CHAPTER 14

Differential analysis, profitability analysis and capital budgeting

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ADDITIONAL PROBLEMS

Problem 14.1 Special order with opportunity costs

Burn-True Ltd manufactures gas barbecues and is considering expanding production. A distributor has asked the company to produce a special order of 2500 barbecues to be sold in another state. The barbecues would be sold under a different brand name and would not influence Burn-True Ltd's current sales. The plant is currently producing 23 000 units per year. The company's maximum capacity is 25 000 units per year, so the company would have to reduce the production of units sold under its own brand name by 500 units if the special order is accepted.

The company's statement of financial performance for the previous financial year ended 30 June 2003 is summarised below:

BURN-TRUE LTD
Statement of Financial Performance
for the year ended 30 June 2003

Sales (23 000 units)		$ 6 900 000
Cost of goods sold:		
Direct materials	$ 2 300 000	
Direct labour	1 840 000	
Factory overhead	1 380 000	5 520 000
GROSS PROFIT		1 380 000
Selling expenses	575 000	
Administrative expenses	337 500	912 500
NET PROFIT		$ 467 500

The company's variable factory overhead is $20 per unit, and the variable selling expenses are $10 per unit. The administrative expenses are completely fixed and would increase by $15 000 if the special order is accepted. There would be no variable selling expenses associated with the special order, and variable factory overhead per unit would remain constant.

The company's direct labour cost per unit for the special order would increase 5%, and direct materials cost per unit for the special order would increase 10%. Fixed factory overhead and fixed selling expenses would not change.

Required:
If the distributor has offered to pay $264 per unit for the special order, should the company accept the offer? Show calculations to support your conclusion.

Solution

BURN-TRUE LTD

CM special order:		
Selling price		$264
Variable costs:		
Direct materials	$110	
Direct labour	84	
Variable overhead	20	214
CM per unit		$50
Units		2 500
Total CM special order		$125 000
Less: Increase admin expense		15 000
		$110 000
Less: Opportunity cost		
CM foregone 500 ($300 – 100 – 80 – 20 – 10)		45 000
Increase in profit if the order is accepted		$65 000

The order should be accepted.

Problem 14.2 Make or buy decision

Eazy Watch Pty Ltd manufactures television receivers and is considering ways to utilise what is currently unused plant capacity because it has recently been operating at slightly below 70% of capacity. One proposal is to produce a component used in several of the company's products that is currently being purchased from a supplier for $70 per unit. The company uses 20 000 components each year. Based on a study by the company's accounting department, the estimated cost of producing each component is as follows:

Direct materials	$24.00
Direct labour (3 hours @ $11.20 per hour)	33.60
Factory overhead	24.00
Total	$81.60

Factory overhead is applied to all products on the basis of direct labour hours. The expected capacity for the year is 250 000 direct labour hours. Fixed factory overhead for the year is budgeted at $1 500 000.

Required:

A. Should the company continue to purchase the component or produce it internally? What is the cost differential involved?

B. The company's sales manager has recommended that a new product should be introduced instead of considering the production of the components. He estimates that the unused plant capacity could be utilised to produce 12 000 units of the new product, each of which would have an estimated contribution margin of $12. One new machine at a price of $120 000 would be required to produce the new product. The machine has a useful life of 60 000 units. Would this alternative affect your decision in requirement A? Why?

Solution

EAZY WATCH PTY LTD

A.

Relevant costs to manufacture:

Direct materials	$24.00
Direct labour	33.60
Variable overhead (1)	6.00
	$63.60
Cost to purchase	70.00
Differential in favour of manufacture	$6.40

The company should manufacture the component for a total cost saving of ($20 000 × $6.40) $128 000

(1) Overhead allocation rate is $24/3 = $8 per DLH

Total estimated overhead $8 × 250 000	=	$2 000 000
Budgeted fixed overhead		1 500 000
Budgeted variable overhead		$500 000

Variable overhead per direct labour hour ($500 000/250 000) = $2 per direct labour hour.

B.

Annual CM new product 12 000 × $12	=	$144 000
Annual cost of machine ($120 000/5)		24 000
		120 000
Cost savings to manufacture component		128 000
Net advantage of component production		$8 000

Problem 14.3 Profitability analysis

Fly-Quick Parcel Co. Ltd operates an overnight package delivery service and is planning the next year's operation. The company's operating assets are estimated to be $900 000 at the beginning of the financial year and $940 000 on 30 June end of financial year. The company anticipates that it will deliver 40 000 packages during the year. The variable costs per package average $5, and total fixed costs are budgeted at $360 000.

Required:

A. What price should the company charge to deliver a package to earn a 20% before-tax return on the estimated investment in operating assets?
B. Calculate the approximate profit margin earned and turnover of assets expected for the company's next financial year. The company will not have any interest expense. Use the price from requirement A.
C. If the company can reduce the variable costs needed to deliver a package by $1.15, what would be the effect on the return on the estimated investment in operating assets?
D. If the company actually delivers 38 000 packages at the price determined in requirement A, what is the company's rate of return on its budgeted average investment in operating assets?
E. Refer to requirement A. If the company requires a return on investment of 15%, how much residual profit can be expected for the next financial year?

Solution

FLY-QUICK PARCEL CO LTD

A.

