

Kiwi fruit pies

Kiwifruit Pies (KP) Ltd. is a commercial pie making business, owned and managed by Nigella Horner. KP supplies large kiwifruit pies (3.5 kilograms (kg) in weight) to the local catering industry. Each kiwifruit pie is made by skilled pie bakers from two purchased ingredients, pastry and kiwifruit filling. In summary form, the budgeted and actual results for May are as follows:

Number of pies	Budget	Actual
	\$	\$
Sales	187,500	205,800
Variable costs	(137,500)	(156,450)
Contribution	50,000	49,350
Fixed overheads	(22,000)	(23,000)
Net profit	28,000	26,350

Nigella is surprised to see that actual profit was below budget despite increased sales:

"The local market is intensely competitive, so we did well to sell 12% more pies than expected. Also I found a cheaper pastry supplier, provided advanced training for the pie bakers and installed energy saving ovens. So why are profits not well above budget?"

Nigella asks you, her recently recruited management accountant, to investigate and produce a detailed and informative analysis of the firm's performance, using standard marginal costing. She supplies you with the following additional information:

Standard Cost Card for a 3.5 kg Kiwifruit pie.		
	\$ per pie	
Materials:		
Pastry	1 kg at \$8 per kg	= 8
Kiwifruit filling	3 kg at \$20 per kg	= 60
Labour:	1.5 hours at \$22 per hour	= 33
Variable overheads:	\$6 per labour hour	= 9
		110

The pie bakers tell you that meeting the unexpected increase in demand, with no extra staff, was a challenge, especially as the new type of pastry proved to be difficult to work with. Although they were happy to be paid a premium rate for overtime work, they found working regular long hours very tiring.

Nigella tells you that the standards (as per the standard cost card) were carefully revised to take account of the anticipated effect of the new ovens and pie baker training on production efficiency. She says:

"I should have got some benefit from all this investment, especially as I ended up spending \$1,000 more on training than I budgeted for. I hope your investigation proves that some of the investments I made were worthwhile"

Required:

Your internal report to Nigella, the owner/manager of Kiwifruit Pies (KP) Ltd., analysing the performance of the business in May and making recommendations for improvement.

Your report should include the following:

- Based on the summary figures only, an operating statement, in columnar format, that compares:
 - The original budget for 1,250 pies.
 - A flexed budget for 1,400 pies.
 - The actual results.
- A calculation of the overall variances (sales volume, sales price, total variable cost and total fixed costs) AND a brief comment on what these overall variances disclose about KP's performance for May.
- A calculation of detailed variable cost variances AND advice to Nigella on how to decide which variances require investigation.
- Plausible explanations for those cost variances (at least 4) that you consider should be investigated by Nigella.
- Recommendations for appropriate actions to improve KP's future performance.

As KP sold 150 more kiwifruit pies than expected, there is a \$6,000 favourable volume variance, indicating that a profit of \$34,000 should have been achievable. However, a price cut (adverse price variance of \$4,200) was needed to halt falling market share due to quality problems and net adverse cost variances amounted to \$3,450.

Inability to predict rising demand and hire new staff has caused an adverse labour rate variance (\$2,250), due to overtime premiums paid, and has contributed to an adverse labour efficiency variance (\$3,300), due to overworked and tired staff. The effectiveness of training to improve staff productivity may have been compromised. The purchase of a new pastry type has also adversely affected labour efficiency, as it has proved hard to work with and pies end up with too much pastry (causing customer complaints and potentially lower future sales, and an adverse materials usage variance).

Recommendations to improve KP's performance include:

- o Some targeted market research to assess customer satisfaction and to facilitate more accurate demand forecasts.
- o Matching staffing levels with market demand, greater staff participation in standard setting and more staff consultation with respect to training and productivity improvement initiatives.
- o Supplier choice and materials quality need to be reviewed. Suppliers and the ingredients they offer should be assessed on the basis of cost of ownership (not just purchase price).
- o Set accurate standards that are challenging but accepted by staff as achievable.
- o Only significant variances (ones that indicate a loss of control) need be investigated.

