

Chapter 4

Financial study

This chapter involves the financial study for the production of a single lever factory. This chapter consists of 2 parts. The first part involves the estimation on capital investment and sources of fund, including financial estimations e.g. sales, manufacturing costs, administrative expenses, as well as financial statements e.g. statement of profit/loss, balance sheet and cash flow statement, etc. The second part is about financial evaluation, which shows the calculation on the returns on investment such as Net Present Value, Internal Rate of Return, and Payback period.

4.1 Financial Estimation

The following part shows the calculation of each related figure for the year 1999. This section begins with the estimation on capital investment, and then sources of fund. Next, the information will be linked together by using Microsoft Excel (Appendix-5) in order to help in preparation of financial statements and financial returns.

4.1.1 Capital investment

Capital investment is 34,071,567 baht. It comprises of three parts: expenses before operating, fixed assets and working capital. Details in each part are as follows.

4.1.1.1 Expenses before operating

Expected period before operating is about 6 months. During this period, the factory requires 507,000 baht for the following items which expected to occur.

<u>Item</u>	<u>Description</u>	<u>Amount (baht)</u>
1	Project manager salary (35,000 baht/month)	210,000
2	Secretary salary (12,000 baht/month)	72,000
3	Office rental (8,000 baht/month)	48,000
4	Office expenses (7,000 baht/month)	42,000
5	Transportation expenses (10,000 baht/month)	60,000
6	Registration and taxes	15,000
7	Miscellaneous (10,000 baht/month)	60,000
	Total expenses before operating (baht)	<u>507,000</u>

4.1.1.2 Fixed assets

The value of fixed assets for the project is 17,159,100 baht. Details consist of land, factory, machine and equipment, office equipment, and vehicles.

<u>Item</u>	<u>Description</u>	<u>Amount (baht)</u>
1	Land 0.4 acre	4,400,000
2	Factory	8,000,000
3	Machines and equipment	1,441,100
4	Office equipment	768,000
5	Vehicles	2,550,000
	Total	<u>17,159,100</u>

The details of each asset are as follows:

Land

With reference to 3.5.4, the project requires area for construction of factory around 1 Rai (0.4 acre). Selling price of land in Ladkrabang Industrial Estate for 1 Rai area is 4.4 million baht.

Factory

Factory costs 8,000,000 baht. With 20 years economic life, depreciation of factory is 400,000 baht per year.

Machine and equipment

<u>Item</u>	<u>Description</u>	<u>Qty.</u>	<u>Unit price</u>	<u>Total (baht)</u>
1	Injection machine (50 tons)	1	1,100,000	1,100,000
2	Cooling tower (10 tons)	1	22,000	22,000
3	Mixing machine (single head 50 kg)	1	44,000	44,000
4	Hopper dryer	1	44,000	44,000
5	Lathe (4 feet)	1	71,500	71,500
6	Drilling machine	1	22,000	22,000
7	Sawing machine	1	11,000	11,000
8	Grinding machine	1	50,000	50,000
9	Pliers	2	300	600
10	Hand tools	2	5,000	10,000
11	Test equipment	1	50,000	50,000
12	Trolley	4	4,000	16,000
Total machine and equipment cost				1,441,100
Economic life for machine and equipment		=	5 Years	
Depreciation of machine and equipment		=	288,220	

Office equipment

<u>Item</u>	<u>Description</u>	<u>Amount (baht)</u>
1	Office furniture	200,000
2	Office equipment	
	Computer & printer	200,000
	Telephone	6,000
	Facsimile machine	12,000
	Copying machine	40,000
	Miscellaneous	10,000
3	Air-condition	300,000
	Total	<u>768,000</u>

Economic life of constructions = 5 years

Depreciation of office equipment = 153,600 baht / year

Vehicles

Vehicles are cars for managers, pickup truck for delivery the goods, and motorcycles for messengers.

