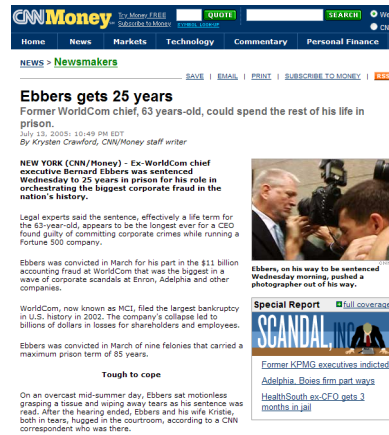


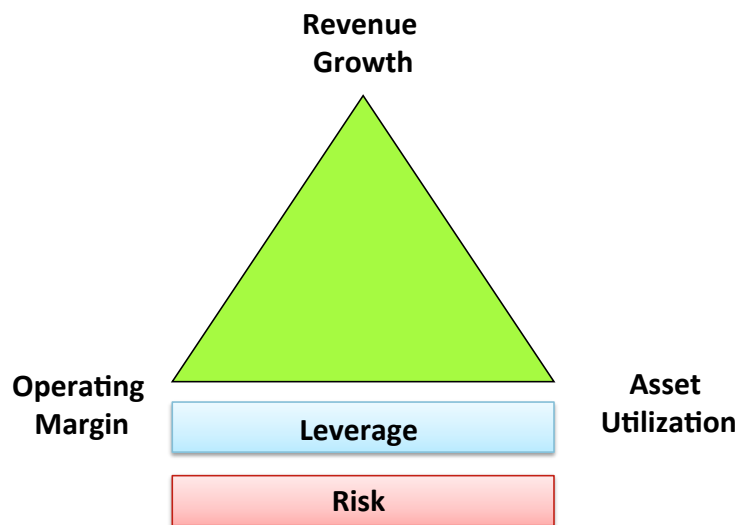
Two Goals of the CEO

- Provide Shareholder Value
- ...and stay out of jail

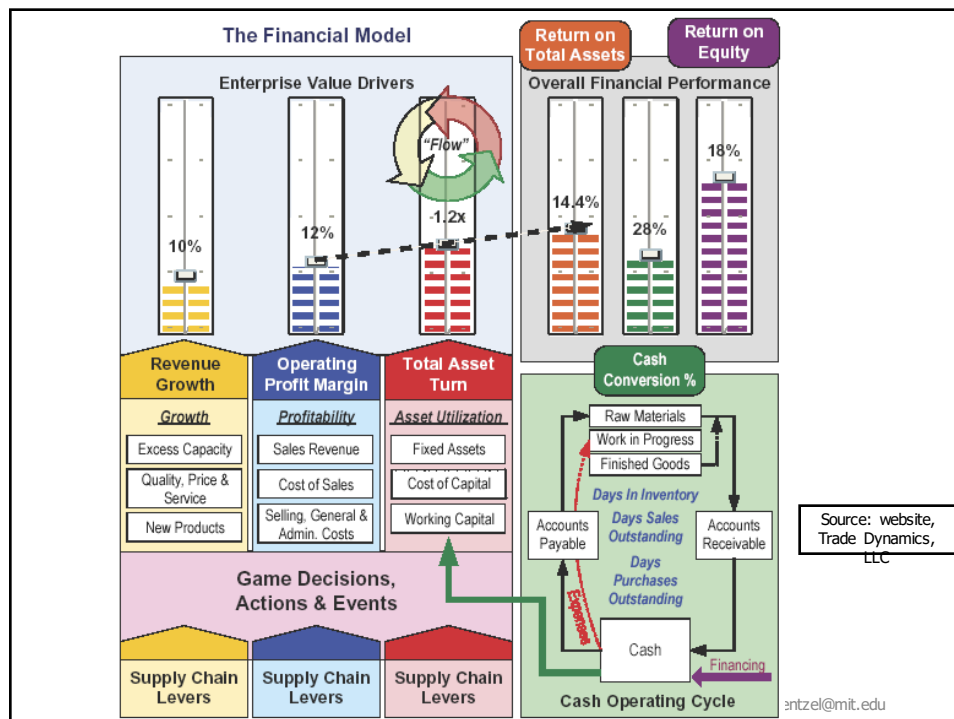