Main Report

a) Operating Statement containing a Flexed Budget:

	Original Budget	Flexed Budget	Actual Results
No. of pies	1,250	1,400	1,400
	\$	\$	\$
Sales	187,500	210,000	-SP-- 205,800
V.C.	(137,500)	(154,000)	-VC-- (156,450)
Cont'n	50,000	-SV-	49,350
F.O/H	(22,000)	(22,000)	-PC-- (23,000)
Net Profit	28,000	34,000	26,350

Summary Variances:

	Adv	Fav
Sales Volume (SV)	\$ 6,000	\$
Sales Price (SP)	4,200	
Variable Costs	2,450	
Fixed Costs	1,000	
	*****	*****
Totals	7,650	6,000

There is a favourable volume variance due to selling 150 more pies than anticipated, and the flexed budget highlights that this extra volume should have increased the overall profit by \$6,000 ($150 \times \40^3) to \$34,000 (if all costs were in line with standards). However, all other variances are adverse and total \$7,650 and this results in an actual profit that is \$1,650 below the original budgeted profit. The largest adverse variance is a \$4,200 sales price variance (perhaps indicating that the increased sales were 'bought' with a price cut). Variable costs exceeded flexed budget by \$2,450, indicating process inefficiencies. Total fixed costs exceeded budget by \$1,000 because Nigella spent extra in training. The detailed analysis of cost variances (below) will support a more informative analysis of the firm's performance.

b) Detailed variable cost variances are calculated as follows:

i) Materials: Pastry.

AQ,AP	AQ,SP	SQ,SP
\$11,700	= \$12,000	$1,400 \times 1 \times \$8$ \$11,200
\$300 Favourable Materials Price		\$800 Adverse Materials Usage

ii) Materials: Kiwifruit filling.

AQ,AP	AQ,SP	SQ,SP
\$80,000	= \$80,000	$1,400 \times 3 \times \$20$ \$84,000
\$0 Materials Price		\$4,000 Favourable Materials Usage

iii) Labour:

AHAR	AHSR	SHSR
\$51,750	2,250 x \$22 \$49,500	1,400 x 1.5 x \$22 \$46,200
\$2,250 Adverse Labour Rate	\$3,300 Adverse Labour Efficiency	

iv) Variable Overheads:

AHAR	AHSR	SHSR
\$13,000	2,250 x \$6 \$13,500	1,400 x 1.5 x \$6 \$12,600
\$500 Favourable V.O/H Expenditure	\$900 Adverse V.O/H Efficiency	

Which variances should be investigated?

Nigella is advised to set appropriate "control limits" and only investigate those variances which fall outside these control limits and hence highlight abnormalities. This applies the technique of "management by exception" – only those variances which are significantly out of line with expectations need investigation. (It is a waste of resources to investigate "normal fluctuations".) Control limits may be set by "rule of thumb" or as a percentage of budgeted profit or a percentage of the specific cost or revenue under consideration. In this case Nigella may wish to investigate any variance in excess of (say) 5% of budgeted profit or (say) 5% of the specific item's standard cost or revenue. Alternatively she may wish to investigate all variances above a certain figure (e.g. \$1,500).

d) Explanation of main variances and advice on corrective action.

Nigella is advised to investigate all variable cost variances in excess of \$1,400 (5% of budgeted profit) and the adverse fixed overhead variance of \$1,000.

There was a \$4,000 favourable usage variance on kiwifruit filling. Clearly pie bakers used less kiwifruit than standard (by 200kg overall). This is good news if it is due to less spillages/wastage, but bad news if pie bakers are not following Nigella's recipe and are putting too little fruit in the pies. In this case the apparent cost saving appears to be false economy as customers have complained that KP's pies contain "too much pastry and not enough fruit".

It is advised that pie bakers are better trained or more closely monitored in order to ensure that the right quantity of fruit filling is used in pies.