<u>Item</u>	<u>Description</u>	<u>Qty</u>	<u>Unit price</u>	<u>Amount (baht)</u>
1	Car	2	800,000	1,600,000
2	Pickup truck	2	400,000	800,000
3	Motorcycle	3	50,000	150,000
	Total			<u>2,550,000</u>

Economic life of vehicles = 5 Years

Depreciation of vehicles = 510,000 baht / year

4.1.1.3 Working capital

Working capital is the amount of cash that the factory should have for operating during a period (In the study, the period is 3 months). It spends on the

expenses such as raw material costs, labor costs, rents, production costs (exclude depreciation), administration expense, etc. The components of the working capital for the project are illustrated in the following table:

Item	Description	Amount (baht)	
		Per year	Per 3 months
1	Direct materials	57,790,200	14,447,550
2	Direct labor	702,000	175,500
3	Indirect materials	592,069	148,017
4	Selling and Administrative Expenses	6,537,600	1,634,400
Amount of working capital required for 3 months period			16,405,467

The details of each component are described as follows:

Raw Material Cost

From 3.7 in engineering study, raw material cost per unit is 600 baht. Therefore, total raw material cost for the year 1999 is 57,790,200 baht.

Direct labor cost

From the engineering study, direct labor consists of an engineer, a technician, and 9 workers. Total wage for these labors is 702,000 baht/year.

Overhead cost (Indirect material)

As being described in the Engineering study, total overhead cost is 592,068.83 baht /year.

Selling and administrative expenses

The expenses required for selling and administrative purpose in the year 1999 can be described as follows:

<u>Description</u>	<u>Amount (baht)</u>
Salary	2,016,000
Fuel	198,000
Insurance	1,260,000
Depreciation	
-Office equipment	153,600
-Vehicles	510,000
Selling expenses	2,400,000
Total (baht)	<u>6,537,600</u>

Remark:

- 'Salary ' and 'Fuel' will be increased by 5% every year.
- 'Insurance', 'Depreciation' and 'Selling Expenses' are fixed throughout the project life.

4.1.2 Sources of fund

According to capital investment of the project, fund of the project will come from the following sources:

- Loan (70% of fixed asset value)	12,000,000	baht.
- Shareholders	22,071,567	baht.
Total	34,071,567	baht.

4.1.3 Profit and Loss account at the end of year 1999-2003

	1999	2000	2001	2002	2003
Sales	96,317,000	102,078,000	109,447,000	120,744,000	133,447,000
Cost of goods sold	59,772,489	66,356,132	74,514,122	86,052,635	97,071,470
<i>Gross profit</i>	<i>36,544,511</i>	<i>35,721,868</i>	<i>34,932,879</i>	<i>34,691,365</i>	<i>36,375,530</i>
Administrative expense	6,537,600	6,658,200	6,785,820	6,920,910	7,063,952
Gain/loss from sale of assets					-75,160
<i>Earning before tax and interest</i>	<i>30,006,911</i>	<i>29,063,668</i>	<i>28,147,059</i>	<i>27,770,455</i>	<i>29,236,418</i>
Loan interest	1,800,000	1,440,000	1,080,000	720,000	360,000
<i>Earning before tax</i>	<i>28,206,911</i>	<i>27,623,668</i>	<i>27,067,059</i>	<i>27,050,455</i>	<i>28,876,418</i>
Income tax	10,436,557	10,220,757	10,014,812	10,008,669	10,684,275
<i>Net profit</i>	<i>17,770,354</i>	<i>17,402,911</i>	<i>17,052,247</i>	<i>17,041,787</i>	<i>18,192,143</i>

Remark:

- Loan interest rate = 15% p.a., Income tax = 37%, Ending inventory is equal to zero.