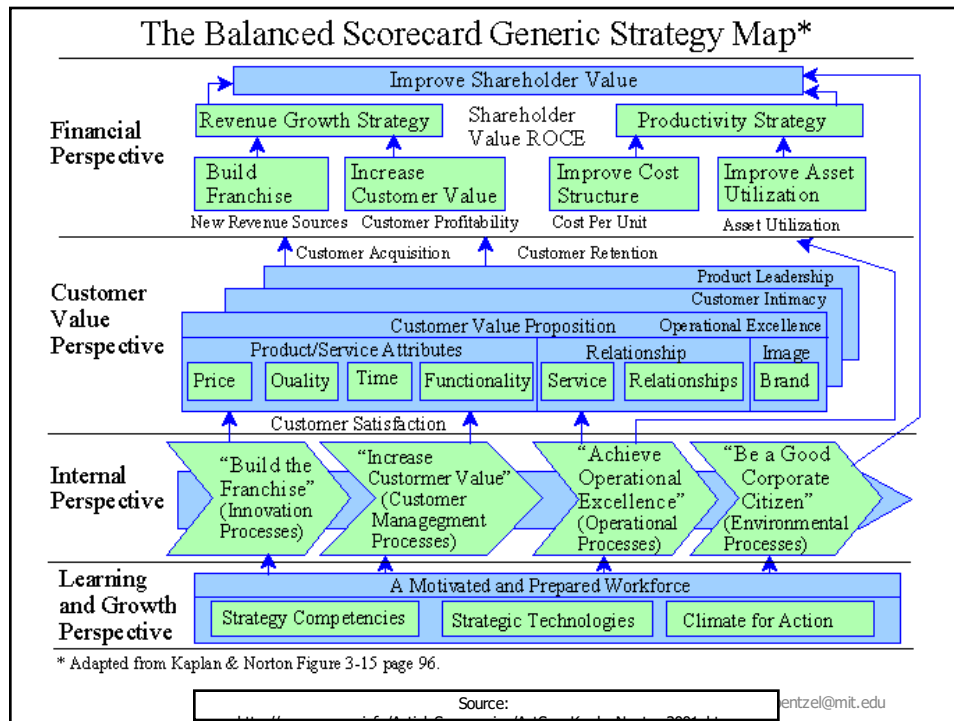


Jarrod Goentzel goentzel@mit.edu

Drivers of shareholder value

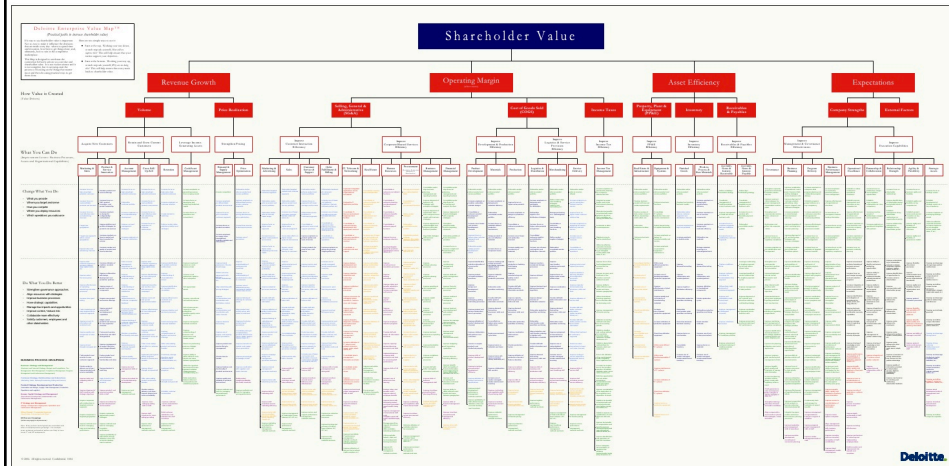
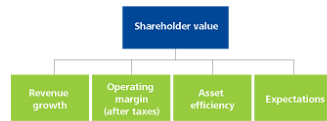