The adverse labour rate variance of \$2,250 is most likely due to unplanned overtime premiums paid (as no extra staff were hired to cope with the unexpected increase in demand).

Better market research is needed so that increases in demand are predicted and staffing levels are appropriate (this avoiding excessive overtime and overtime premiums).

The adverse labour efficiency variance of \$3,300 is due to pie bakers taking 150 hours more than standard to make the 1,400 pies. This may be due to the 'difficult to work with' new pastry type* and/or due to tiredness caused by excessive overtime. Moreover, it is possible that the standards were set at too challenging a level in anticipation of immediate benefits from staff training (which are yet to materialise).

Review the use of the new pastry type, unless pie bakers can be trained to use it efficiently it is not worth the cost saving. Ensure KP is fully staffed to avoid excessive overtime and resultant tiredness and inefficiency.

The \$1,000 adverse fixed overhead variance is due to Nigella "spending \$1,000 more on training than I budgeted for" in relation to advanced pie baker training. There do not currently appear to be benefits from this (see adverse labour efficiency variance), perhaps due to the training coinciding with such a busy time

Do not have too much training in a short space of time, especially when KP are exceptionally busy. Provide short bursts of training, during the least busy periods, and assess effectiveness of training before adjusting standards.

[Other plausible explanations for variances may be acceptable as are alternative (e.g. more general) recommendations for improving future performance. See appendix 2.]

Summary Variances and Reconciliation between budget and actual profits:

Budgeted Net Profit	\$	\$	\$
			28,000
Variances:			
Sales Volume:		Adv	Fav
Sales Price		4,200	6,000
		-----	-----
		4,200	6,000
		-----	1,800
Expected profit from actual sales			29,800
Raw Materials – Pastry:			
Price			300
Usage		800	-
Raw Materials – Kiwifruit filling:			
Price			4,000
Usage			-
Labour rate		2,250	-
Labour efficiency		3,300	-
Variable Overheads expenditure			500
Variable overheads efficiency		900	-
Fixed overheads		1,000	-
Total of cost variances		8,250	4,800
		-----	(3,450)
Actual Profit			26,350

Appendix 2

Not required in the answer, but a complete analysis of performance might look something like this:

KP sold 150 (12%) more pies than budgeted and at a budgeted contribution of \$40 per pie this means that the sales volume variance was \$6,000 favourable. The increase in pie sales was no doubt influenced by the price cut which caused an adverse sales price variance of \$4,200. The net effect of these two variances is \$1,800 positive, but this may be a short term gain as competitors may match KP's price cut to win back market share and KP appears to have quality problems (customer complaints). KP could be facing lower sales volumes at lower margins unless it improves quality and gets more competitive.

The cost variances netted out to \$3,450 adverse and hence indicate some serious production efficiency and cost control problems. With respect to raw materials, the \$300 favourable price variance on pastry is not significant except that it may explain the \$800 adverse pastry usage

variance. Pie bakers commented that "the new type of pastry proved to be difficult to work with" perhaps explaining why 100kg more than standard was used. This could be due to wastage but also the pastry on pies being too thick (hence customer complaints). The \$4,000 favourable usage variance on kiwifruit filling may appear to be a welcome cost saving, but this appears to be false economy given that customers have complained that KP's pies contain "too much pastry and not enough fruit".

The adverse labour rate variance of \$2,250 is due to overtime premiums paid as no extra staff were hired to cope with the unexpected increase in demand. The adverse labour efficiency variance of \$3,300 is due to pie makers taking 150 hours more than standard to make the 1,400 pies. This may be due to the difficult to work with pastry and also due to tiredness caused by excessive overtime. Moreover, it is possible that the standards were set at too challenging a level in expectation of immediate effects from staff training.

The variable overhead efficiency variance was \$900 adverse due to the extra labour hours discussed above. The \$500 favourable variable overhead expenditure variance is within control limits and hence need not be investigated, but is perhaps due to savings on power costs because the new ovens were even more energy efficient than expected.

