Technical Assistance Facility for Industrial Modernisation & Investment (TAF)

Financial Modeling

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Why this presentation?

- to show the importance of defining the key components of the business concept
- to introduce key terms used in financial models
- to build together a simple financial model
- to show that a financial model is critical to get an idea of the viability of a business
- to draw a few conclusions from this exercise

What is a financial model?

- A financial model is simply a tool in form of spreadsheets to forecast the future of a business
- The financial model is part of a comprehensive business plan
- The quality of a financial model derives from the assumptions made reflecting the business concept
- Key components of a financial model are income statement (or profit and loss account), balance sheet and cash flows - all projected into the future (3 statement model)
- On the basis of these components, various ratios can be calculated and interpreted (we will focus on the the Internal Rate of Return (IRR) and compare it to the Weighted Average Cost of Capital (WACC)
- Finally, sensitivity calculations will evaluate the robustness of the business case

The Business Concept as the basis for the financial model

Some key components:

- What's the vision, the mission statement?
- What do I want to produce/offer?
- What is the market, who are the clients, what is the competition, what is the Unique Selling Proposition?
- How much do I want to sell at what price, how long will it take to penetrate the market?
- What do I need to produce the product, what is the CAPEX, how long will it take to build the facility?
- How can I sustain the business, what are the operating cost, is further Capex required?
- What are the finance options, will I be able to get grants?

➔ Answers to these questions (even if they are preliminary) are the assumptions (=variables) for the financial model
➔ A decision needs to be taken whether to build the model at nominal rates or real rates (constant prices)

➔ With this input we can build and analyse a fictional cash flow model in only 9 steps:

Step 1: Organising your work

Elements of the analysis:

- List of assumptions/variables – important not to put numbers directly into cash flow model but only formulas or cell references
- Cash flow model
- Calculation of cost of capital
- Analysis of cash flows using key financial figures/ratios
- Sensitivity analysis
- Balance Sheet
- Income Statement

Step 2: Capex

	0	1	2	3	4	5
CAPEX	-25					
Plant and Equipment	*15*					
Hardware	*5*					
Patents/Licenses	*2*					
Vehicles	*3*					

Comments:

- Construction Period needs to be defined (in this example 1y) and cost assumptions be made; a cushion for cost overruns should be built in
- In the balance sheet these items will feature as long-term assets
- These assets will depreciate over different periods
- For the cash flow projections Capex will be a cash outlay
- During pre-development and development stage various cost would accrue – some of them can be capitalized (i.e. recorded as assets and depreciated over time). Detailed accounting regulations for start-up need to be observed.

Step 3: Revenues

	0	1	2	3	4	5
CAPEX	-25					
REVENUES		30	50	70	100	100

Comments:

- Year 1 is the start of operation
- A ramp-up period needs to be considered as well as price adjustments
- Assumptions on prices and revenues should be based on a market study
- Will there be long term supply contracts?
- In addition to revenues from sales other revenues may need to be recorded (e.g. interest; dividends; sale of assets, rentals etc.)

Step 4: OPEX

	0	1	2	3	4	5
CAPEX	-25					
REVENUES		30	50	70	100	100
- Variable Cost		-18	-30	-42	-60	-60
Gross Contribution		12	20	28	40	40
- Fixed Cost		-20	-20	-20	-20	-20
EBITDA		-8	0	8	20	20
EBITDA Ratio/Margin		*-27%*	*0%*	*11%*	*20%*	*20%*

Comments:

- Cost are often divided into variable cost and fixed cost (or direct and indirect cost)
- It is paramount that revenues cover all variable cost and make a contribution to the fixed cost
- EBITDA: Income before interest, taxes, depreciation and amortisation (for intangibles)
- EBITDA Margin: is a measure of a company's operating profit as a percentage of its revenues
- EBITDA Margin is considered a good indicator of the health of a company

Step 5: Profit after tax

	0	1	2	3	4	5
CAPEX	-25					
REVENUES		30	50	70	100	100
- OPEX		-38	-50	-62	-80	-80
EBITDA		-8	0	8	20	20
-Depreciation		-5	-5	-5	-5	-5
EBIT		-13	-5	3	15	15
-Interest		-1	-1	-1	-1	-1
-Tax		0	0	0	-1	-1
Profit after tax		-14	-6	2	13	13

Comments:

- Assets (as recorded in the balance sheet) are being depreciated over time which is a non-opex expense
- Different asset categories are depreciated over different periods
- EBIT: Earnings before interest and taxes
- The level of interest depends on the level and conditions of the debt as recorded in the balance sheet
- Taxes are 0 in year the first years – losses may be carried over into future periods
- From year 1 the columns are in fact income statements projected into the future

Step 6: Cash flows

	0	1	2	3	4	5
CAPEX	-25					
REVENUES		30	50	70	100	100
- OPEX		-38	-50	-62	--80	-80
EBITDA		-8	0	8	20	20
-Depreciation		-5	-5	-5	-5	-5
EBIT		-13	-5	3	15	15
-Interest		-1	-1	-1	-1	-1
-Tax		0	0	0	-1	-1
Profit after tax		-14	-6	2	13	13
+ Depreciation		5	5	5	5	5
Cash Flow	-25	-9	-1	7	18	18

Comments:

- Profit after tax is not a good indicator for assessing the viability of a business – cash flow is preferable
- That means that the non-cash items need to be added-back (=indirect method) (e.g. depreciation, change in working capital, inventory adjustments, correction for financial transactions etc.)

