merging the project schedule with the project budget, sales volume, forecasts and estimated costs (production and marketing)

Major** Cashflow components

Outflows	Inflows
<ol style="list-style-type: none">1. Development costs2. Ramp-up costs3. Marketing and Support costs4. Production Cost	Sales Revenue

** A full blown model would include Tax components , depreciation, write-offs etc. However we would explore a simplified model







Typical Inputs for NPV Analysis

- Development and testing cost (+ timing)
- Tooling investment (+ timing)
- Ramp-up cost and timing
- Marketing and support (+ timing)
- Sales volume (+ lifetime)
- Unit production cost
- Unit revenue
- Recycling cost or revenue
- Discount rate



Base-Case Model Inputs

<u>Model Inputs</u>	<u>Model Values</u>
Sales Volume Growth, machines	15% per year
Initial Sales Volume, machines	200000 units/year
Initial Retail Price, machines	\$260 per unit
Distributor + Retail Margin	40%
Retail Price Growth, machines	-10% per year
Sales Volume, capsules	400 capsules/machine each year
Initial Retail Price, capsules	\$0.60 per unit <input checked="" type="checkbox"/> Capsule Sales
Retail Price Growth, capsules	5% per year
Product Development	5.0 \$M over 1 year
Equipment and Tooling	4.0 \$M over 1/2 year
Production Ramp-up	2.0 \$M over 1/2 year
Market Launch	10.0 \$M over 1/2 year
Marketing and Support	5.0 \$M/year
Production Cost, machines	\$55 per unit
Production Overhead	1.0 \$M/year
Production Cost, capsules	\$0.050 per unit
Recycling Rate, capsules	20% <input type="checkbox"/> Recycling?
Recycling Overhead	0.50 \$M/year
Recycling Cost, capsules	\$0.010 per unit
Recycling Recovery Value	\$0.0010 per unit (1g Al @ \$1/kg)
Discount Rate	7%



Project Schedule

	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Development																
Ramp Up																
Marketing and Support																
Production and Sales																

Coffee Machines Only

Value in \$Million (except where noted)			Year 1				Year 2				Year 3				Year 4			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Period			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Sales Volume																		
Sales Volume, Machines (units/qtr)							40000	50000	50000	60000	46000	57500	57500	69000	52900	66125	66125	79350
Unit Wholesale Revenue, Machines(\$/unit)							156	156	156	156	140	140	140	140	126	126	126	126
Total Revenue							6.24	7.80	7.80	9.36	6.44	8.05	8.05	9.66	6.67	8.33	8.33	10.00
Product Development			1.25	1.25	1.25	1.25												
Equipment and Tooling					2	2												
Production Ramp-up						1	1											
Marketing and Support						6.25	6.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Production, Machines																		
Production Machines							2.2	2.75	2.75	3.3	2.53	3.163	3.163	3.795	2.91	3.637	3.637	4.364
Production Overhead (1million/year)							0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Production Cost							2.45	3	3	3.55	2.78	3.413	3.413	4.045	3.16	3.89	3.89	4.61
Total Costs			1.25	1.25	3.25	10.5	9.7	4.25	4.25	4.8	4.03	4.66	4.66	5.3	4.41	5.14	5.14	5.86
Period Cash Flow			-1.25	-1.25	-3.25	-10.5	-3.46	3.55	3.55	4.56	2.41	3.39	3.39	4.36	2.26	3.19	3.19	4.14
Discounted Rate			7%															
Period Present Value			-1.25	-1.21	-3.09	-9.8	-3.17	3.2	3.14	3.97	2.06	2.85	2.8	3.54	1.8	2.5	2.46	3.14
NPV			12.9															

