

DS3000: Entrepreneurship & Management functions

Session 7



INDIAN INSTITUTE OF INFORMATION TECHNOLOGY,
DESIGN AND MANUFACTURING,
KANCHEEPURAM

- Dr Sudhir Varadarajan
- Dr Suresh Varadarajan

Contents

Capital Requirements and Sources of Funds

Valuation of a Firm (& startups)

Profitability Analysis

Profitability Analysis (Example)

Estimating Financial Requirements

- Long-term funds (capital requirement). Long term funds can be estimated by
 - Listing fixed assets of various types, namely,
 - Land
 - Buildings
 - Plant & machinery
 - Acquisition of patents and
 - Trade investments (all these are blocked for a long period > 1 yr)
 - Computing the working capital requirement (part of it is considered as long-term)
- Short-term funds – working capital requirement
 - To pay for production (labor/material) & operating costs (sales & general admin)

Sources of funds

- Sources of long-term finance:
 - Shareholder funds
 - the amount raised by issue of equity or preference shares
 - the amount of retained profits not distributed amongst shareholders as dividend
 - Loans or debentures (long-term debt) – fixed rate of interest
- Incubators / Angels / Venture Capitalists in the case of startups

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Valuation

- Valuation usually refers to the process for determining the total value of a company.
- Book value is simply the owner's equity in the balance sheet.
- But, the market value of the business – what an acquirer would pay for it – may be quite different
- Publicly traded companies can measure their market value every day – multiply daily stock price by the number of shares outstanding.
- A privately held company must estimate its market value