Jarrod Goentzel goentzel@mit.edu

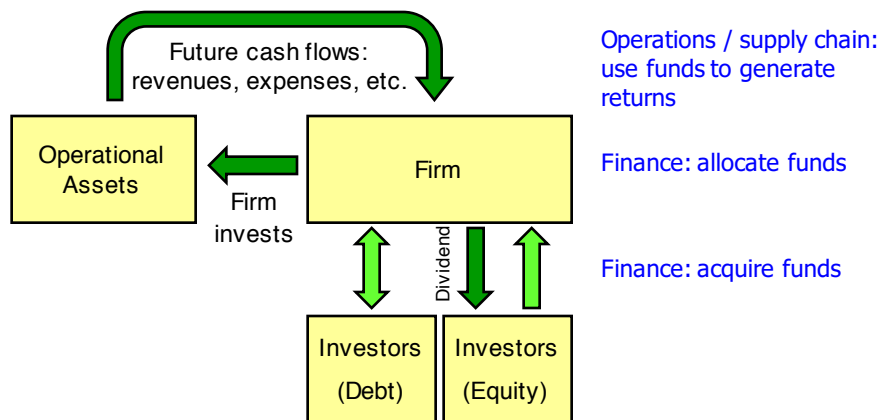


Deloitte Enterprise Value Map

Enterprise Value Map™ (EVM)



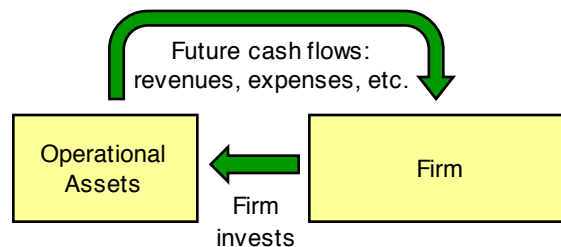
Finance and supply chain work together to create shareholder value



Jarrod Goentzel goentzel@mit.edu

Investment evaluation

1. Estimate the relevant cash flows
2. Calculate a figure of merit for the investment
3. Compare the figure of merit to an acceptance criterion



Jarrod Goentzel goentzel@mit.edu

What is a relevant cash flow?

1. Cash Flow Principle:

only cash flows where *money moves* in or out of the firm are relevant

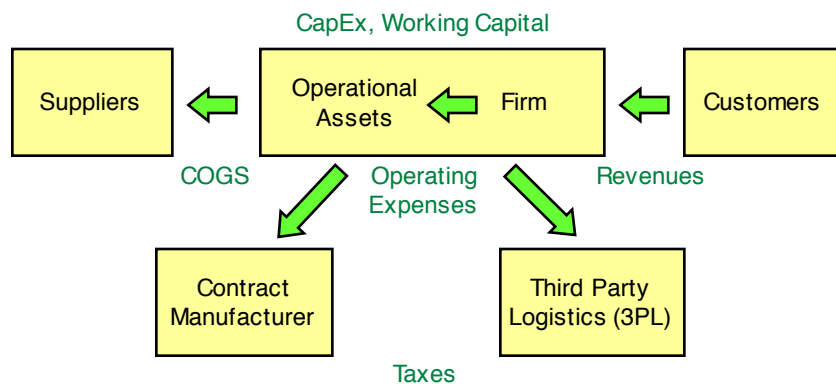
2. With-Without Principle:

only cash flows that are different (incremental) *with* the investment than *without* the investment are relevant to the decision

