Project Evaluation – Making Capital Investment Decisions:

What goes into cash flow of a project?

Any incremental cash flow related to the project. Think of the Cash Flow of the firm with the project and without the project.

Sunk Costs: A cost that has already occurred. Accepting or rejecting the project will not change the fact that it has already incurred.

Opportunity Cost: The best alternative use (of anything that you already own.)

Side Effects: cannibalism, erosion, synergy

Allocated Costs: Costs should be allocated correctly across projects.

Example: Your company is considering to undertake a new project that will last for 4 years. To determine whether it is worth it, you need to determine all the incremental cash that will flow in and flow out and the timing.

1) Determine the Revenue and the Costs. They may take different forms: For example, sales is a revenue item, as well as reduction in costs as a result of the project.
2) How can you estimate Sales? In the following example, Sales are estimated by another department and given to you. Otherwise, you would estimate the price per unit for each year as well as the projected number units that would be demanded.
3) How can you estimate Costs? Again, we are given the costs for each year for the following example but you could estimate it by forecasting the unit cost and the total number units that would be produced.
4) There is an initial Fixed Asset investment, in this case, it is $16,000. This asset will depreciate over the life of the project. There may or may not be a salvage value at the end. In the following example it depreciates down to zero over the life of the project with no salvage value. That is, the book value of this asset is zero at the end of 4 years. This does not have to be the case!
   Salvage Value = Market Value - t (Market Value-Book Value)
5) Apart from the initial investment, the Project requires you to hold extra funds in NWC until the last year of the project. They are recovered at the last year of the project. Tax rate is 34%.

So, the net income and total cash flow for each year will be:

		Year 1	Year 2	Year 3	Year 4
Sales		$8,500	$9,000	$9,500	$7,000
Costs		1,900	2,000	2,200	1,700
Depreciation		4,000	4,000	4,000	4,000
EBT		$2,600	$3,000	$3,300	$1,300
Tax		884	1,020	1,122	442
Net income		$1,716	$1,980	$2,178	$858
OCF		$5,716	$5,980	$6,178	$4,858
Capital spending	–$16,000				
NWC	–200	–250	–300	–200	950
Incremental cash flow	–$16,200	$5,466	$5,680	$5,978	$5,808

The NPV for the project is (assuming a 12% interest rate):

$$NPV = -\$16,200 + \$5,466 / 1.12 + \$5,680 / 1.12^2 + \$5,978 / 1.12^3 + \$5,808 / 1.12^4$$
$$NPV = \$1,154.53$$

Alternative Definitions of Operating Cash Flow:

Sales $1500, Cost $700, Depreciation $600

EBIT = 1500-700-600=$200, Tax = (Sales-Costs-Dep.)*t = EBIT*t = 200.34=$68

Net Income = 200-68=$132

What is the Operating Cash Flow(OCF)?

Top Down Approach	Bottom –Up Approach	Tax-Shield Approach
OCF = Sales-Cash Costs-Taxes = 1500-700-68 = $732	OCF = Net Income+Depreciation = 132+600 = $732 works only if there is no interest	OCF = (Sales-Cash Costs)*(1-t)+t*Dep. =(1500-700)*.66+.34*600 = $732

Example: Consider a company that is undertaking a 3-year expansion project that requires an initial fixed asset investment of $2.4M. The fixed asset will depreciate straight line to zero over its three-year life but will have a market value of $225,000 at the end of the project. The project needs an initial investment of $285,000 in NWC which will be recovered in the last year. Project is estimated to generate $2,050,00 in annual sales, with costs of $950,000. The tax rate is 35% and interest rate is 12%.

Using the tax-shield approach:

$OCF = (Sales – Costs)(1 – t_C) + t_C Depreciation$

$OCF = (\$2,050,000 – 950,000)(1 – 0.35) + 0.35(\$2,400,000/3)$

$OCF = \$995,000$

The cash outflow at the beginning of the project will increase because of the spending on NWC. At the end of the project, the company will recover the NWC, so it will be a cash inflow. The sale of the equipment will result in a cash inflow, but we also must account for the taxes which will be paid on this sale. So, the cash flows for each year of the project will be:

Year	Cash Flow	
0	– $2,685,000	= –$2,400,000 – 285,000
1	995,000	
2	995,000	
3	1,426,250	= $995,000 + 285,000 + 225,000 – (0.35)(225,000 - 0)

And the NPV of the project is:

$NPV = –\$2,685,000 + \$995,000(PVIFA_{12\%,2}) + (\$1,426,250 / 1.12^3)$

$NPV = \$11,777.34$