- Unit: baht

4.1.4 Cash flow for the year 1998-2003

	1998	1999	2000	2001	2002	2003
<i>Cash in (baht)</i>						
Sales		96,317,000	102,078,000	109,447,000	120,744,000	133,447,000
Loan	12,000,000					
Shareholder	22,071,567					
Revenue from sales of assets						10,324,840
<i>Total inflow</i>	<i>34,071,567</i>	<i>96,317,000</i>	<i>102,078,000</i>	<i>109,447,000</i>	<i>120,744,000</i>	<i>143,771,840</i>
<i>Cash out (baht)</i>						
Expenses before operating	507,000					
Land	4,400,000					
Factory	8,000,000					
Machine & equipment	1,441,100					
Office equipment	768,000					
Vehicle	2,550,000					
Raw material cost		57,790,200	64,309,140	72,399,191	83,866,368	94,810,300
Direct labor cost		702,000	737,100	773,955	812,653	853,286
Indirect cost		592,069	621,672	652,756	685,394	719,664
Salary		2,016,000	2,116,800	2,222,640	2,333,772	2,450,461
Fuel		198,000	217,800	239,580	263,538	289,892
Insurance		1,260,000	1,260,000	1,260,000	1,260,000	1,260,000
Selling exp.		2,400,000	2,400,000	2,400,000	2,400,000	2,400,000
Income tax		10,436,557	10,220,757	10,014,812	10,008,669	10,684,275
Loan payment		2,400,000	2,400,000	2,400,000	2,400,000	2,400,000
Loan interest		1,800,000	1,440,000	1,080,000	720,000	360,000
<i>Total outflow</i>	<i>17,666,100</i>	<i>79,594,826</i>	<i>85,723,269</i>	<i>93,442,933</i>	<i>104,750,393</i>	<i>116,227,877</i>
<i>Net cashflow</i>	<i>16,405,467</i>	<i>16,722,174</i>	<i>16,354,731</i>	<i>16,004,067</i>	<i>15,993,607</i>	<i>27,543,963</i>

Remark:

* Selling price of land and assets at the end of project is 10,324,840 baht:

Land: 4,400,000 baht.

Factory: 60% of beginning value = 4,800,000 baht.

Machine & Equipment: 40% of purchasing price = 576,440 baht.

Vehicle: 20% of beginning value = 510,000 baht.

Office equipment: 5% of purchasing price = 38,400 baht.

- Raw material cost, direct labor cost, and indirect cost increase by 5% every year.

4.1.5 Balance sheet at the end of year 1998-2003

	1998	1999	2000	2001	2002	2003
Assets						
<i>current asset</i>						
Cash	16,405,467	33,127,641	49,482,372	65,486,439	81,480,046	109,024,009
Inventory	0	0	0	0	0	0
Account Receivables	0	0	0	0	0	0
<i>Property, Plant and Equipment</i>	0	0	0	0	0	0
Land	4,400,000	4,400,000	4,400,000	4,400,000	4,400,000	0
Factory	8,000,000	7,600,000	7,200,000	6,800,000	6,400,000	0
Machines and equipment	1,441,100	1,152,880	864,660	576,440	288,220	0
Office equipment	768,000	614,400	460,800	307,200	153,600	0
Vehicles	2,550,000	2,040,000	1,530,000	1,020,000	510,000	0
Total	33,564,567	48,934,921	63,937,832	78,590,079	93,231,866	109,024,009
Liabilities & Equity						
Account Payable	0	0	0	0	0	0
Loan	12,000,000	9,600,000	7,200,000	4,800,000	2,400,000	0
Shareholder's equity	22,071,567	22,071,567	22,071,567	22,071,567	22,071,567	22,071,567
Retain Earnings	-507,000	17,263,354	34,666,265	51,718,512	68,760,299	86,952,442
Total	33,564,567	48,934,921	63,937,832	78,590,079	93,231,866	109,024,009

Remark: Inventory and account receivables are equal to zero at the end of the year.

4.2 Financial evaluation

4.2.1 Net Present Value

NPV is summation of Present Value of Net Cash Flow (starting from the year that the factory starts to operate). Present value in each year can be calculated by multiplying Net Cash Flow with discount factor. Discount factor can be calculated by using the below formula.

$$\text{Discount factor} = 1 / (1 + i)^n$$

Where,

i = interest rate

n = year

If we expected that the minimum rate of return from this project should more than 12%, Present Value will be as follows.

<u>Year</u>	<u>Net cashflow</u>	<u>Discount factor</u>	<u>Present value</u>
		12%	
0	-34,071,567	1	-34,071,567
1	16,722,174	0.893	14,932,901
2	16,354,731	0.797	13,034,721
3	16,004,067	0.712	11,394,896
4	15,993,607	0.636	10,171,934
5	27,543,963	0.567	15,617,427
		Net Present Value	31,080,312

Since NPV is more than zero, therefore we can conclude that this project is worthwhile for investment.

