Factory Rollout Model

We have got an opportunity to set up a Tile production facility in another country. We are planning to roll out a series of factories over the next five years.

Based on the assumptions and inputs that we have available to us, put together a financial model that will forecast

1. Tile production
2. Revenue
3. Capital expenditure
4. Loan requirements
5. P&L, Cash flow and Balance Sheet

Then perform scenario analysis on the results.

Input Assumptions for the model

1. The factories will be rolled out starting from Year 1, Quarter 1, and construction will begin on a new factory every nine months
2. It takes nine months (three quarters) to build a factory, so there is a time lag needs to be modelled. This should be input on the Workings page.
3. Each factory is capable of producing 2.3m tiles per annum
4. However, it is likely that they will only be operating at 50% capacity
5. Factory overhead and materials are indexed at 5% per annum (non-compounding)
6. We can sell the tiles for $10 each (not indexed)
7. Each factory will require 124 workers, who will be paid $250 per month (indexed)
8. It costs $2.25m per annum in fixed costs to run each factory (indexed) and these fixed costs are incurred from the beginning of factory construction
9. There is a variable cost of $1.50 per tile (indexed)
10. The factories will cost $10m each to build. This amount is assumed to remain the same due to efficiencies
11. The factories have a useful life of 40 years. Depreciation is not incurred until construction is complete.
12. When you borrow money, it will be at a rate of 7.5%
13. Do not factor in any principal repayments on the loans; assume interest only.
14. You have $5m in the bank
15. You will need to pay 30% tax on any profit

16. We are not paying any dividends at this stage
17. We are expecting Australian Government Grants of $2m in Q2 of Year 1, and $150,000 six months later. This should be input on the Workings page.

Below is a table of inputs:

	Base case inputs	**Suggested named range**	**Indexed?**
Annual Prodn Capacity	2,300,000	capacity	
Utilisation	50%	utilisation	
Sale price per tile	$10	tile_price	No
Labourers per factory	124	no_workers	
Labourer wages	$250	wages	Yes
Fixed Overheads	$2,250,000	OH	Yes
Variable Materials costs	$1.50	mat_cost	Yes
Factory Const cost	$10,000,000	const_cost	No
Life of Factory	40	factory_life	
Factory Build time	3	delay	
Escalation	1.25%	esc	
Interest rate	7.5%	interest	

Cash at bank	$5,000,000	case	
Tax rate	30%	tax	

Calculating Factory Rollout

1. Go to the "Assumptions & Scenarios" page, and insert all the assumptions in column B, using named ranges. Ignore the scenarios for now.
2. Go to the "Workings" page and enter in the factory rollout assumptions in row 5.
3. Enter in the escalation factor in row 4. 100% can be entered in cell B4, and then the formula **=B4+esc** should be in cell C4. Copy it across. Note that calculating it this way means it is not escalating.
4. We now need to calculate both:
    a. the cumulative number of factories that have begun construction ("rolled out")
    b. the factories that have been completed and are now producing tiles
5. In row 6, calculate the cumulative number of factories that have been rolled out. The formula in cell B6 should be **=SUM($B$6:B6)**
6. In row 7, calculate the cumulative number of factories that have begun construction using the delayed number of quarters from the Assumptions page with an OFFSET formula.
7. In cell B7, your formula should be: **=OFFSET(B6,,-delay).** Copy it across.
8. Remove the errors and text by using the ISNUMBER formula:
=IF(ISNUMBER(OFFSET(B6,,-delay)),OFFSET(B6,,-delay),0)
9. In row 8, calculate the number of tiles produced per quarter. You'll need to include capacity, operational factories and utilisation.
10. In cell B8, your formula should be: =**capacity/4*B7*utilisation**. Copy it across.

Calculating Operating Profit

1. Enter the grant amounts manually in row 12.
2. On the "Workings" page, estimate the Tile revenue in row 13. The formula in cell B13 should be **=B8*tile_price**. Copy it across.
3. In row 17, calculate the fixed overheads. Don't forget these are calculated from the beginning of construction, and are indexed. The formula in cell B17 should be **=OH/4*B4*B6**. Copy it across.