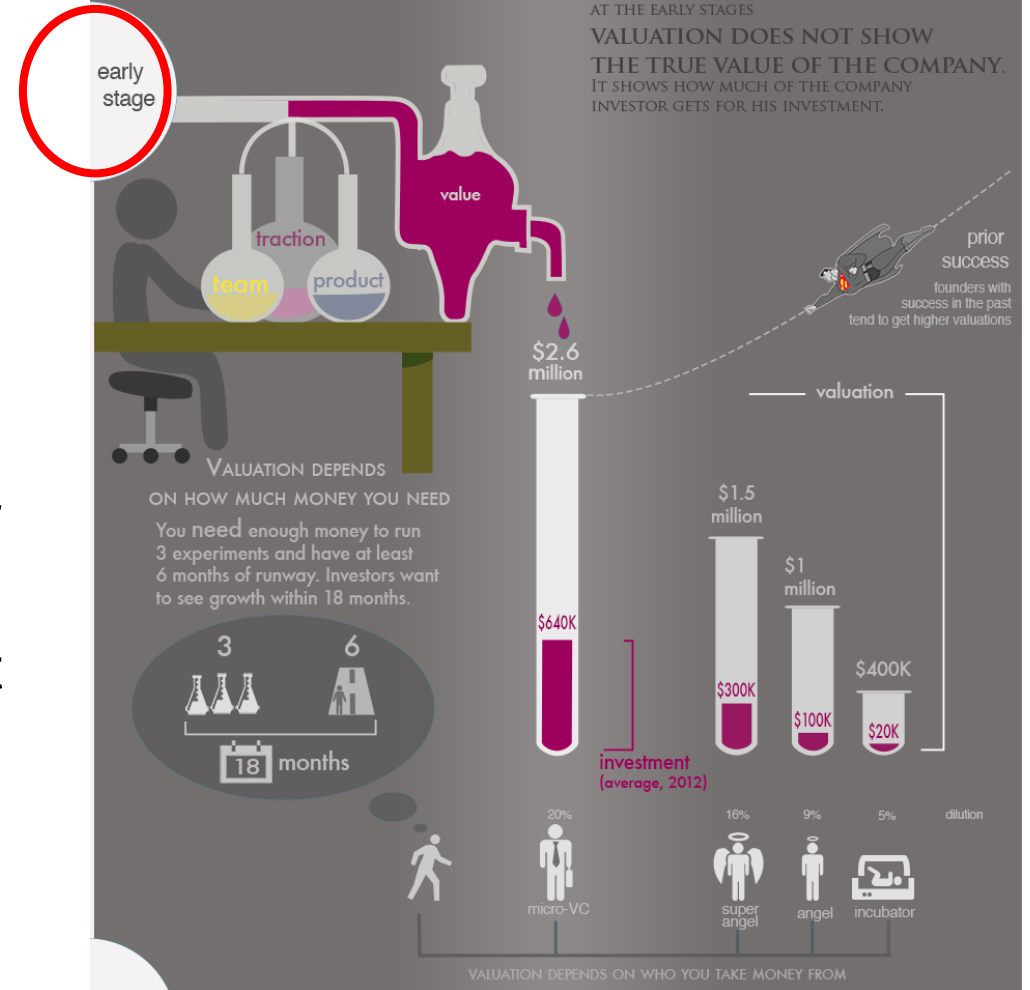
Market Multiples

- Apply valuation ratio of comparable firm to firm being valued
 - Examples: P-E, market value/book value, Market value/ Sales, EBITDA
- Value of firm = Average P/E multiple in industry \times EPS of firm
- P/E method can be used when
 - firms in the industry are profitable (have positive earnings)
 - firms in the industry have similar growth (more likely for “mature” industries)
 - firms in the industry have similar capital structure
- Market Value/Book Value is used more in manufacturing (where book value = equity)
- EBITDA multiple is used more in software services (measures value of operations)



Valuation of Startups?

- It is a basis for deciding how much of the company's equity will the entrepreneur have to give up in order to raise required amount of capital?
- An entrepreneur wants to project higher valuation to raise more capital
- An investor wants the opposite so that it will give him access to more share of the company

