

Teach yourself how to build a Business Case for any industry
including mining

1r Hands On Modelling – Really bad things not to do in Business Evaluation



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

This module has personal opinions!

A really dreadful model ...

Recently I had to use another person's evaluation model that was the embodiment of everything not to do when modelling.

It was an evaluation of a major investment. The person was in another country and we never met.

Error #1: Did not get first his 'hands dirty' in the business → Naïve

He looked to have quickly looked at the business at a high level and try his best. But he definitely did not get his 'hands dirty' by getting involved or educating himself about how the marketing, production and logistics worked. This meant that his business model was naïve. I suspect he was of an accounting/commercial background because the model was very detailed and therefore extensive in the taxation and depreciation calculations but was superficial where it mattered in the sales, production process and operating expenses.

Error #2: Time periods = 48 months then 44 quarters across the rows → too big and too clumsy

I had never seen this before as his modelling of 15 years was as 48 months, then 44 quarters. He had a total of 92 columns across each of numerous worksheets of hundreds of rows. He did not understand that this production schedule was far too detailed for a business case, so he stupidly copied the enormous data set. It was too vast for me to visually sense check the rows of data input and of computations as I worked through his model. I was completely overwhelmed by his ridiculous detail.

Error #3: Mathematical errors

Mixing monthly and quarterly time periods across each worksheet caused him to make lots of mathematical errors. Numerous times he failed to change algorithms when months changed to quarters across a row of computations.

Error #4: omitted totals = *Gross negligence!*

He did not sum the quantities across each row. He failed to check that the 92 inputs of data across each row totalled the same as in the source data. He did not do the most basic check of his own work but rushed to get a result. To me that is inexcusable negligence.

A really dreadful model ...

Error #5: Redundant computations to demonstrate his prowess? or his naivety?

One of the vital organs of an evaluation model in mining is the mine schedule → tonnes and qualities of materials mined. It normally is generated by very sophisticated software. Its key outputs are used inside the evaluation model to compute production, sales and costs. For some inexplicable reason, he preceded this section with his own simplistic version of a mine schedule. It had no function than to demonstrate his 'prowess' in mining but actually showed he was an egotist in fairy land.

Error #6: Upside down logic

An important metric in open cut mining is the amount of waste rock that has to be removed to get access to each tonne of ore. The mine schedule computes the tonnes of waste and the tonnes of ore and hence computes the waste-to-ore ratio. (for example waste:ore = 5.8:1). He got hold of the waste-to-ore ratio and the ore tonnes mined and used those two to generate the tonnes of waste that would need to be mined. Upside down logic again shows his incompetence.

Error #7: Double counting mining dilution

Someone must have explained to him that when the ore is mined, small quantities of waste rock usually get mixed in so the ore gets diluted. The quality of the ore after dilution is called its 'head grade'. He did not understand this, but proceeded to dilute the run of mine ore by a further 7%. He double diluted (then made second error in logic by not increasing the tonnes).

A really dreadful model ...

Error #8: No working stocks

This was a final feasibility study but the essential working stocks were missing. There was no ore stockpiled in front of the processing plant, there were no intermediate stocks through the processing plant and there were no stocks of finished product awaiting despatch at the mine, or being trucked to the customers' point of purchase. These would have tallied many weeks of ore, material and production and thus significantly reduced the sales revenue in the early years. They would be released in the final year.

Error #9: Magical production

When the ore was fed to the processing plant in the business model it was higher in grade than the ore in the mine schedule. This is plain shoddy workmanship. He should have recognised the stupidity. This error was hidden because he did not compute totals for each row of calculations. It shows he was not working closely with the mining engineers and metallurgists.

Error #10: All in black and white

He crafted his model entirely in black and white. There was no colour coding of fresh data inputs (blue font) or for data referenced from other worksheets (green font). I had to work laboriously through cell by cell searching for the fresh data inputs and for computations. To speed up my understanding I coloured coded key parts of his model. I found lots of errors that I coloured in pink font.

Error #11: Lots of convoluted computations

My inspection led me to discover that instead of all the mining and processing intuitively flowing down one worksheet he managed to weave it through multiple worksheets. Computations and logic jumped from one worksheet to another. Why? Why make it unnecessarily convoluted when a simple flow down one worksheet would be most effective? I see this too often in poorly structured models. He did not know the business. His mind was muddled. Others trying to understand his model would have been bewildered and given up.

What you should do ...

When creating a business model for a mine you should ...

1. Use the final production schedules presented by the mining engineers and by the processing metallurgists.
 - Check the row totals in your own work against their life of mine totals.
 - Then have those specialists check your model. Co-operate! Get them on-side!
2. Keep the flow of computations intuitive for others.
 - Use obvious step-by-step mining, processing, logistics, sales and operating costs.
 - Colour code the fresh data inputs (blue), references from other worksheets (green) and computations (black).
3. Tally every row of inputs and of your outputs and check them against the external information.
4. When working down the mining, processing and sales, compute the tonnes of each valuable metal (or ounces of gold) and sometimes its notional value, contained in the:
 - i. Run of mine ore
 - ii. Ore fed to the processing plant
 - iii. Concentrates produced from the feed
 - iv. Products sold

Firstly it is a most important check of your own work. (Find your own errors before others do!)

Secondly it tells everyone how much value is inputted and lost at each stage of the business.

If you do not readily understand my model, then you do not have a problem. I do!!!

End of Module