Fixed overhead expenditure was \$1,000 more than budget due to the extra expenditure on staff training. All other fixed overheads were in line with budget, indicating good cost control in their respect (but there may have been compensating variances between different fixed cost categories).

Recommended management actions.

Although the profit for the month of May was only \$1,650 (5.9%) below budget this was a disappointing result given the favourable sales volume variance of \$6,000. Competitor reaction to the 3% price cut need to be monitored carefully. Customer feedback indicates quality problems which are borne out in the variance analysis. The pies are being produced with too much pastry and too little kiwifruit and hence better control over usage of materials needs to be established. The use of the new pastry needs to be reviewed. The favourable price variance is far outweighed by adverse materials usage and labour efficiency effects. Unless better training can solve the problems when using this type of pastry an alternative supply should be sought. When considering supplier choice, KP should consider the whole 'cost of ownership' not just the purchase price.

Some expenditure on market research may be worthwhile as customer perceptions of pie quality are very important and ability to predict market demand should be improved. Having the right number of staff in place to meet the growing demand would have reduced some adverse variances (labour rate and efficiency variances and possibly also materials usage variances). Revision of standards needs to be done with care and some participation of staff in the setting of standards is recommended. It is possible that the new standards for labour hours were too ambitious or that the pie makers were not sufficiently consulted about them and did not 'buy-in' to the whole training/productivity improvement process. The unexpected demand increase and the need for excessive overtime (and hence tired pie bakers) may have undermined the effectiveness of the training at this busy time.

Brooklyn outsourced builders

BACKGROUND

Brooklyn Outsourced Builders (BOB) supplies contract labour to construction companies for both short-term and long-term assignments throughout New Zealand. Many construction companies are happy to pay BOB a premium price for contract labour because they know that BOB will supply only highly skilled and reliable workers. With the Christchurch rebuild ongoing and a growing need for affordable houses in Auckland, the New Zealand demand for construction workers has risen rapidly over the last few years.

Consequently, BOB's managing director, Alec Trishon, is confused by the firm's poor performance. Knowing of your management accounting expertise Alec has asked for your advice. He exclaims:

"We sold 100,000 hours of contract labour last year, and construction is booming, so we should be growing. Why is our business shrinking?"

DETAILS

You conduct some background research and discover that the New Zealand construction sector is now struggling to grow further. In one recent press article it is stated:

"While the level of building activity is elevated, and firms continue to report that they are extremely busy, what is clear is that the construction sector is struggling to grow further. Capacity, cost and capital constraints are acting as caps."

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BOB has an extensive database of available contract labour and sufficient administrative infrastructure to meet any of these demand levels with no significant change in variable costs per hour or total fixed costs. Sue Sawyer suggests that you use these demand estimates to calculate the price that will maximise BOB's profits.

REQUIRED

Prepare a report to Alec Trishon, the managing director of Brooklyn Outsourced Builders (BOB), advising him on the most appropriate pricing strategy for the business.

(Marks will be available for good report style)

Your report should include the following:

- A calculation of the price per hour of contract labour if BOB continues to price at full cost plus 25%, and an explanation of the key advantages of this method of pricing.
- A calculation of the price per hour of contract labour if BOB takes Don Carpenter's advice and moves to rate of return pricing, and an explanation of any advantages this method provides compared to BOB's previous (full cost plus 25%) method of pricing.
- A calculation of the price per hour of contract labour if BOB takes Sue Sawyer's advice and uses the predicted demand to set a price that maximises profits, and a statement of the expected profit and ROCE that this price will yield if demand predictions prove to be reliable.
- A discussion of the key advantages and disadvantages of the pricing method used in (c) compared to the cost plus methods used in (a) and (b) above.
- Assuming that Sue's demand predictions prove to be reliable, a comparison of the expected profit and ROCE generated by each of the three pricing methods and your final recommendation to Alec, with supporting reasoning.