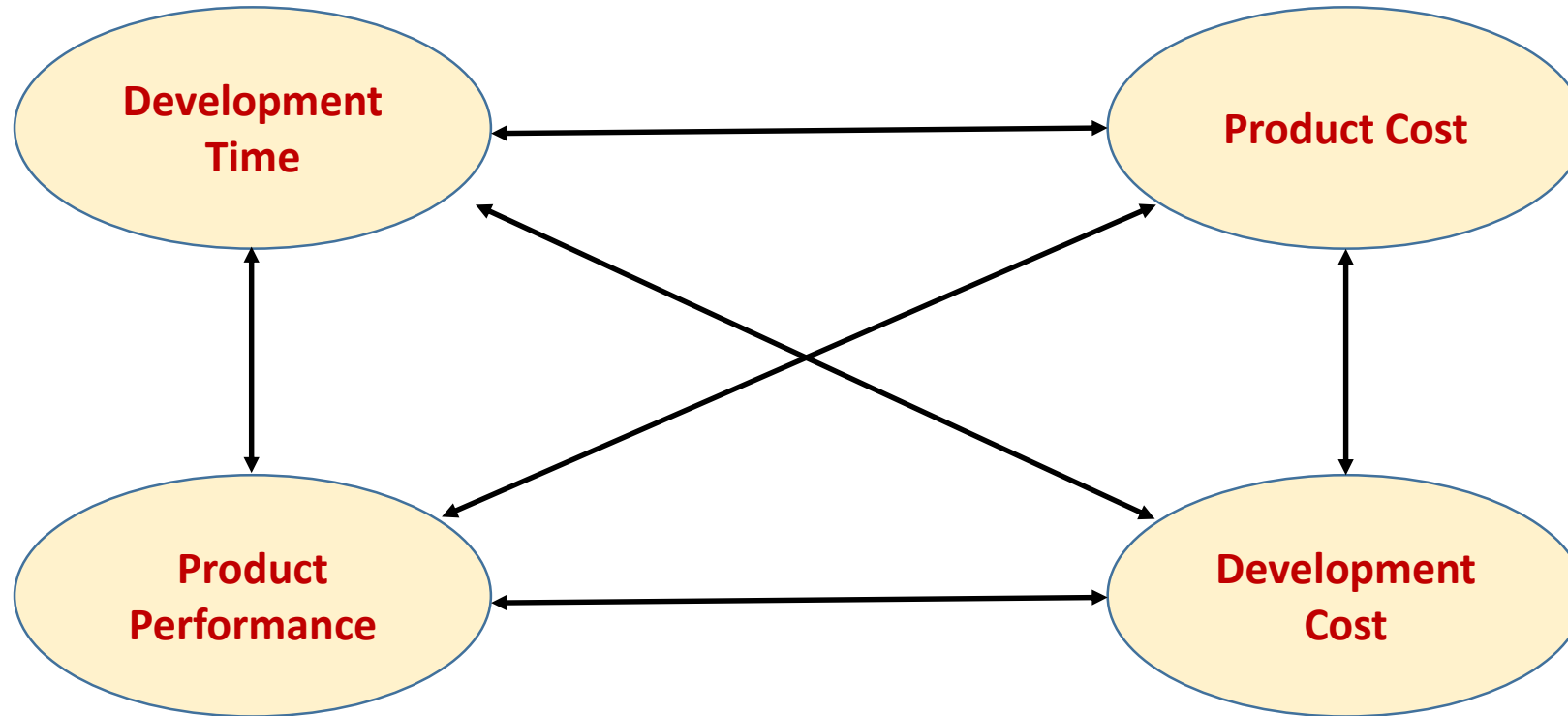


Sensitivity Analysis

- Uses the financial model to address “What if “ questions by calculating the change in NPV corresponding change in the factors included in the model
- Internal and external factors influence the project value

Project Trade-Offs

Six Potential Interactions



Sensitivity Analysis

Internal Factors

- Development cost
- Development Time
- Production Cost
- Production Performance
- Ramp up cost