Jarrod Goentzel goentzel@mit.edu

Projected, relevant cash flows in the SC

Use incremental financial statements to capture the projected, relevant cash flows and calculate FCFs



Jarrod Goentzel goentzel@mit.edu

Incremental Income Statement

Revenue
 Cost of goods sold (COGS)
GROSS INCOME
 Operating expenses
OPERATING INCOME (EBITDA)
 Depreciation & amortization
OPERATING INCOME (EBIT)
 Interest expense
 Other non-operating expenses/income
 Income taxes
 Extraordinary items
NET INCOME

Revenue
 Cost of goods sold (COGS)
GROSS INCOME
 Operating expenses
OPERATING INCOME (EBITDA)
 Depreciation & amortization
OPERATING INCOME (EBIT)
 Income taxes
Net Operating Profit After Taxes (NOPAT)

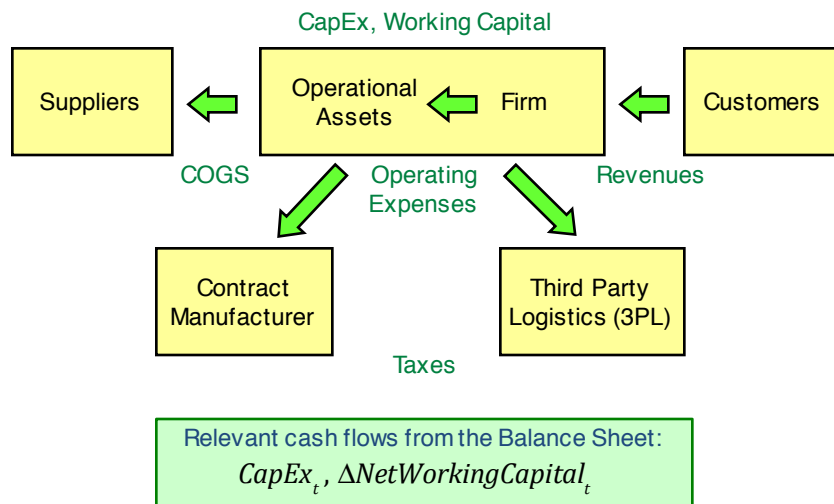
$$\begin{aligned} NOPAT_t &= EBIT_t - TaxRate \times EBIT_t \\ &= (1 - TaxRate) \times EBIT_t \end{aligned}$$

Relevant cash flows from the Income Statement:

$$NOPAT_t + DA_t$$

Jarrod Goentzel goentzel@mit.edu

Incremental Balance Sheet



Jarrod Goentzel goentzel@mit.edu

Free cash flows

$$FCF_t = NOPAT_t + DA_t - CapEx_t - \Delta NetWorkingCapital_t$$

$$FCF_t = [(1 - TaxRate) \times EBIT_t] + DA_t - CapEx_t - \Delta NetWorkingCapital_t$$

Incremental Income Statement

	Year 0	Year 1	Year 2	Year 3
Revenue				
- COGS				
= Gross Income				
- Operating Expenses				
= Operating Income (EBITDA)				
- Depreciation & Amortization				
= Operating Income (EBIT)				
- Income Tax				
= Net Operating Profit After Taxes (NOPAT)				

Adjustments

+ Depreciation (not a cash flow)	
- Net Capital Expenditures	
- Net Working Capital Investment	

Free Cash Flow

Net Present Value – NPV

- Figure of Merit: The discounted sum of all cash flows including the initial outlay (time 0)
- Acceptance Criterion: Invest if $NPV > 0$
 - + Theoretically sound and widely used
 - Difficult to determine the correct discount or interest rate

Jarrold Goentzel goentzel@mit.edu

Example: White Nile

- White Nile, an online retailer, is considering a new warehouse for better home delivery service
- What are the relevant cash flows?

