Teach yourself how to build a Business Case for Industry & Mining

1q Hands On Modelling – Very Important Concepts

incremental value, optimised without case,
methods of computing NPV and expected value
base date, foreign currencies
key drivers and range analysis.

Artisan in wood, Kairouan Tunisia

Kairouan,
Tunisia

Spend only a few seconds on each page

This website may contain errors so always check your own work and have it audited by a competent person.

This module has personal opinions!

The purpose of this module is to highlight **five very important concepts in valuation**

Level 3: Decision making

Level 2: Evaluating the business/project

Level 1: Hands-on economic modelling

1. **Incremental Value & Optimised Without Case**
2. **Three Methods of Computing NPV: Expected value**
3. **Base Date**
4. **Foreign Currencies**
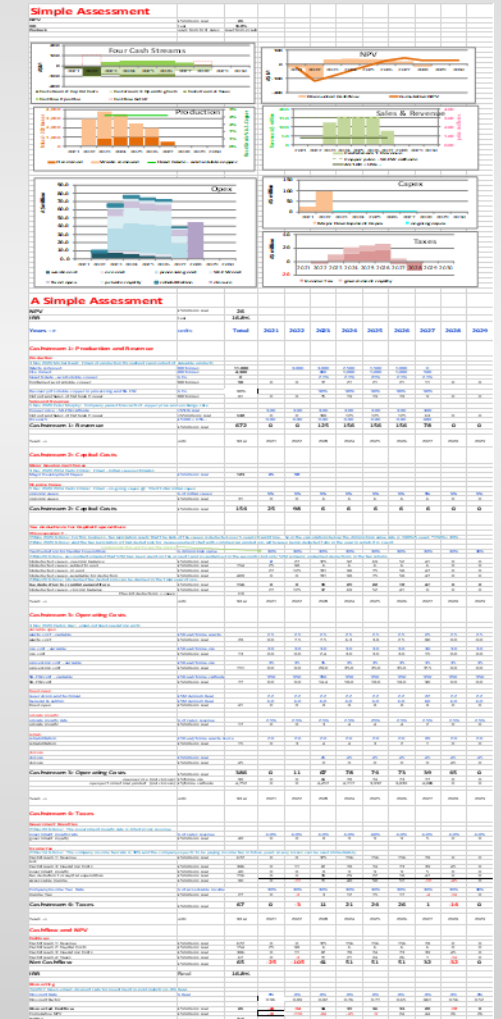5. **Key Drivers and Range Analysis**

#1: Revenue

#2: Capex

#3 Opex

#4: Taxes

Cashflow
(incl NPV)

1. Incremental Value

When valuing a project or a modification inside an existing business you of course, compare the value of doing the project/modification with the value of not doing it.

This means that you will value the company "without" the project/modification and value the company "with" the project/modification.

The difference is the *"incremental value"*

(value of 'with' case) – (value of 'without' case) = (incremental value)

	"With" Case NPV = $10.3M	**Incremental Value $2.5M**
"Without" Case NPV = $7.8M		
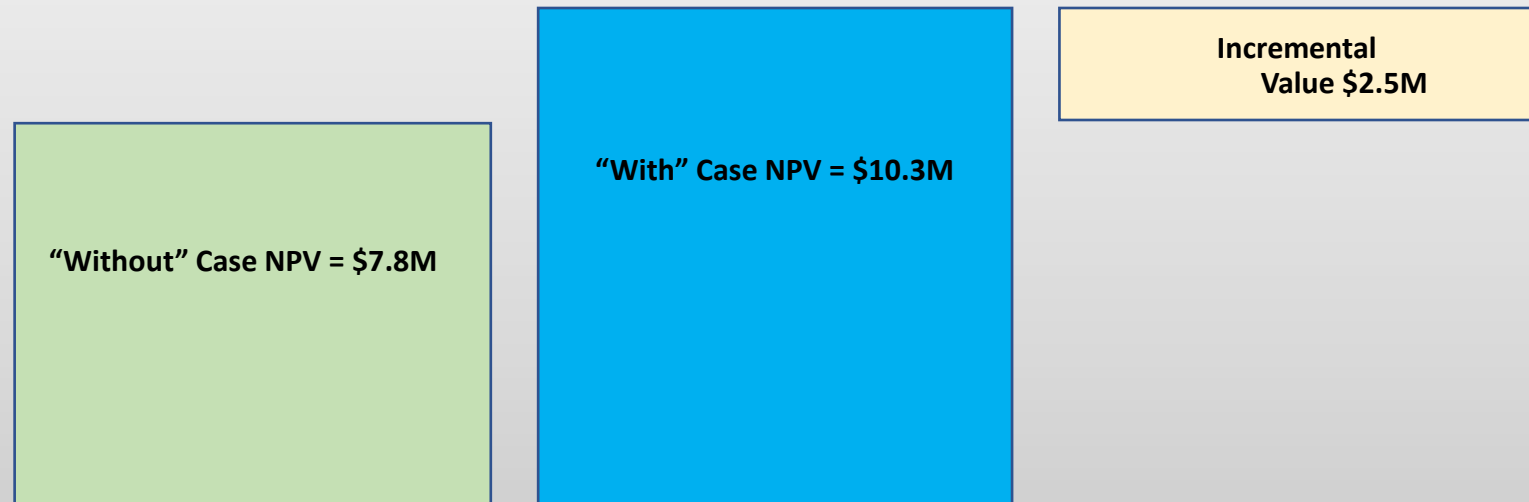
1. Optimised Without Case