You establish that Bob's draft budget assumes that demand for contract labour will fall and for next year the budget predicts the supply of only 80,000 hours of contract labour. The variable cost per labour hour is \$26 and total fixed costs are expected to be \$1,248,000 for the year. BOB has always absorbed fixed costs on the basis of budgeted labour hours and sets the price for contract labour at budgeted full cost plus 25%.

The new accountant, Don Carpenter, has suggested that rate of return pricing might be more appropriate. Don states that BOB's total capital employed is \$9,920,000 and explains that BOB must earn a good return on capital employed (ROCE) in order to keep shareholders happy.

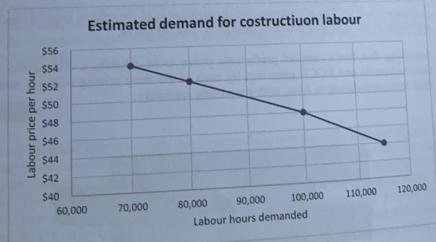
Don argues:

"Rate of return pricing will ensure that we meet our ROCE target of 10%"

However, the marketing manager, Sue Sawyer, claims that neither of these cost plus pricing methods are appropriate in the current fiercely competitive market for construction workers. Sue pleads with you:

"I'm surrounded by bricklayers. You will have to help me educate them. Times are changing and we can't blindly rely on historical information. Therefore I have conducted some market research. We sell to big construction companies who have the upper hand in contract negotiations and hence our target market is still very price sensitive. At cost plus 25% we could price ourselves out of the market"

Sue suggests that prices should not be set based on costs and asks you to take account of the demand estimates provided by her market research in order to set an appropriate market based price. She provides you with the following extracts from her market research report:



Executive Summary

- The cost plus 25% price is calculated at \$52 per hour.
- Cost plus pricing enables fair and plausible prices to be found quickly and easily and encourages price stability if market norms (e.g. for the mark-up %) are followed.
- Based on budgeted output of 80,000 labour hours sold, the rate of return price, for a desired ROCE of 10% (and hence a \$920,000 profit), is calculated at \$54 per hour.
- Rate of return pricing ensures that the firm's capital is employed and the need for an adequate return for shareholders are considered.
- The market based profit maximising price, based on the market research, is \$48.
- If market predictions prove accurate, the expected profits and ROCE under these three alternative prices will be as follows:

Pricing Method	Price	Expected demand	Profit	ROCE
Cost + 25%	\$52	80,000	\$832,000	8.6%
Rate of return	\$54	70,000	\$712,000	7.2%
Market based	\$48	100,000	\$952,000	9.6%

- It is recommended to the board that the market based price of \$48 is used for the coming year – nearly meets 10% ROCE target despite fierce competition.
- The main advantage of the market based price is that it specifically takes demand side issues into account as well as costs. The other methods are based on full cost and assumed volumes, and largely ignore current market conditions.
- In a 'fiercely competitive market' it is essential to take demand side issues into account as use of full cost based pricing may be inappropriate and could result in prices that are too high and therefore trigger a death spiral.

a) Use of full cost plus 25% pricing method.

The price per hour of contract labour hour if BOB continues to price at full cost plus 25% is calculated as follows:

Variable costs	\$26.00
Fixed costs (\$1,248,000 ÷ 80,000 hours)	15.60
Full cost per hour	\$41.60
25% mark up	10.40
Cost plus 25% price	\$52.00 per hour

The advantages of this cost plus pricing method include:

- Plausible prices, found quickly and easily (hence a cheap method).
- Produces fair and morally defensible (justifiable) prices (Hence can be used in 'open book' contracts).
- Encourages price stability – assuming all firms in industry have similar cost structures and use the same mark-up percentage).
- May be used as a 'base price' and then amended for market effects/considerations.
- Efficient use of management (Pareto) might be to use Cost Plus for the 80% of products that only generate 20% of sales (and only use the more expensive market-based pricing for the other 20% of products that generate 80% of sales).

b) Use of rate of return pricing (as suggested by Don Carpenter).