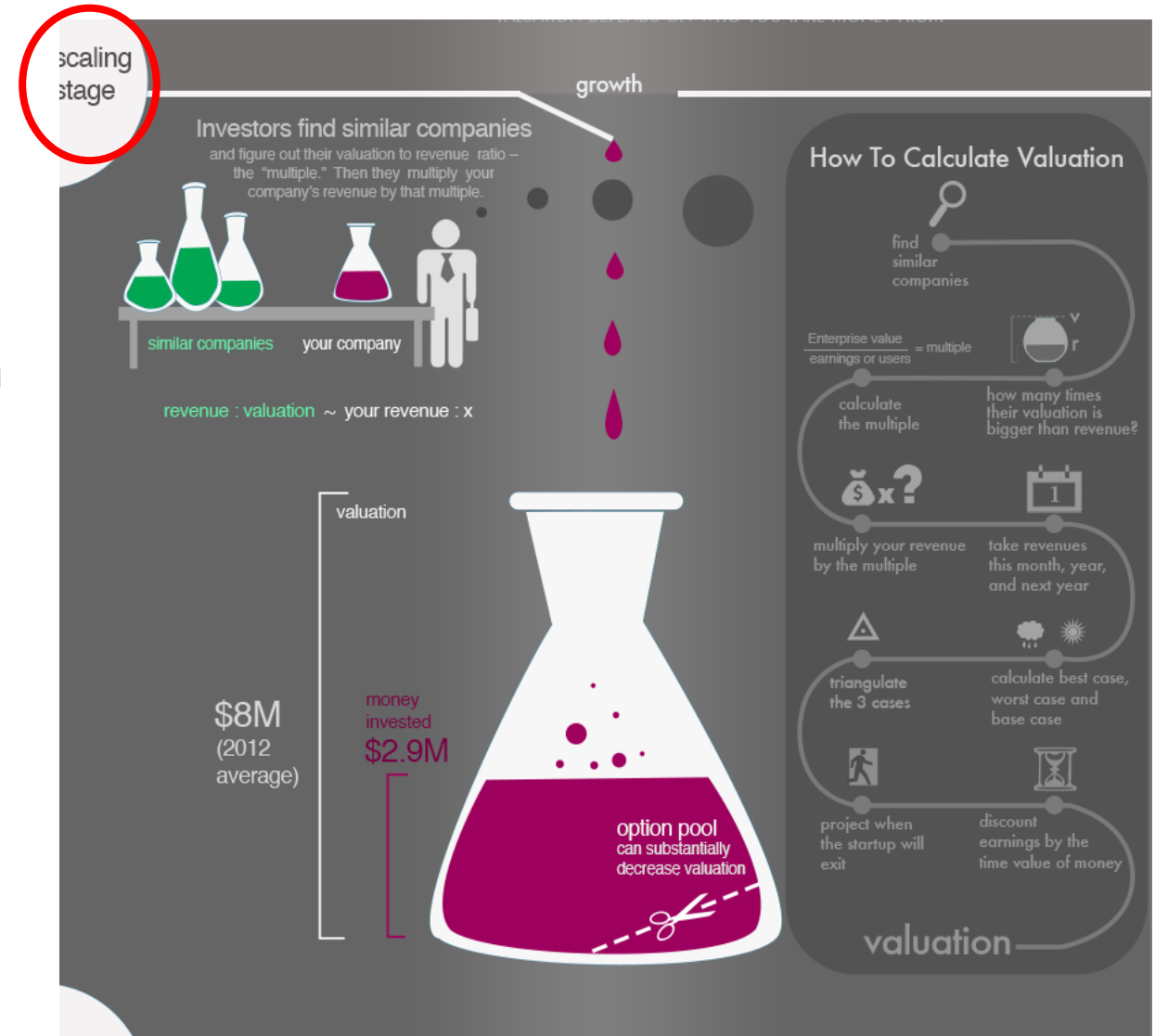


Source: <https://blog.adioma.com/how-startup-valuation-works-infographic/>



How to do valuation?

- Three frequently used approaches
 - Estimate future cash flows and use an interest rate to compute its worth now (DCF)
 - Look at the market value of a publicly traded companies that are similar
 - Evaluate the company's assets – tangible and intangible (patents/customer list)



Source: <https://blog.adioma.com/how-startup-valuation-works-infographic/>

Discounted cash flow

- Time value of money
 - What is the present value of \$100 to be received next year?
 $PV = CF_t / (1+r)^t$
If $r = 10\%$, ... risk associated with the cash flow
 $PV = 100 / (1+0.1) = \$90.91$

What is r ? Required rate of return – usually 40-60% in VC situations



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.