The *'without case'* is not the '*do nothing case*' nor is it the '*status quo case*'.
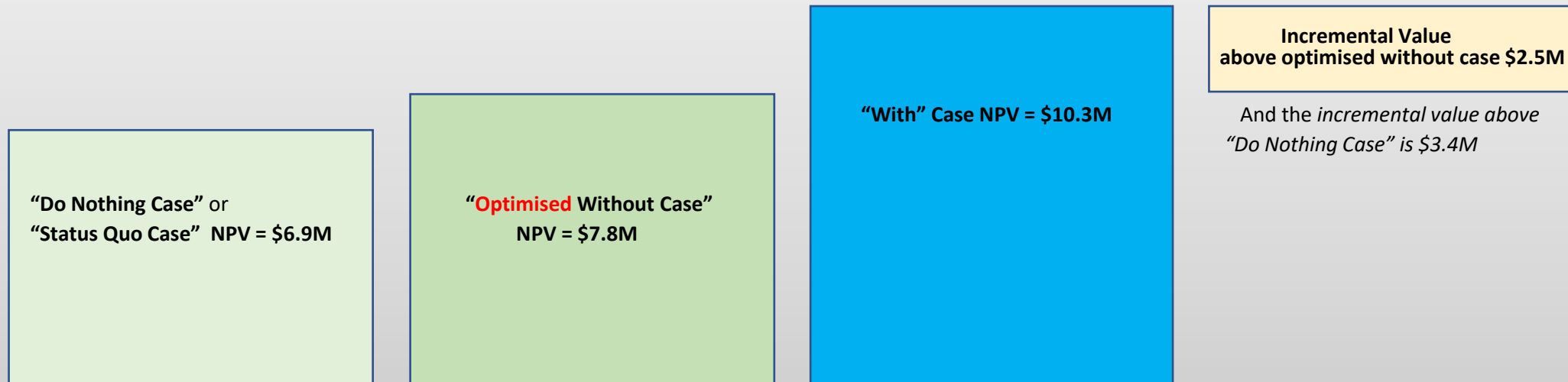
If the project/modification does not proceed then management has to assess other steps to improve and optimise the business as best it can.
   For example it might make lesser improvements to squeeze out more production and more sales, change product quality, target new customers, press down production costs, try new logistics…

The business would become optimised without the investment/modification and its value is called the *"optimised without case"*.

Its value should be greater than the 'do nothing case' or 'status quo' case.

And therefore the 'incremental value' would be less than the value gap above the 'do nothing case'.

"Do Nothing Case" or
"Status Quo Case" NPV = $6.9M

"Optimised Without Case"
NPV = $7.8M

"With" Case NPV = $10.3M

Incremental Value
above optimised without case $2.5M

And the *incremental value above*
"Do Nothing Case" is $3.4M

2. Three Methods of Computing NPV

Three common methods of computing NPV are: -

1. **Single Case NPV:** One case represents the 'mid case' or the best opinion. *For example: NPV = US$32M*

2. **Expected Value:** Typically, a range of scenarios are given probabilities so that a weighted NPV is presented

As an illustration:

Scenario/Case	NPV	Probability	Weighted
Unfavourable	-20	35%	-7
Mid (as above)	+32	50%	+16
Favourable	+55	15%	+8
Expected NPV			**17**

The 'expected value' of US$17M is a lot less than the single mid case of $32M because of the 35% downside.

3. **Probabilistic NPV:** A Monte Carlo is run that gives a distribution of hundreds or thousands of possible NPVs. From this can be read the mean NPV, median NPV, most likely NPV, likelihood of being greater than zero NPV, etc, etc.

Remember to always take a helicopter view of the business.

- *As is discussed in other modules, **NPV is nothing more than the mathematical treatment of a collection of expert opinions.***
- *Don't get side-tracked into a debate about terminology, such as mean versus median.*
- *Decision making is a lot, lot more than focussing on the highest NPV.*

Paramount Importance = NPV is just one of a basket of metrics by which you can assess your business/project.

2. Preferred Method = Expected Value

Of the these three methods, I prefer the **expected value** method; but only if the matrix of the cases is shown. It gives a much broader and more useful assessment of the business/project. It gives a view if things go bad and an assessment if things go well with their probabilities. It gives a better helicopter view.

When useful the '*maximum'* and the '*minimum*' cases can be added to show a wider range.

Most importantly this 'expected value' matrix is valid only if each of the three (or five) cases is *internally consistent*. Each must have its own marketing strategy, sales plan and production plan with matching price forecast, capex estimate and opex estimate. It is totally unsatisfactory to change price and sales without reconfiguring a new matching production plan, capex estimate and opex estimate.