4. In row 18, calculate the variable materials cost, including indexation. The formula in cell B18 should be **=B8*Mat_cost*B4**. Copy it across.
5. In row 19, calculate wages. These will not begin until the factories are completed and operational. The formula in cell B19 should be **=(no_workers*wages*B7)*3*B4**. Copy it across.
6. Now calculate your operating profit in row 22.
7. Your model should look something like this:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	**WORKINGS**													
2		YEAR 1				YEAR 2				YEAR 3				
3		YEAR 1	YEAR 1	YEAR 1	YEAR 1	YEAR 2	YEAR 2	YEAR 2	YEAR 2	YEAR 3	YEAR 3	YEAR 3	YEAR 3	YEAR 4
4		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
5	*Escalation*	*100%*	*101%*	*103%*	*104%*	*105%*	*106%*	*108%*	*109%*	*110%*	*111%*	*113%*	*114%*	*11*
6	Factory rollout	1			1			1			1			
7	Cumulative rolled out	1	1	1	2	2	2	3	3	3	4	4	4	
8	Cumulative Operational fact	-	-	-	1	1	1	2	2	2	3	3	3	
9	Tiles produced	-	-	-	287,500	287,500	287,500	575,000	575,000	575,000	862,500	862,500	862,500	1,150,0
10														
11	**Operating Profit / Loss**													
12	**Revenue**													
13	Grants		$2,000,000		$150,000									
14	Tile revenue	$0	$0	$0	$2,875,000	$2,875,000	$2,875,000	$5,750,000	$5,750,000	$5,750,000	$8,625,000	$8,625,000	$8,625,000	$11,500,(
15	**Revenue**	**$0**	**$2,000,000**	**$0**	**$3,025,000**	**$2,875,000**	**$2,875,000**	**$5,750,000**	**$5,750,000**	**$5,750,000**	**$8,625,000**	**$8,625,000**	**$8,625,000**	**$11,500,(**
16														
17	**Expenses**													
18	Fixed Overheads	$562,500	$569,531	$576,563	$1,167,188	$1,181,250	$1,195,313	$1,814,063	$1,835,156	$1,856,250	$2,503,125	$2,531,250	$2,559,375	$3,234,:
19	Variable Materials costs	$0	$0	$0	$447,422	$452,813	$458,203	$927,188	$937,969	$948,750	$1,439,297	$1,455,469	$1,471,641	$1,983,:
20	Wages	$0	$0	$0	$96,488	$97,650	$98,813	$199,950	$202,275	$204,600	$310,388	$313,875	$317,363	$427,:
21	**Expenses**	**$562,500**	**$569,531**	**$576,563**	**$1,711,097**	**$1,731,713**	**$1,752,328**	**$2,941,200**	**$2,975,400**	**$3,009,600**	**$4,252,809**	**$4,300,594**	**$4,348,378**	**$5,645,**
22														
23	**Operating Profit / Loss**	**-$562,500**	**$1,430,469**	**-$576,563**	**$1,313,903**	**$1,143,288**	**$1,122,672**	**$2,808,800**	**$2,774,600**	**$2,740,400**	**$4,372,191**	**$4,324,406**	**$4,276,622**	**$5,854,**

Summary | Assumptions & Scenarios | P&L | Cash Flow | Bal Sheet | Workings

Capital Expenditure

In order to forecast loan requirements, cashflow, assets and depreciation, we need to forecast the cash requirements.

1. In row 25, calculate the capex using the formula **=const_cost*B5** in cell B25. Copy it across.
2. If there are any operating losses incurred, we will need to add in losses in row 26. The formula should be: **=IF(B22<0,-B22,0).** Copy it across.
3. In row 27 deduct the cash already in the bank.
4. Leave row 28 blank just in case there are adjustments. We can add these later here.
5. In row 29 add up the total cash requirements for each quarter.
6. In row 30, we calculate the total cash requirements, and the cumulative amount in row 29. This will be the amount we need to borrow. Your formula in cell B30 should be **=SUM($B$29:B29)**
7. In row 32, we can now calculate the interest on the loan. The formula should be: **=(B30*interest)/4**. Copy it across.
8. Note we are not calculating any principal repayment in this model.