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

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

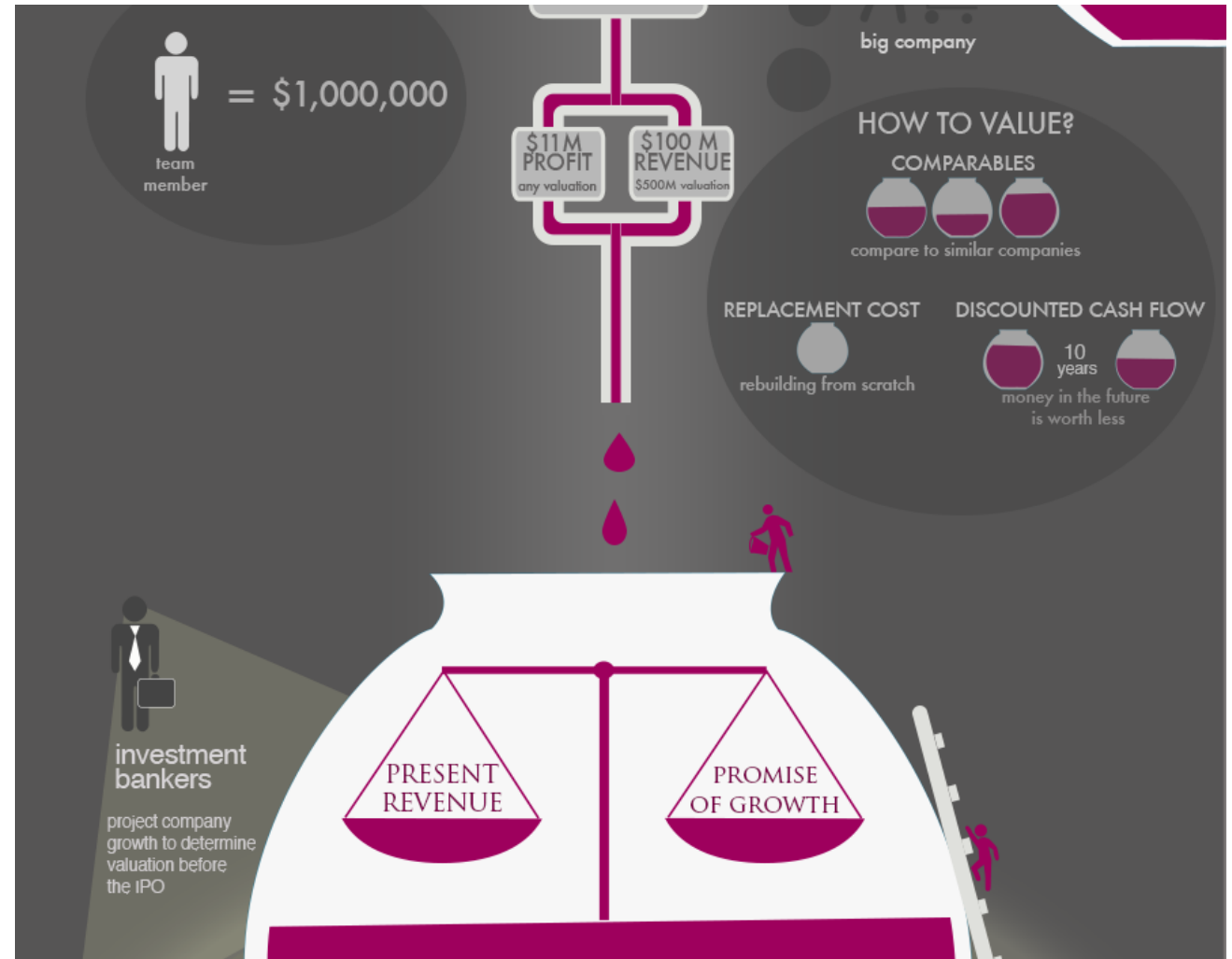


Things to work out before next class

Start preparing a 3-year income statement for your firm

Assess fixed and variable costs (capital requirements & cost of goods sold / operating expenses)