Step 7: Analysis of cash flow - IRR

	0	1	2	3	4	5
Cash flow w/o terminal value	-25	-9	-1	7	18	18
Cash flow with terminal value	-25	-9	-1	7	18	38

- With the cash flows in place one can calculate the Internal Rate of Return (IRR). The IRR is the discount rate at which the Net Present Value (NPV) of the cash flows of the 6 years is zero.

- The IRR is a good guidance for deciding whether to go ahead with a project or not. In case the IRR is lower than the cost of capital for this specific project the project should be abandoned.

The IRR for the cash flows w/o terminal value is 5%.

- After 5 years the project/company is likely to still have a value - the terminal value. The terminal value needs to be included at the end of the projected period, especially when the projected period is short (different methods used such as exit multiples or discounted cash flows)

The IRR for the cash flows with terminal value is 15%

Step 8: Calculation of Cost of Capital - WACC

Instrument	Cost (% pa)	Share in overall financing (%)
Cost of equity (pa)	25	50
Cost of debt (pa)	8	30
Cost of grant	0	20
WACC = 14.9%		

Comments:

- WACC is the weighted cost of capital for the project
- For start-ups the cost of equity is high: Angel investors may ask for 20-25%, venture capitalists may take even more, especially when the project is still under development
- Due to the high risk of a start-up the equity portion will have to be high; commercial debt may not be available at all
- For an established company trading successfully the WACC would be significantly below 10%

Step 9: Sensitivity Calculations

1 Capex +10%	IRR: 13% (down from 15%)
2 Revenues -15%	IRR: 4%
3 Capex +10% and Revenues -15%	IRR: 2%
4 Variable Cost +10%	IRR: 4%
5 Variable Cost +10% and Capex +10%	IRR: 2%

Comments:

- For sensitivity calculations a professional integrated financial model is required since a change of a variable would trigger other changes (e.g. increase in Capex needs to be funded and may lead to higher interest cost and higher depreciation; a change in sales volumes leads to a change in variable cost etc.)

- It is advisable to run a series of sensitivity calculations and to combine different scenarios. The result may be the definition of a Base Case, a Worst Case and a Best Case

- The interpretation of the results of sensitivity calculations may be challenging. It is thus important to have a good understanding of the building blocks of a financial model and the inter-linkages of the various variables

Balance Sheet (beginning year 1)

ASSETS			LIABILITIES AND EQUITY		
Plant and Equipment	15		Debt (30%)	*7.5*	Financing
Hardware	5		LIABILITIES	7.5	
Patents/Licenses	2		Equity (50%)	*12.5*	Financing
Vehicles	3		Grant (20%)	*5*	Funding
			TOTAL EQUITY	17.5	
TOTAL ASSETS	**25**		**TOTAL LIABILITIES AND EQUITY**	**25**	

Comments:

- In this balance sheet grants are treated as equity (specific accounting rules apply)
- Terminology: differentiate between Financing and Funding
- Debt/Equity Ratio: 0.43 (Liabilities/Equity)
- For a start-up no debt may be available (i.e. total assets may need to be equity financed – leverage is 0)
- Asset categories: tangible/intangible; short term/long term
- Once a profit is made (and not distributed) total equity will be shareholders equity plus retained earnings

Income Statement (end of year 1)

Revenues	30
- Variable Cost	-18
- Fixed Cost	-20
- Depreciation	-5
- Interest	-1
- Tax	0
Net Profit/Earnings	-14

Comments:

- For each accounting year the income statement would start at zero (contrary to balance sheet)
- Various ratios can be calculated to assess the Income Statement (e.g. Gross Margin; Profit Margin etc.)
- Gross Margin: Revenues minus direct cost of goods sold divided by revenues - 40%
- Profit Margin: Portion of the Revenues which would be turned into profits - negative
- Comparisons with previous years will provide useful indicators and trend lines

Concluding remarks

- Building a basic Financial Model is not rocket science; it can be done by any professional involved in developing a project/establishing a company
- One should, initially, make and effort and initially produce one's own simple Financial Model since it focuses one's mind and might sharpen the business concept in terms of products, clients, markets, unique selling proposition, costs etc.
- The IRR provides a good indication of the viability of a business, but additional ratios can be calculated. The IRR must be high enough to cover the cost of capital – the WACC
- The level of the WACC is a function of the risks involved in the business
- In a subsequent step, one would do a sensitivity analysis (i.e. alter relevant variables or a combination of different variables to see how it effects the various ratios). For this exercise, a professional model is required which links the various variables
- Financing and funding will be one of the biggest challenges since start-ups are risky by definition, requiring mainly equity and grants, if available

Thank you!

For any further questions, please contact:

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