9. In row 33, calculate the depreciation. Depreciation is not incurred until construction is complete, so we need to multiply the cumulative number of operational factories by the construction cost, and divide it by the useful life of the factory. The formula in cell B33 should be: **=(const_cost*B7)/factory_life/4**. Copy it across.

Financial Statements

It's generally easiest to model the P&L, so we start with that. Cashflow next, and then balance sheet.

Profit and Loss Statement

1. To sum up the YEAR 1 total the "P&L" page, you can either use a SUMIF formula to add together the years, or a simple SUM. Using the SUMIF is better practice, however, you'll need an extra row to use as the criteria for the SUMIF formula to use. Because we used Merge Cells on the Workings sheet, we'll need to insert another row underneath the Years so that we can use this as the criteria for the aggregation formula on the P&L. Go to the Workings sheet, and insert another row in row 3. Type YEAR 1, YEAR 1, YEAR 1, YEAR 1, YEAR 2 etc. in this row.

2. Now go to the "P&L" page, and use a SUMIF function to add together all of the years and create your P&L. In cell B5, your formula should be **=SUMIF(Workings!$B$3:$U$3,B$3,Workings!$B13:$U13)**

3. Fill out the rest of your P&L using similar formulas. Note that you don't have to recreate the SUMIF formula each time. Simply copy and paste it, and if you have used correct cell referencing you should only need to change a couple of row or column references in order to reuse the formula.

4. If there is a loss before tax, the tax payable in that year should be zero. Use the formula **=IF(B24<0,0,B24*tax)** in cell B26.

5. Your P&L should look something like this:

Profit & Loss Statement

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Revenue					
Grants	$2,150,000	$0	$0	$0	$0
Tile revenue	$2,875,000	$17,250,000	$31,625,000	$48,875,000	$63,250,000
Revenue	**$5,025,000**	**$17,250,000**	**$31,625,000**	**$48,875,000**	**$63,250,000**
Expenses					
Fixed Overheads	$2,875,781	$6,025,781	$9,450,000	$13,816,406	$17,838,281
Variable Materials	$447,422	$2,776,172	$5,315,156	$8,576,484	$11,573,672

costs					
Wages	$96,488	$598,688	$1,146,225	$1,849,538	$2,495,888
Expenses	**$3,419,691**	**$9,400,641**	**$15,911,381**	**$24,242,428**	**$31,907,841**
EBITDA	**$1,605,309**	**$7,849,359**	**$15,713,619**	**$24,632,572**	**$31,342,159**
Depreciation Amortisation	$62,500	$375,000	$687,500	$1,062,500	$1,375,000
EBIT	**$1,542,809**	**$7,474,359**	**$15,026,119**	**$23,570,072**	**$29,967,159**
Interest Expense	$626,309	$1,585,430	$2,522,930	$3,647,930	$4,585,430
Profit/Loss Before tax (PBT)	**$916,501**	**$5,888,930**	**$12,503,189**	**$19,922,142**	**$25,381,730**
Income Tax Expense	$274,950	$1,766,679	$3,750,957	$5,976,643	$7,614,519
Net Profit After Tax (NPAT)	**$641,551**	**$4,122,251**	**$8,752,232**	**$13,945,500**	**$17,767,211**

Cash Flow Statement

Use a similar methodology for the Cashflow statement. It should look something like this:

Cash Flow Statement

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Cash Receipts					
Revenues (incl Grants)	$5,025,000	$17,250,000	$31,625,000	$48,875,000	$63,250,000
Cash from Factory Loans	$16,139,063	$10,000,000	$10,000,000	$20,000,000	$10,000,000
Equity Funding					
Total Cash Receipts	**$21,164,063**	**$27,250,000**	**$41,625,000**	**$68,875,000**	**$73,250,000**
Cash Payments					
Operating Expenses	$3,419,691	$9,400,641	$15,911,381	$24,242,428	$31,907,841
Interest	$626,309	$1,585,430	$2,522,930	$3,647,930	$4,585,430
Tax	$274,950	$1,766,679	$3,750,957	$5,976,643	$7,614,519
Capital Expenditure	$20,000,000	$10,000,000	$10,000,000	$20,000,000	$10,000,000
Repayments on Factory Loan (excl int)					
Equity Distributions ; Dividends					
Total Cash Payments	**$24,320,949**	**$22,752,749**	**$32,185,268**	**$53,867,000**	**$54,107,789**
Balance					
Opening	$5,000,000	$1,843,113	$6,340,364	$15,780,096	$30,788,096
Net Movement	-$3,156,887	$4,497,251	$9,439,732	$15,008,000	$19,142,211
Closing	$1,843,113	$6,340,364	$15,780,096	$30,788,096	$49,930,306