To be submitted with the final business plan



Source: <https://blog.adioma.com/how-startup-valuation-works-infographic/>

Contents

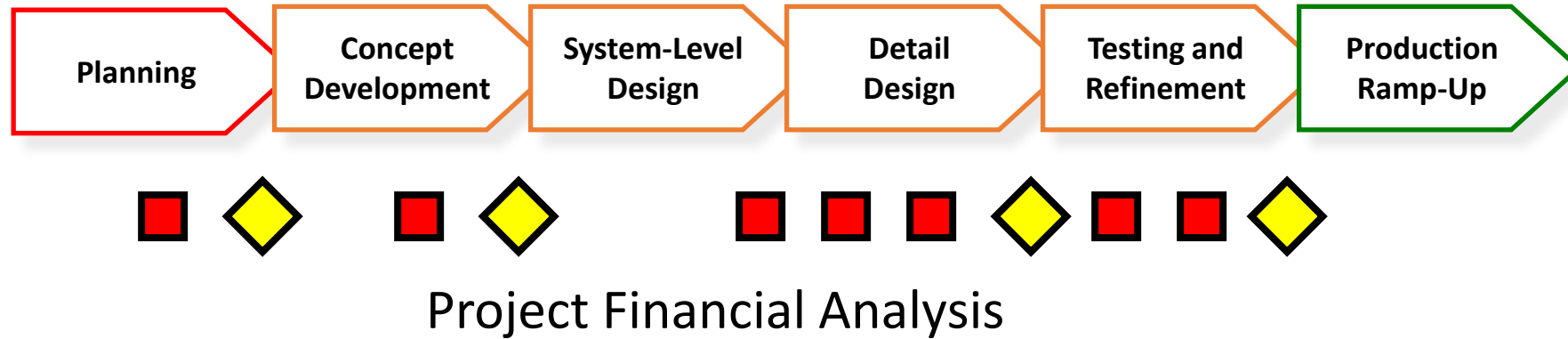
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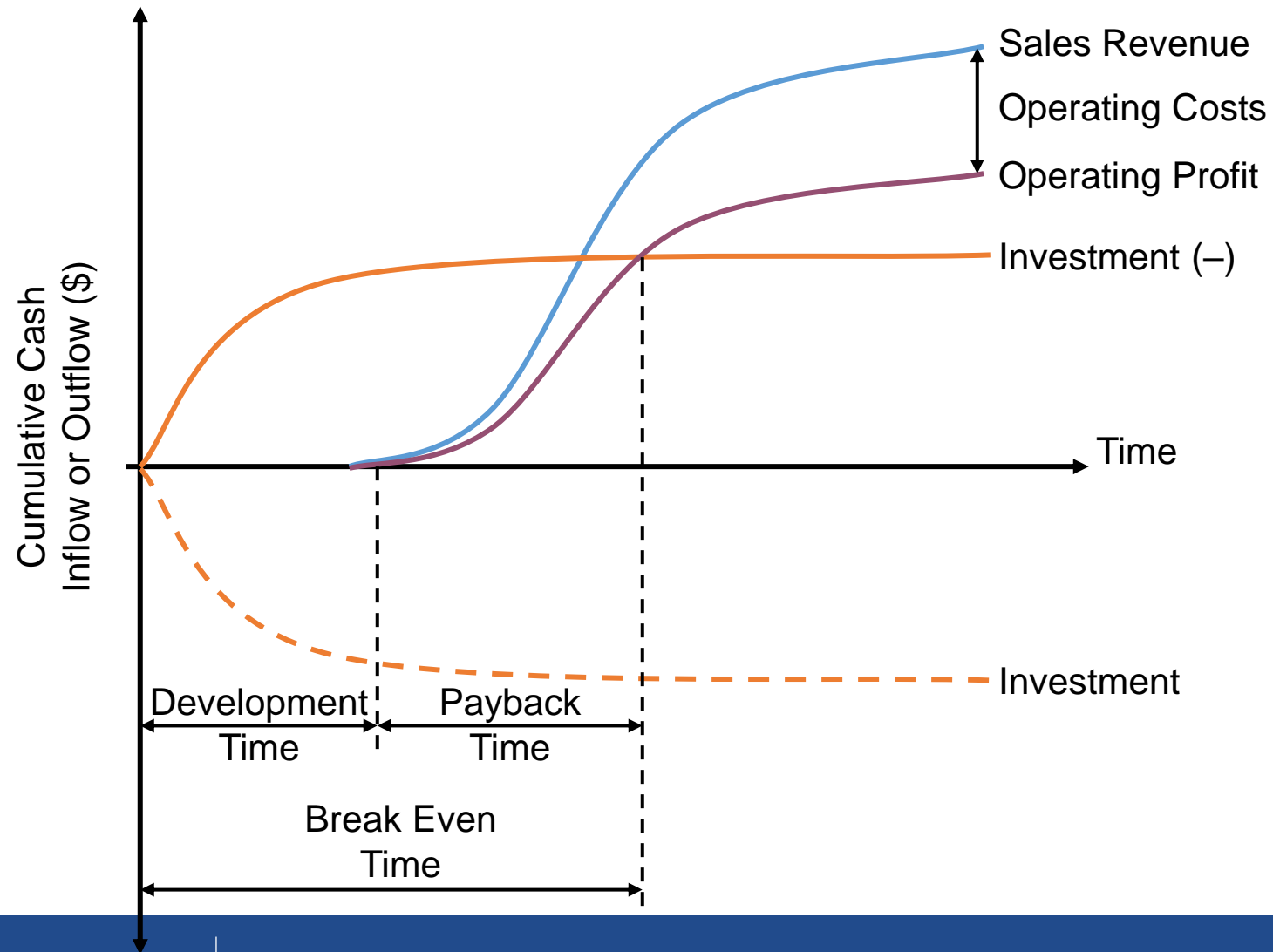
Product Development Process



◆ 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



Return of Investment (ROI)

- Return on investment (ROI) is a financial ratio used to calculate the benefit an investor will receive in relation to their investment cost. It is most commonly measured as net income divided by the original capital cost of the investment. The higher the ratio, the greater the benefit earned.

$$ROI = \text{Net Income} / \text{Cost of Investment}$$

- $ROI = \text{Investment Gain} / \text{Investment Base}$

Benefits and Limitations of ROI

Benefits

1. Simplicity, Easy to calculate
2. Universally well Understood

Limitations

1. The ROI Formula Disregards the Factor of Time
2. The ROI Formula is Susceptible to Manipulation

An investor needs to look at the true ROI, which accounts for all possible costs incurred when each investment increases in value.