4.2.2 Internal Rate of Return

IRR is the discount factor that made NPV equal to zero. In other words, IRR is the discount factor that made the net present value of cash inflow equal to the net present value of cash outflow.

There are several methods to determine IRR e.g. trial and error, using commands in packaging software, etc.

By using function “IRR” in Microsoft Excel Spreadsheet, The result shows the IRR is 42.18%

<u>Year of operation</u>	<u>Net cash flow</u>	<u>Discount factor</u>	<u>Present value</u>
		42.18	
0	-34,071,567	1.00	-34,071,567
1	16,722,174	0.642	11,760,908
2	16,354,731	0.412	8,089,835
3	16,004,067	0.265	5,567,686
4	15,993,607	0.170	3,913,262
5	27,543,963	0.109	4,739,877
		Total	0

4.2.3 Payback period

Payback period is the duration of operation where accumulated cash inflows equal to initial investment.

The accumulated cash flow is shown as below:

Year	Net Cashflow	Accumulated amount
0	-34,071,567	-34,071,567
1	16,722,174	-17,349,393
2	16,354,731	-994,662
3	16,004,067	15,009,405

From the above table, the initial investment is 34,071,567 baht and the accumulated cashflow will equal to initial investment in the second year. The exact pay back period is 2 years.

4.2.4 Break even point

Break even point is the point where sales equal to manufacturing cost. BEP analysis is the study of the relationship between fixed cost, variable cost and selling price.

BEP can be calculated by using the below formula:

$$X = F/(P-V)$$

Where X = Break even volume

F = Total fixed cost

P = Selling price per unit

V = variable cost per unit

According to section 4.1.1.1 and 4.1.1.2, fixed cost equal to 17,666,100 baht which consist of the summation of the following items:

- expenses before operating
- land
- factory
- machine and equipment
- office equipment
- vehicle

The selling price is 1,000 baht per set. variable costs consist of material cost, labor cost and factory overhead. With reference to section 3.7, material cost is 78,000,000 baht, labor cost is 702,000 baht, and factory overhead is 592,069 baht. When dividing total variable cost with the production volume, variable cost per unit is 609.95 baht $[(78,000,000+702,000+592,069) / 130,000]$.

$$\begin{aligned}
 \text{Therefore, BEP} &= 17,666,100 / (1000 - 609.95) \\
 &= 17,666,100 / 390.05 \\
 &= 45,292 \text{ units}
 \end{aligned}$$

4.2.5 Return on Equity

With reference to 4.1.3 and 4.1.5, return on equity (New profit/Equity) of the first and final year of project is as follows.

$$\begin{aligned}
 \text{ROE}^{1999} &= 17,770,354 / 39,334,921 = 0.45 \\
 \text{ROE}^{2003} &= 18,192,143 / 109,024,009 = 0.17
 \end{aligned}$$

ROE in the first year is rather high but after that ROE is decrease because, in 2000 - 2003, retain earning does not spend to generate income back to the project due to small demand of the market.

4.3 Sensitivity analysis

Market share changes from 20% to 10%

If the market share decrease to 20%, the expected sale will be:

	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>
Expected sales volume for local market (set)	35,281	36,834	38,786	42,471	48,119	54,471
Expected sales volume for Singapore and Vietnam market(set)	10,714	11,325	12,253	12,253	12,253	12,253
Total sales volume (set)	45,995	48,159	51,039	54,724	60,372	66,759

With the use of spreadsheet that we have set in 4.1, we find that if the market share change from 20% to 10%, IRR will decrease from 42.18% to 6.93%. Details are in Appendix-5.

4.4 Summary of financial study

Capital investment for setting up a single lever mixer factory is 34,071,567 baht (Expense before operating 507,000 baht, Fixed assets 17,159,100 baht, Working capital 16,405,467 baht). Source of fund consists of loan 12,000,000 baht and shareholders 22,071,567 baht.

Since, the project provides high return on investment (Net Present Value of the project is 31,080,312 baht and 42.18% on the return on investment) and short pay back period (2 years), therefore, we can conclude that the project is worthwhile for investment.