**Product
Development Project**



External Factors

- Product Price
- Sales Volume
- Competition Effects



NPV

Coffee Machines and Capsules

Values in \$M (except where noted)	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Sales, machines					6.24	7.80	7.80	9.36	6.46	8.07	8.07	9.69	6.68	8.36	8.36	10.03
<i>Sales Volume, machines (units/qtr)</i>					40,000	50,000	50,000	60,000	46,000	57,500	57,500	69,000	52,900	66,125	66,125	79,350
<i>Unit Wholesale Revenue, machines (\$/unit)</i>					156	156	156	156	140	140	140	140	126	126	126	126
Sales, capsules					1.44	3.24	5.04	7.20	9.30	11.47	13.65	16.25	19.17	21.79	24.42	27.56
<i>Sales Volume, capsules (units/qtr)</i>					4,000,000	9,000,000	14,000,000	20,000,000	24,600,000	30,350,000	36,100,000	43,000,000	48,290,000	54,902,500	61,515,000	69,450,000
<i>Unit Wholesale Revenue, capsules (\$/unit)</i>					0.36	0.36	0.36	0.36	0.38	0.38	0.38	0.38	0.40	0.40	0.40	0.40
Total Revenue					7.68	11.04	12.84	16.56	15.76	19.55	21.72	25.94	25.85	30.15	32.77	37.59
Product Development	1.25	1.25	1.25	1.25												
Equipment and Tooling			2.00	2.00												
Production Ramp-up				1.00	1.00											
Marketing and Support				6.25	6.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Production, machines					2.45	3.00	3.00	3.55	2.78	3.41	3.41	4.05	3.16	3.89	3.89	4.61
Production, capsules					0.20	0.45	0.70	1.00	1.23	1.52	1.81	2.15	2.41	2.75	3.08	3.47
Total Costs	1.25	1.25	3.25	10.50	9.90	4.70	4.95	5.80	5.26	6.18	6.47	7.45	6.82	7.88	8.21	9.34
Period Cash Flow	-1.25	-1.25	-3.25	-10.50	-2.22	6.34	7.89	10.76	10.50	13.37	15.25	18.50	19.03	22.26	24.56	28.25
Period Present Value	-1.23	-1.21	-3.09	-9.80	-2.04	5.71	6.99	9.37	8.98	11.24	12.60	15.02	15.19	17.46	18.93	21.41
Net Present Value	125.5															



Model Uncertainty

Model Inputs	Model Values
Sales Volume Growth, machines	15% per year
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Marketing and Support	5.0 \$M/year
Production Cost, machines	\$55 per unit
Production Overhead	1.0 \$M/year
Production Cost, capsules	\$0.050 per unit

Uncertainty of Model Values		
Base	Worst	Best
15%	-5%	25%
200000	100000	250000
\$260	\$225	\$295
40%	50%	35%
-10%	-15%	5%
400	250	600
\$0.60	\$0.55	\$0.70
5%	0%	5%
5.0	7.0	4.0
4.0	5.0	3.0
2.0	2.5	1.5
10.0	15.0	8.0
5.0	6.0	4.0
\$55	\$60	\$50
1.0	1.2	0.8
\$0.050	\$0.055	\$0.045