Alternatives to the ROI formula : NPV

1. Net Present Value (NPV)

Net present value is the present value of the cash flows at the required rate of return of your project compared to your initial investment. By looking at all of the money you expect to make from the investment and translating those returns into today's Cash equivalent (\$), you can decide whether the project is worthwhile.

Why Use NPV

- NPV considers the time value of money, translating future cash flows into today's dollars.
- it provides a concrete number that managers can use to easily compare an initial outlay of cash against the present value of the return.

Alternatives to the ROI formula: IRR

2. Internal Rate of Return (IRR)

- It is the discounting rate where the total of initial cash outlay and discounted cash inflows are equal to zero. *(In other words, it is the discounting rate at which the net present value(NPV) is equal to zero.)*
- commonly used by financial analysts in conjunction with net present value, or NPV. That's because the two methods are similar but use different variables.
- With NPV you assume a particular discount rate for your company, then calculate the present value of the investment
- with IRR you calculate the actual return provided by the project's cash flows, then compare that rate of return with company mandated rate
- If, IRR is higher, then it is a worthwhile investment
- Generally, NPV and IRR methods are used in conjunction to evaluate investments

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

Contents

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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															

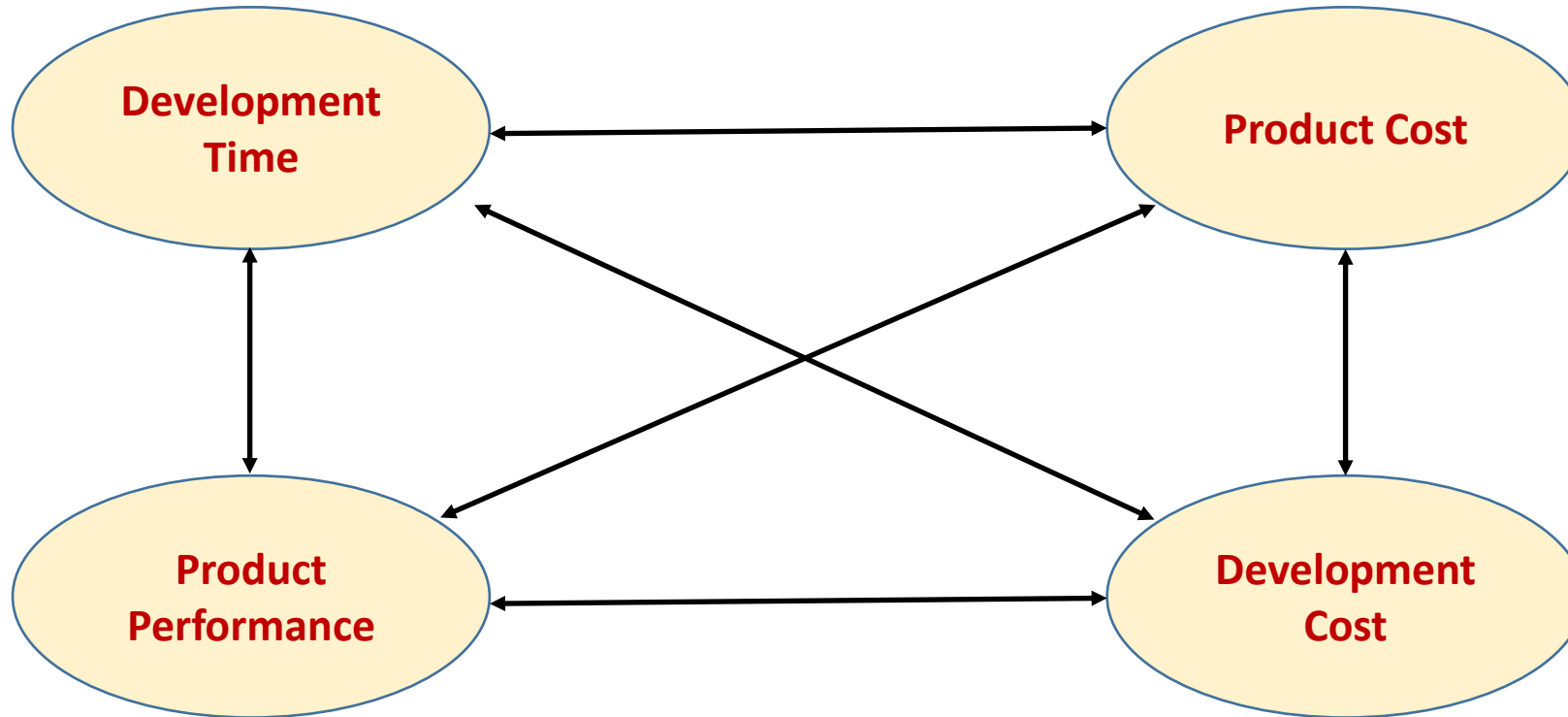


Sensitivity Analysis

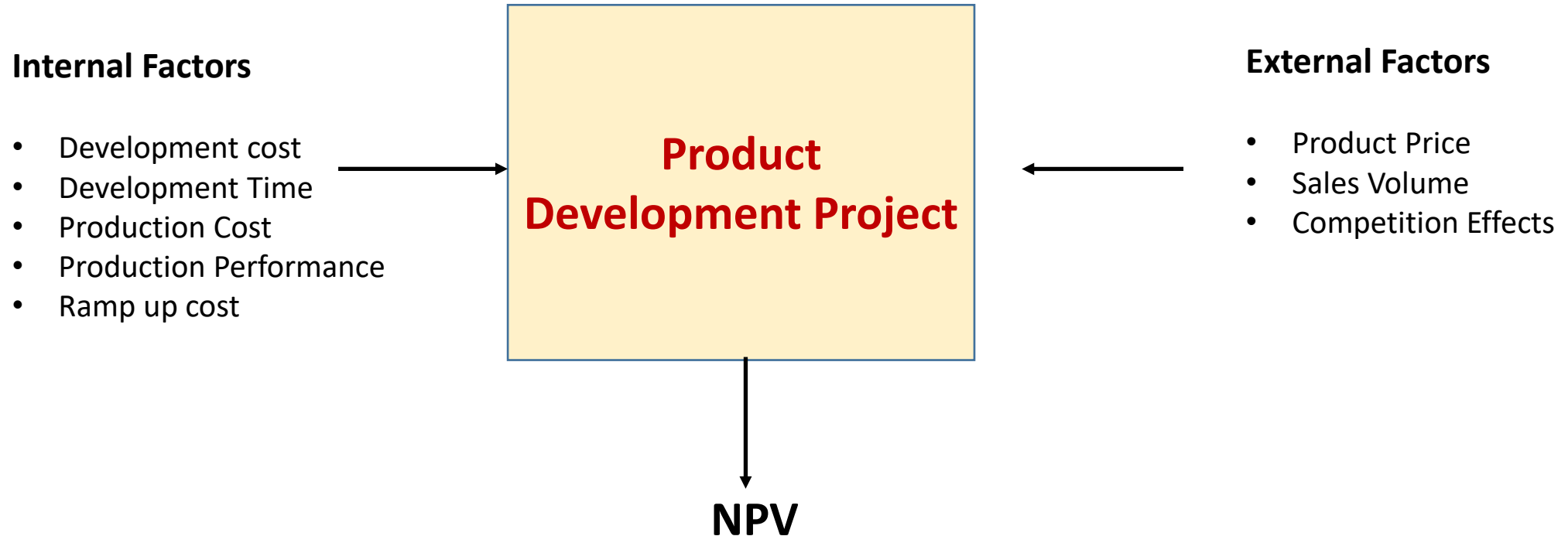
- Uses the financial model to address “What if “ questions by calculating the change in NPV corresponding change in the factors included in the model
- Internal and external factors influence the project value