Balance Sheet

The balance sheet Is a statement of assets at the end of the period

ASSETS – LIABLITIES = EQUITY

1. Cash at bank is the closing cash balance
2. Add in the cumulative value of the factories as assets
3. Take of the depreciation. Don't forget that this is a statement at a point in time, therefore it must be a cumulative value.
4. Add in the factory loans
5. The carried forward equity is the cash in the bank ($5m)
6. Add the retained earnings (NPAT from the P&L) to get total equity
7. Check that the net assets equals the total equity
8. The Balance Sheet should look something like this:

Balance Sheet	**YEAR 1**	**YEAR 2**	**YEAR 3**	**YEAR 4**	**YEAR 5**
CURRENT ASSETS					
Cash at Bank	$1,843,113	$6,340,364	$15,780,096	$30,788,096	$49,930,306
Accounts receivable					
	$1,843,113	$6,340,364	$15,780,096	$30,788,096	$49,930,306
NON-CURRENT ASSETS					
Factories (cumulative)	$20,000,000	$30,000,000	$40,000,000	$60,000,000	$70,000,000
Less Depreciation (cumulative)	-$62,500	-$437,500	-$1,125,000	-$2,187,500	-$3,562,500
	$19,937,500	$29,562,500	$38,875,000	$57,812,500	$66,437,500
TOTAL ASSETS	$21,780,613	$35,902,864	$54,655,096	$88,600,596	$116,367,806
CURRENT LIABILITIES					
Accounts Payable					
Short Term Provisions					
	$0	$0	$0	$0	$0
NON-CURRENT LIABILITIES					
Unsecured Loans					
Principal repayments					
Factory Loans (cumulative)	$16,139,063	$26,139,063	$36,139,063	$56,139,063	$66,139,063
TOTAL NON-CURRENT LIABILITIES	**$16,139,063**	**$26,139,063**	**$36,139,063**	**$56,139,063**	**$66,139,063**
TOTAL LIABILITIES	**$16,139,063**	**$26,139,063**	**$36,139,063**	**$56,139,063**	**$66,139,063**
NET ASSETS	**$5,641,551**	**$9,763,801**	**$18,516,034**	**$32,461,533**	**$50,228,744**

EQUITY					
Carried forward equity	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000
Capital Raised					
Shareholders equity					
Retained Earnings	$641,551	$4,763,801	$13,516,034	$27,461,533	$45,228,744
Dividends paid					
TOTAL EQUITY	$5,641,551	$9,763,801	$18,516,034	$32,461,533	$50,228,744
ASSETS - LIABILITIES	$5,641,551	$9,763,801	$18,516,034	$32,461,533	$50,228,744
EQUITY	$5,641,551	$9,763,801	$18,516,034	$32,461,533	$50,228,744
check	*$0*	*$0*	*$0*	*$0*	*$0*

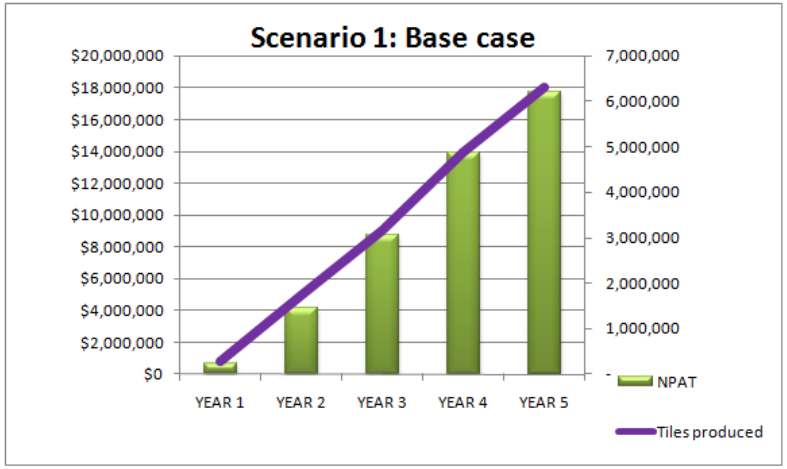
Snapshot Summary

1. Go to the "Summary" sheet, and fill in the key components of the snapshot
2. Calculate the ratios. Put an error suppression formula around your ratios.
3. Enter a graph which shows NPAT as a column, and number of tiles as a line on a separate axis
4. See the next section for details on how to do this.
5. Your snapshot summary should look something like this:

Financial Statements Snapshot

Profit & Loss Statement	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Revenue	$5,025,000	$17,250,000	$31,625,000	$48,875,000	$63,250,000
Expenses	$3,419,691	$9,400,641	$15,911,381	$24,242,428	$31,907,841
EBITDA	**$1,605,309**	**$7,849,359**	**$15,713,619**	**$24,632,572**	**$31,342,159**
EBIT	$1,542,809	$7,474,359	$15,026,119	$23,570,072	$29,967,159
PBT	$916,501	$5,888,930	$12,503,189	$19,922,142	$25,381,730
NPAT	**$641,551**	**$4,122,251**	**$8,752,232**	**$13,945,500**	**$17,767,211**
Cashflow Statement					
Closing Cash	$1,843,113	$6,340,364	$15,780,096	$30,788,096	$49,930,306
Balance Sheet					
Assets	$21,780,613	$35,902,864	$54,655,096	$88,600,596	$116,367,806
Liabilities	$16,139,063	$26,139,063	$36,139,063	$56,139,063	$66,139,063
Net Assets	**$5,641,551**	**$9,763,801**	**$18,516,034**	**$32,461,533**	**$50,228,744**
Equity	$5,641,551	$9,763,801	$18,516,034	$32,461,533	$50,228,744
Return on Net Assets	4%	16%	23%	22%	22%
Net Profit Ratio	32%	34%	40%	41%	40%
Asset Turnover	13%	48%	58%	55%	54%

Tiles produced	287,500	1,725,000	3,162,500	4,887,500	6,325,000



Notes:

Scenario Analysis

1. Go to the "Assumptions & Scenarios" page. Below are your scenarios:

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario
	Base case	Economic	International	Best		
Annual Prodn Capacity	2,300,000	2,300,000	2,300,000	2,300,000		
Utilisation	50%	50%	**40%**	**60%**		
Sale price per tile	$10	$10	$10	$10		
Labourers per factory	124	124	124	124		
Labourer wages	$250	$250	**$350**	$250		
Fixed Overheads	$2,250,000	$2,250,000	$2,250,000	$2,250,000		
Variable Materials costs	$1.50	$1.50	**$2.00**	**$1.20**		
Factory Construction cost	$10,000,000	$10,000,000	**$12,000,000**	$10,000,000		
Life of Factory	40	40	40	40		
Factory Build time	3	3	**4**	3		

Escalation	1.3%	**3.0%**	1.3%	1.3%		
Interest rate	7.5%	**10.0%**	7.5%	7.5%		
Cash at bank	$5,000,000	$5,000,000	$5,000,000	$5,000,000		
Tax rate	30%	**35%**	30%	30%		

2. Leave scenarios 5 & 6 as blank for later
3. Insert the cells in bold as a different colour.
4. Create an in-cell data validation drop-down box in cell B3 so that the user can select their scenario.
5. Use an INDEX or SUMIF formula to populate column B. Your formula in cell **B4** could be something like: **=SUMIF(scenario_names,scen_selected,E4:J4)**. copy it down.
6. Practice changing the drop-down box to see if the numbers are changing.
7. In row 1, create a flag that will show which scenario is currently showing using the formula: **=IF(scen_selected=E2,"↓","")** in cell E1. Copy it across.
8. Go back to the "Summary" page, and create a formula that will show which scenario is being selected, such as: **=scen_selected&": "&HLOOKUP(scen_selected,'Assumptions & Scenarios'!$E$2:$J$3,2,0)** in cell A2.
9. Do the same on the P&L, Cashflow and Balance Sheet.
10. Move the tabs around so that their order is logical.

Your model is now complete.