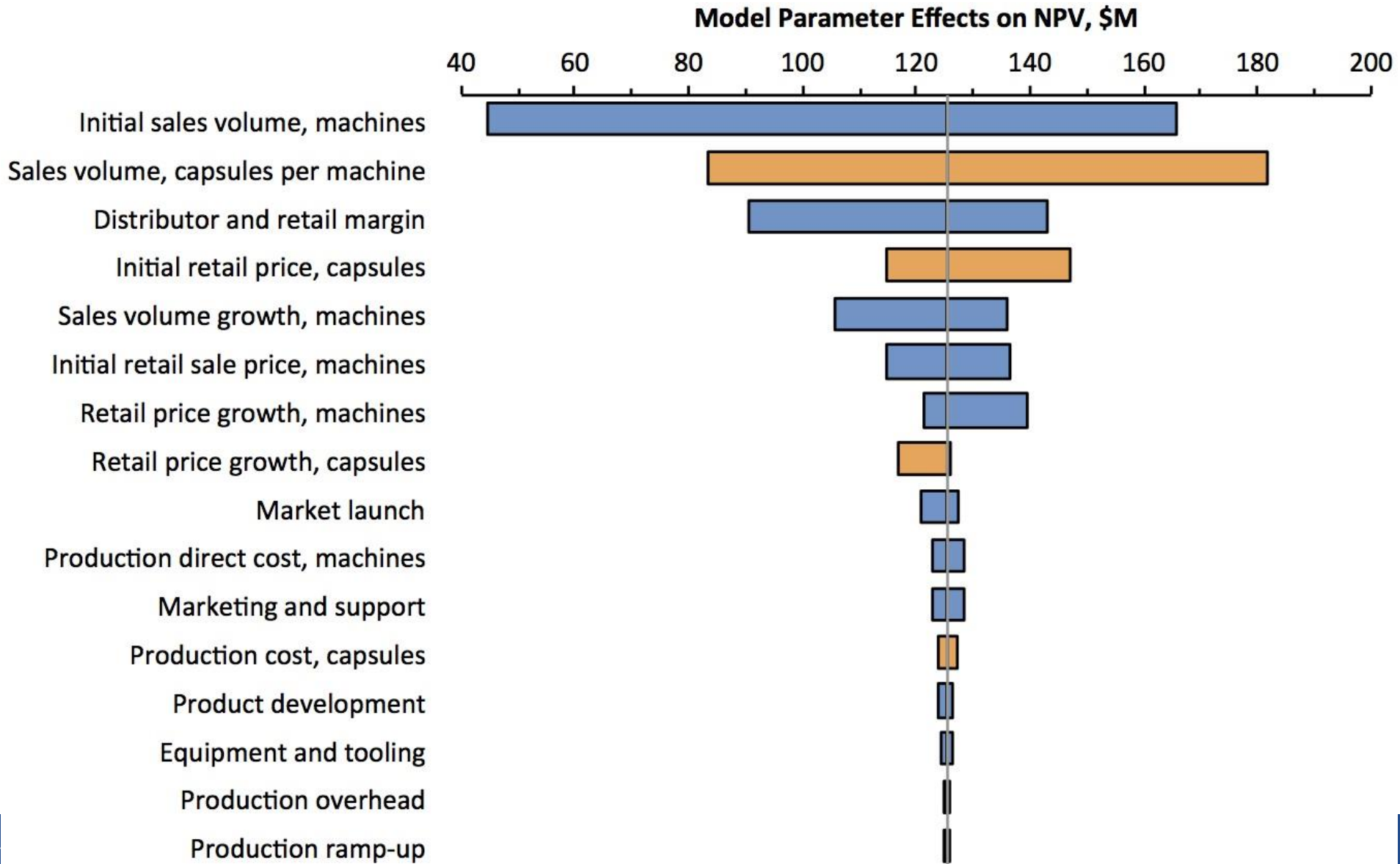


Sensitivity Analysis – with capsules

		Uncertainty of Model Values			with Capsules	
Model Inputs	Model Values	Base	Worst	Best	Worst	Best
Sales Volume Growth, machines	15% per year	15%	-5%	25%	105.9	136.1
Initial Sales Volume, machines	200000 units/year	200000	100000	250000	44.8	165.9
Initial Retail Price, machines	\$260 per unit	\$260	\$225	\$295	114.7	136.4
Distributor + Retail Margin	40%	40%	50%	35%	90.6	143.0
Retail Price Growth, machines	-10% per year	-10%	-15%	5%	121.2	139.4
Sales Volume, capsules	400 capsules/machine each year	400	250	600	83.4	181.7
Initial Retail Price, capsules	\$0.60 per unit <input checked="" type="checkbox"/> Capsule Sale	\$0.60	\$0.55	\$0.70	114.8	147.1
Retail Price Growth, capsules	5% per year	5%	0%	5%	116.8	125.5
Product Development	5.0 \$M over 1 year	5.0	7.0	4.0	123.6	126.5
Equipment and Tooling	4.0 \$M over 1/2 year	4.0	5.0	3.0	124.6	126.5
Production Ramp-up	2.0 \$M over 1/2 year	2.0	2.5	1.5	125.1	126.0
Market Launch	10.0 \$M over 1/2 year	10.0	15.0	8.0	120.9	127.4
Marketing and Support	5.0 \$M/year	5.0	6.0	4.0	122.8	128.3
Production Cost, machines	\$55 per unit	\$55	\$60	\$50	122.7	128.4
Production Overhead	1.0 \$M/year	1.0	1.2	0.8	125.0	126.0
Production Cost, capsules	\$0.050 per unit	\$0.050	\$0.055	\$0.045	123.9	127.2



Tornado Chart Displays Uncertainty Analysis





Recycling Decision

- Recycling costs
 - Infrastructure
 - Take-back program
 - Marketing activity
- Recycling benefits
 - Environmental impact
 - Materials recovery
 - Sales



End of Session