Project Trade-Offs

Six Potential Interactions



Sensitivity Analysis



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

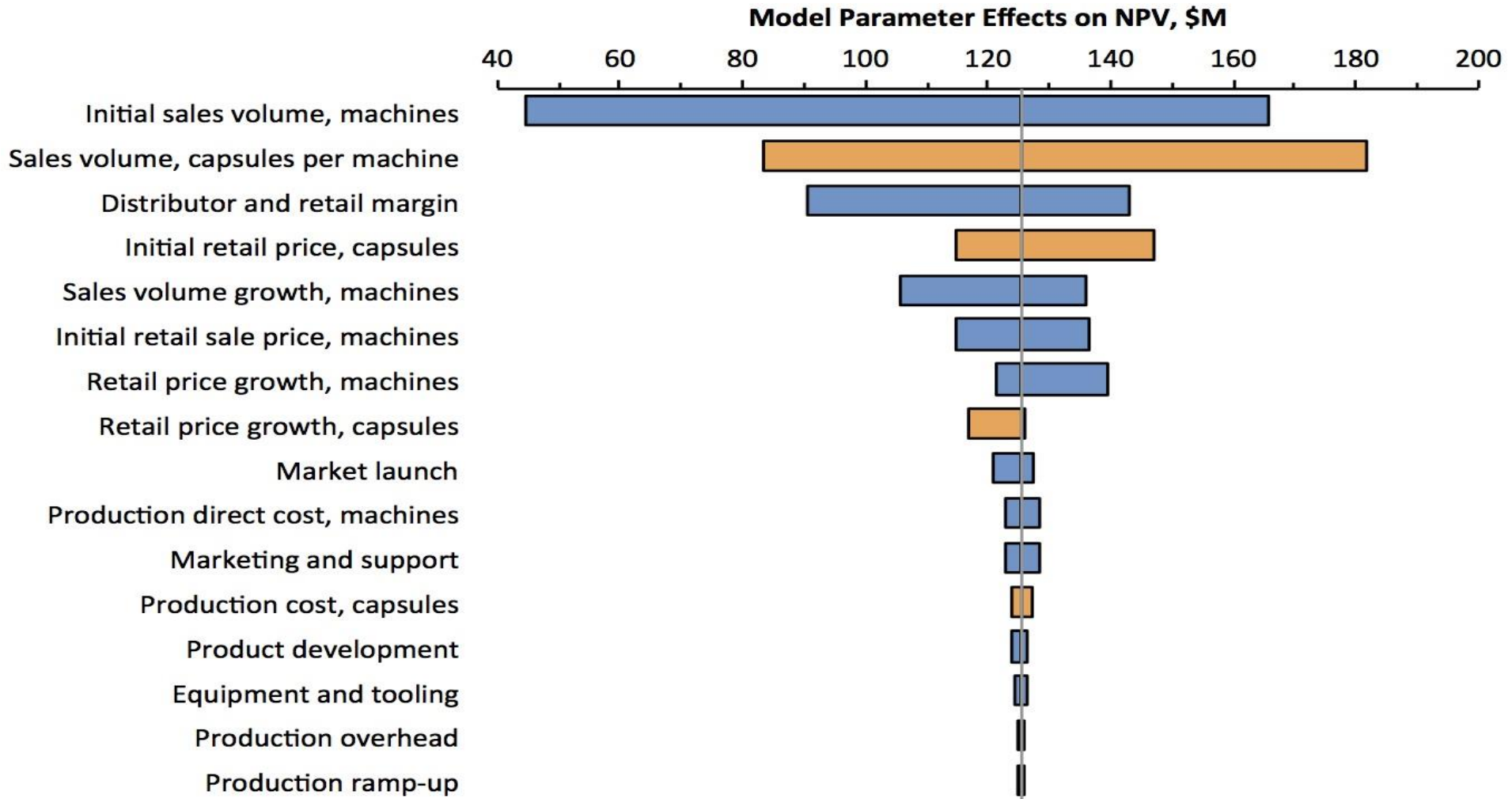


Sensitivity Analysis – with capsules

		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

