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Practical Financial Modelling

Factory Rollout Model – PART 1

Now that we've been through all of these tools and techniques and formulas and functions and different tools that you can use to build your financial model, we are going to go through and build a full financial model from scratch, well almost from scratch. I've given you the layout just to save you a bit of time, design and just to save you a bit of formatting basically. But what we've got here is a situation where we're creating a series of factories that are going to roll out across another country, overseas. We're going to roll them out every nine months. We are going to look at modelling that, we do some cumulative calculations. We're going to work out how many factories we've got, what our cash flow, what our capex requirement is going to be on that. So then we can work out our income, our expenses and basically, how much we need to borrow. So what we need to find out from this model is what our cash, basically what our financials look like, so if we were to roll out these factories, we're producing tiles, we've got lots and lots of assumptions that go into the model. So here are the assumptions or the input for the base case. In fact, if you open up your file, it's called 'factory roll out blank'.

So if you open that one up, you'll see there that you've got lot of these scenarios on the right hand side. Don't worry about the scenarios just yet. What we're going to do first of all is, we're going to follow best practice in it. We're going to do. We're going

to end up doing a drop down scenario analysis at the end. But before we do that, we need to get all of the workings on our base case.

I'll write the way throughout the model, and get it all calculating and then we'll do our scenario analysis at the end once we've created it. Here are all of your inputs. They're all laid out in there for you. I've used named ranges. You don't have to use named ranges. We're just doing them to make your formulas a little bit easier to understand but there's no real need for them in this model. However, I've given you instructions on what each of your formulas should look like and I've used named ranges so if you want your formulas to look the same as the way mine do in the notes, then use the same named ranges as I have. If you don't want to use named ranges, you are just going to have formula references instead. So the instructions for these are not in your book. They're in a separate PDF so you'll have to download this separately as a PDF but it takes you through step by step how to do, what all your formulas should look like, and it shows to you what the outcome or what each of your financial statements should look like roughly at the end once we've finished this case study. So here is what it looks like.

What we are going to do first of all, we're going to put all of our inputs. In column B, this is where we are going to have everything linking this is going to be the driver of your model. So everything is going to be linking through to column B, so those are going to be hard coded, first of all. Just to save you a bit of typing, what I'd recommend that you do is go to the base case and just copy and paste it in there, that will just save you a bit of typing there so you don't have to go in and type them all in. If you're going to use the named ranges you will need to go in and insert the named ranges if you choose to do that.

So our assumptions are that you've got… what your production capacity is, you've got 2.3 million tiles is your maximum capacity that you can create. You've only got 50% utilisation we're going to do some scenario analysis on that later. So just go

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through and have a look at all of these assumptions and how they work in your model.

We'll start out by doing our workings sheet, it's all been laid out for you, just to save you a little bit of time and in the comments there are a few little instructions that will kind of help you work out where everything goes. In some cases we've got escalation, in some cases we don't, so the easiest way is to put some escalation factor across the top, so we're going to do that in a 100%, we'll say a 100% plus the escalation amounts, it won't be compounding in this case.

Start out with your escalation, you'll get more out of this exercise if you guys go through and actually build the model yourself. So just pause for a bit and have a go at working through the model, see how you go and then we'll work through it together and then pause a bit and then we'll work through it a little bit more.

We start out by putting our escalation in there, we start out with a 100% so we start out with none. Our escalation here is linking through to the assumptions page. And what we've put in there is 1.3%.

Now I know that it's said in the notes, it was 5% per annum. So what we've done is we've split it down into quarters, just be really careful of your timing here. This is a quarterly model so we're putting everything in as quarters. Sometimes you're given the inputs as monthly, sometimes you're given it as annually so when we do our calculations just be really careful that everything is showing in quarters. In this case we've got 1.25, it's showing as 1.3 but it's in fact 1.25, it's the rounding, so we start out with 100%. I've used a named range 'escalation' here, so it's going to be a 100% plus the escalation, it's going to go across like that. So just make that calculation and copy it across.

When it comes to where our factories roll out, we're just going to manually type them in. It was quite difficult to…there is no clever way of doing the rollout. We are just going to put in every 9 months, you can tell by the formatting that this is going

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to be hard coded. So just every nine months, just put in one, one, one, one all the way across the page.

What we are going to do next is to calculate the cumulative total. Now you could, there's a couple of ways of doing cumulative calculations. You can say one, and then you can say that plus that, like that, that's one way of doing it, and then copy it across. You haven't then got consistent formulas all the way across, but that's okay. And there is a slightly more elegant way of doing it and that is to do a formula that looks like that. So you are summing, two together and then you are fixing the first, you are anchoring the first cell, so that when you are adding them up, it then becomes, a cumulative sum of the total. So that's a fairly common way of calculating a cumulative sum in a financial model.