■ New warehouse and equipment (Cap Ex)	5,000,000
■ More sales from the better service (Revenue)	6,000,000
■ Warehouse labor (Operating Expense)	400,000
■ Lower transportation cost (Operating Expense)	-200,000
■ More inventory (Working Capital)	600,000
■ COGS (gross margin is 25%)	4,500,000
■ Depreciation (10 years, straight line)	500,000
■ Salvage (book value after 3 years)	3,500,000
■ Income tax (30% of net income)	TBC

Assume no inflation

Jarrold Goentzel goentzel@mit.edu

Incremental Income Statement	Year 0	Year 1	Year 2	Year 3
Revenue	\$ -	\$ 6,000	\$ 6,000	\$ 6,000
<i>increased sales from better service</i>		\$ 6,000	\$ 6,000	\$ 6,000
- COGS	\$ -	\$ 4,500	\$ 4,500	\$ 4,500
<i>increased COGS from those sales</i>		\$ 4,500	\$ 4,500	\$ 4,500
= Gross Income	\$ -	\$ 1,500	\$ 1,500	\$ 1,500
- Operating Expenses	\$ -	\$ 200	\$ 200	\$ 200
<i>lower transportation cost</i>		\$ (200)	\$ (200)	\$ (200)
<i>warehouse operations</i>		\$ 400	\$ 400	\$ 400
= Operating Income (EBITDA)	\$ -	\$ 1,300	\$ 1,300	\$ 1,300
- Depreciation & Amortization	\$ -	\$ 500	\$ 500	\$ 500
<i>warehouse & equip depreciation</i>		\$ 500	\$ 500	\$ 500
<i>line item (positive values)</i>				
= Operating Income (EBIT)	\$ -	\$ 800	\$ 800	\$ 800
- Income Tax	\$ -	\$ 240	\$ 240	\$ 240
= Net Operating Profit After Taxes (NOPAT)	\$ -	\$ 560	\$ 560	\$ 560
Adjustments				
+ Depreciation (not a cash flow)		\$ 500	\$ 500	\$ 500
- Net Capital Expenditures	\$ 5,000	\$ -	\$ -	\$ (3,500)
<i>new warehouse & equipment</i>	\$ 5,000			
<i>salvage warehouse & equipment</i>			\$ (3,500)	
- Net Working Capital Investment	\$ 600	\$ -	\$ -	\$ (600)
+ <i>Net Increase in Accounts Receivable</i>				
+ <i>Net Increase in Inventory</i>	\$ 600			\$ (600)
- <i>Net Increase in Accounts Payable</i>				
Free Cash Flow	\$ (5,600)	\$ 1,060	\$ 1,060	\$ 5,160

Free cash flows for investment decisions

Why consolidate various line item cash flows from your investment/project into FCFs?

- An incremental Income Statement confounds various cash flows in a consistent way, e.g. revenue growth and margin growth
- It applies Income Tax once in an effective way
- Business professionals are accustomed to reading Income Statements
- Investor value is driven by free cash flows

Supply chain cash flows

- It is important to describe your supply chain design in terms of cash flows
- The evaluation of your supply chain initiative (for internal budgets, by external investors) is based on the future free cash flows it creates
- It is challenging but critical to determine which cash flows are relevant
 - Cash must flow
 - Cash flows must be incremental (with or without)
- Consolidate the projected, relevant cash flows into free cash flows
 - FCFs effectively confound various line items in magnitude and timing
 - FCFs align with investor value creation and business professional practice
- Don't forget the balance sheet
 - Capital expenditures are infrequent but high magnitude
 - Net changes in working capital requirements from the previous period define critical cash flows in our supply chain designs (they often make or break it)
- This lesson does not make you an expert, but it enables you to
 - engage with accounting and finance colleagues to confirm your numbers
 - define the basis for investment/budget decisions

Jarrod Goentzel goentzel@mit.edu