Average investment
($900 000 + $940 000)/2 = $920 000
Let X = Delivery charge
40 000 X = 5(40 000) + 360 000 + 0.20 (920 000)
40 000 X = 200 000 + 360 000 + 184 000
X = $18.60

B.

$$\text{Profit margin} \quad \frac{40\,000\ (\$18.60 - \$5) - 360\,000}{40\,000\ (\$18.60)}$$

$$= \frac{544\,000 - 360\,000}{744\,000} = \frac{184\,000}{744\,000}$$

$$= 25\% \text{ (rounded)}$$

$$\text{Asset turnover} \quad \frac{\$744\,000}{920\,000} = 0.81$$

C.

$$\text{ROI (B)} \quad \frac{\$184\,000}{920\,000} = 20\%$$

$$\text{ROI (C)} \quad \frac{40\,000\ (\$18.60 - 3.85) - 360\,000}{920\,000}$$

$$\frac{230\,000}{920\,000} = 25\%$$

An increase of 5%.

D.

$$\text{ROI} \quad \frac{38\,000\ (\$18.60 - \$5) - 360\,000}{920\,000} = 17\%$$

E.

Operating profit (B)	$184 000
Minimum acceptable return (1)	138 000
Residual profit	$46 000

(1) 0.15 (920 000)

Problem 14.4 Alternative capital budgeting methods

Lam and Kim Processing Ltd is considering three investments for the new year. The company has a cost of capital of 16%. Summary information concerning the net cash inflows of the investments and their initial costs is shown below:

	Investment		
Year	A	B	C
1	$ 70 000	$ 50 000	$ 30 000
2	70 000	50 000	30 000
3	70 000	50 000	30 000
4	70 000	50 000	30 000
5		50 000	30 000
6		50 000	30 000
7			30 000
8			30 000
9			30 000
10			30 000
11			30 000
12			30 000
Initial cost	$(195 874)	$(166 275)	$(185 832)

Required:

A. Calculate the payback period for each investment.
B. What is the net present value for each investment?
C. What is the net present value index for each investment?
D. Should any of these investments be accepted? If so, in what order should they be accepted, given limited available funds?

Solution

LAM AND KIM PROCESSING LTD

A.

Payback period:

Project:	A	B	C
	$\frac{\$195\,874}{\$70\,000} = 2.7982$ years	$\frac{\$166\,275}{\$50\,000} = 3.3255$ years	$\frac{\$185\,832}{\$30\,000} = 6.1944$ years

B.

NPV

Project:

A: 2.7982 ($70 000) − $195 874 = $0
B: 3.6847 ($50 000) − $166 275 = $17 960
C: 5.1971 ($30 000) − $185 832 = ($29 919)

C.

Present Value Index

Project:

A: $195 874/$195 874 = 1
B: $184 235/$166 275 = 1.108
C: $155 913/$185 832 = 0.839

D.

Project B should be accepted.
Projects A and C are not acceptable.

Problem 14.5 Capital expenditure decision

Power Electronics Ltd is an engineering consulting company specialising in the installation of highly sophisticated electronic communications systems. The company is considering the purchase of testing equipment that would be used on jobs. The equipment would cost $132 000 and would have no residual value at the end of its 5-year life. Straight-line depreciation would be used if the equipment is purchased.

The company's accountant projects revenue and expenses with the operation of the equipment that are equal to the cash inflows and cash outflows associated with it, except for depreciation. A summary of the cash flows expected from the equipment (without considering taxes) is as follows:

Year	Revenues	Expenses (excluding depreciation)
1	$103 740	$69 600
2	115 200	73 800
3	122 700	73 800
4	130 200	73 800
5	137 700	73 800

Assume the company's expected tax rate is 30%, and its cost of capital is 12%.

Required:

A. Calculate the return on average investment for the equipment.
B. Determine the annual net cash inflows (after tax) expected from the operation of the equipment.
C. Calculate the net present value for the investment.
D. Determine the net present value index for the investment.
E. Should the testing equipment be purchased?

Solution

POWER ELECTRONICS LTD

A.

Year	Net cash inflow before depreciation	Depreciation	Net profit before tax	Tax @ 30%	Net profit after tax
1	$34 140	$26 400	$ 7 740	$2 322	$ 5 418
2	41 400	26 400	15 000	4 500	10 500
3	48 900	26 400	22 500	6 750	15 750
4	56 400	26 400	30 000	9 000	21 000
5	63 900	26 400	37 500	11 250	26 250
Total net profit after tax					78 918
Average net profit after tax					$15 784

Return on average investment

$$\frac{\text{Average net profit after tax}}{\text{Average investment}} = \frac{\$15\,784}{\$132\,000/2}$$

$$\frac{15\,784}{66\,000} = 24\%$$

B.

Year	Net profit After tax	After back depreciation	Net cash inflows after tax
1	$ 5 418	$26 400	$31 818
2	10 500	26 400	36 900
3	15 750	26 400	42 150
4	21 000	26 400	47 400
5	26 250	26 400	52 650

C.

	Year cash inflows	Expected net factor @ 12%	PVPV cash flows (rounded)
1	$31 818	0.8929	$ 28 410
2	36 900	0.7972	29 417
3	42 150	0.7118	30 002
4	47 400	0.6355	30 123
5	52 650	0.5674	29 874
Present value cash flows			147 826
Initial investment			132 000
Net present value			$ 15 826

D.

Net present value index

$$\frac{\$147\,826}{132\,000} = 1.12$$

E.

Yes. NPV is positive.

Net present value index greater than one.