Now what we need to do next is to put in the time lag, because even though we rollout the factory, in that month, it actually takes nine months to build the factory. Now, we could just say, okay, so we know there, that is going to be the total from three quarters previously, but what we are going to do at the end is do some scenario analysis and we want to be able to push our factory amount backwards and forwards, so, in order to do that we need to use the offset function. So just like we talked about earlier, when we did the offset cash flow calculation, we are going to use exactly the same formula, and it's going to look like that that. So we need to, we got exactly the same problem with the errors, so just go through, and suppress the error using an IF IS number, exactly like we did before.

Once you've got all of that working, you then can calculate your tiles produced. Now remember that's only, we're only going to start producing tiles, once we've actually got an operational factory we rollout the factory, but it doesn't actually become operational until nine months later. So we are then going to say that total capacity divided by four is the capacity which is given to us as an annual amount, so divide that by 4 to give us the quarterly amount and multiply it by the utilisation and then multiply it by the number of operational factories because later on down the track

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we've got two, three, four operational factories, so we can just multiply it out. So we're following best practice, we've got exactly the same formula all the way across. I know we have, I know what you are thinking. We do have some hard coded numbers in here, we've got the four. We are not going to worry about that, that's just, it's something that's not going to change, the fact that there are four quarters in a year, that's okay we've got grants here, we're just going to type those in manually. So that's just formatted as an input, put that in there.

Then we have got our tile revenues, so that's going to be the number of tiles that are produced I think that is going to be the number of tiles that is produced multiplied by the revenues. One of the assumptions was that there is no escalation here so we are assuming there is no inflation, we are going to charge the same amount every quarter, it is not going to change.

Then we come to fixed overheads and that is going to be, one of the assumptions is that the overheads are going to kick in as soon as the factory is rolled out. So we don't wait until the factory becomes operational, the overheads are going to start straight away. That was just an assumption that we used.

So the variable materials cost, that is going to be the number of tiles produced multiplied by the cost and then we actually do have escalation here so we are going to multiply it by the escalation row, right across the top.

Then we have got wages, we have got the number of workers, so we know how many workers we need in each factory. We know what their wages are, we are multiplying it by three, because there are three months in a quarter, and we are multiplying it by the number of operational factories, because the workers don't start working until the factory is actually operational and then we are going to multiply it by the escalation, which gives us a total of what our expenses are going to be.

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We can then calculate our operating profit and loss. So we know what our revenue is and we know what our expenses are going to be. So we are sort of creating a working P&L in this case. So from that we can calculate our cash requirements. So we know what Capex we need and we know the every single factory that we roll out is going to cost us 10 million dollars. So that is the construction cost of 10 million dollars and that is multiplied by the number of factories that has been rolled out.

Now, this was something maybe being a little conservative but this was one of the assumptions that we made. And that is we are only going to take into account losses. So if we make a profit, we are not going to take it into account in our cash flow. Just being a little bit conservative here, so we put in a formula there saying if it is a loss, include it in our calculations. If it is greater than zero, make it zero and if it is less than zero, include it in our calculations.

We have 5 million dollars in the bank that was one of our assumptions so we have got that in there, so we can take that off there. So this is our cash flow here we have got, it is costing us 10 million dollars, we have got losses of five hundred and sixty two thousand dollars, so depending on, just be careful of your signs. If you do the other way round that is fine, the way I have done them as positive and then we take away the five million dollars in cash which gives us a requirement in the first quarter of 5.5 million dollars. So that is one of the purposes of this financial model is to work out how much cash we are going to need to fund this starter basically.

So, in the first quarter, we are going to need 5 million dollars and in the second quarter, that is okay, not too much is going on, a little bit we are going to need half a million dollars in quarter 3 and then in quarter 4 we got another factory launching, so we need another 10 million dollars, and so, this is, we are going to use another accumulative calculation here. So, it is summing up the total of how much cash we are going to need. So, we are going to sum that together and that is our funding requirement. That is how much we are going to have to borrow in order to start this project. So, that is going to be our cash and this is our interest.

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Now, we have gotten around the problem of a circular reference here because, the interest is being calculated here on the workings page and then pulls it through to the P&L. So we do not end up with that common circular reference where you got the output from your P&L driving your interest. We do not have to worry so much about that, so we calculate our interest here. You could use an IPMT function. We are just going keep it simple. We are just going to multiply by the interest rate and divided by 4 quarters in the year, and then we are going to calculate the depreciation again. Fairly simple, we are just doing straight-line depreciation. Each factory is going to last 40 years, we just take the value of the factory and divide by 40 and then divide it by 4 for each quarter, that is how we calculate your depreciation and then multiply it by the number of factories. That is all that we are calculating on the workings page and now what we need to do is pull it through into our financial statements.

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