Why Not Monte Carlo/Probabilistic: Like many other practitioners I have big reservations about this method. Usually several key parameters are selected and each is given a probability distribution. For the Monte Carlo to work correctly there must be some sort of mathematical relationship between the probability distributions of these key parameters. *For example, if the market has a severe downturn then the management is likely to implement major changes to operations. Costs are likely to be attacked, capital expenditure pruned or suspended, different products/services may be developed.* Usually devising these mathematical relationships is a huge task in itself.

So it usually is not a simple matter of letting the software randomly pick one set of unconnected parameters, then another random set, and another … hundreds or thousands of times. I have seen experts in the software claim the algorithms cover all necessary interrelationships but when probed, find it is totally inadequate. I can see how it can work in the oil industry and in some chemical plants but have severe reservations about factories, service industries, IT businesses. In mining, I have never seen an economic model capable of reconfiguring the mine schedule plus processing plant recoveries every time the price forecast and sales plan changes.

*I will never forget the major project that was lauded because its Monte Carlo was 98% certain of positive NPV, but it **became a terminal disaster***

Still, some senior managers get hooked on the graphs, the distributions, the mathematical outputs, the confidence boundaries and being orally being re-assured that all relationships between parameters have been thoroughly incorporated.

Garbage in = garbage out!

3. Base Date for the Valuation

There are several choices for the base date of the valuation. Some companies use NPV plus a valuation at a later date:

1. Today: The 'P' in NPV is 'Present' so the inference is that the valuation is today! In practical terms this usually is set as the next calendar half year: 1st January or 1st July.

2. When the Decision will be made: Some companies also compute a valuation on the date when the decision is to be made to proceed or not. This might be some years off so it is not an NPV. Of course, it will not include the all the costs of studywork, preliminary works, advanced purchases, etc from today up until that date. Secondly the total cashflow sequence will not be discounted by the months/years until the decision is to be made, so will be a higher value.

3. **When Construction will commence:** This is rare but sometimes used as a 'comforting' valuation.

Most Important: All the forecasts of price, exchange rate and key consumable costs should be recalculated to match the base date. This will be more complex if there are sales and purchases in foreign currencies because the exchange rates are likely to change over these years. You will need to use judgement and discuss within your company how much of this is warranted.

As always take a helicopter view of its significance.

4. Foreign Currencies

Many businesses have sales made overseas and/or import materials and services.

Selling prices may be in one currency (typically US$), capex, opex, services and logistics may be sourced both locally and from several countries and taxes paid in local currency.

- **NPV:** Your company must define the currency in which the NPV is to be expressed.
- The **discount rate** must be based in that currency.

For example: US$ on 1st July 20XX.

- **Price:** Where price is set in a foreign currency, such as in US$, then there may be an inverse relationship. This has been especially evident in countries with a high proportion of primary exports. As the commodity prices increase so does the strength of the local currency. These partly offset each other. This means the company needs to forecast price and exchange rate in couplets. It will need a pair for the mid case, a pair for the unfavourable case, a pair for the favourable case, etc. All of these must be formally forecast by the company and endorsed by the most senior management and/or Board and not left up to the project team.

- **Capex** for example, may be sourced from Chile, Korea, India, Germany then assembled locally. The material purchases need to be inputted in their own currency, the construction costs in local currency and each converted to US$ on a year-by-year basis.
- **Operating costs** including services must be treated similarly.
- **Tax** needs to be computed in local currency *(often in Nominal Terms)* and converted to US$ on an annual basis.

The **bottom row of each of the four cashstreams** therefore will be in US$'s and so can be summed for an annual net cashflow and be discounted in real US$ terms.
Changes in foreign exchange rates will flow automatically through each cashstream .

Rural Living Tunisia

5. Key Drivers & Range Analysis

Key Drivers: It is common for companies to use the economic evaluation model very early in the process to analyse the business/project for its key drivers of value. *Typically these are prices & exchange rates, sales volumes, production yields, service efficiency, production costs and feed materials.*

Range Analysis: It would then conduct a workshop to identify the likely range of values for each of these key drivers – typically minimum, low, mid, high, maximum.

These two activities are very powerful at generating team spirit and common purpose. They will give focus to decision makers, senior management, project leaders, team members and marketing specialists.

Scenarios/Cases: When computing NPV's for a range of scenarios/cases, each scenario/case is carefully assembled. *The 'Minimum Scenario/Case' is not the assembly of all the minimum values of the key parameters. Instead it might be the minimum price combined with favourable operating costs (because pressure is on the business to contain costs) … etc.*

How often do some team leaders put lots of effort into repeated refining capital estimates and chasing up particular operating costs when the most important drivers are in sales and revenue. How often do these people focus on their own areas of expertise rather than on a helicopter view? I have seen many leaders and team members get bogged down in advanced technical discussions that are intellectually stimulating - such as contingency in capex or production contractor margins - but probably are only second or third order in importance? One driver that is commonly grossly underestimated is closure cost.

Knife, scissor & blade artisan, Kairouan Tunisia

End of
Module

Tunisia