The rate of return price is calculated as follows:

Required return =	10% x \$9,920,000 = \$992,000
Required profit per hour =	\$992,000/80,000 =
Full cost (as in a above) =	41.60
Rate of return price =	\$54.00 per hour

The advantages of the rate of return method (compared to the full cost plus 25% method) include:

- Takes into account the company's capital employed and the need to make an adequate return on capital ('to keep shareholders happy').
- Provides a way of deciding on the appropriate % mark up to be applied in full cost plus pricing (in order to achieve an adequate return on capital).
- The required return can be adjusted for current market rates of return (hence may partially take competitive pressures into account).

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- c) Market-based pricing – Using the predicted demand (as recommended by Sue Sawyer), the price that maximises profits is calculated as follows:

Contributions for different prices and demand expectation are as follows:

Price per Hour (1)	Variable Cost per Hour (2)	Contribution per Hour (3) = (1) – (2)	Demand in Hours (4)	Total Contribution (5) = (3) × (4)
\$44	\$26	\$18	115,000	\$2,070,000
48	26	22	100,000	\$2,200,000
52	26	26	80,000	2,080,000
54	26	28	70,000	1,960,000

Fixed costs are irrelevant as they will remain the same regardless of the demand, and so maximization of contribution leads to profit maximization. From the table it is clear that the profit maximising price is \$48 per hour.

The expected profit and ROCE that this price (if demand predictions prove to be reliable) are calculated as follows:

If demand predictions are accurate, a price of \$48 will maximize contribution at: \$2,200,000
Fixed costs will not change and are budgeted at: \$1,248,000
Expected profit will therefore be: \$952,000

ROCE would be 9.6%. (952,000/9,920,000)

c) The advantages and disadvantages of this market-based pricing method.

The advantages of this market-based pricing method (compared to the cost plus methods used in a and b) include:

- Neither the cost-plus 25% method to pricing in (a) nor the rate of return method in (b) take any account of the effect of prices on market demand. They both ignore the competitive environment and the prices set by competitors. This is a dangerous thing to do, especially in a 'fiercely competitive market' (like that faced by BOB) when the historical norms for setting prices in the industry are likely to be disrupted.
- The market-based pricing approach is balanced as it considers both demand/market considerations and supply or cost factors – Hence it considers: *costs, customers and competitors*.
- It also ignores fixed costs and hence prices do not depend on arbitrary allocation methods and are not distorted by the existence of spare capacity.
- By ignoring fixed costs this approach avoids triggering the *death spiral* (lower demand leads to higher OAR (fixed costs per labour hour), and hence higher prices which cause still lower demand, etc.)

The disadvantages of this market-based pricing method (compared to the cost plus methods above) include:

- It may be difficult and expensive to obtain reliable market demand predictions.
- It is a more time consuming and expensive pricing approach. Hence, perhaps best used for the 20% of products that generate 80% of sales – (*Its use in this simplified case is justified as selling contract labour hours is BOB's core business and generates 100% of sales.*)
- Using a contribution approach and ignoring fixed costs could be dangerous and might lead to inappropriate prices that result in either, an inadequate contribution to the fixed costs (that must be covered to make a return) or are too high and reduce quantity demanded.

d) A comparison of the expected profit and ROCE generated by each of the three pricing methods.

If market predictions prove accurate, the expected profits and ROCE under alternative prices will be as follows:

Pricing Method	Price	Expected demand	Profit ¹	ROCE ²
Cost + 25%	\$52	80,000	\$832,000	8.6%
Rate of return	\$54	70,000	\$712,000	7.2%
Market based	\$48	100,000	\$952,000	9.6%

Recommendations and conclusion.

On the assumption that the market research is reliable, the rate of return price of \$54 per hour appears to be too high and could trigger the death spiral (as new OARs calculated at a budgeted output of 70,000 hours would be higher and would raise full cost per hour). Perhaps in the current 'fiercely competitive environment' for construction labour the expectation of a 10% return is optimistic. The current method of full cost plus 25% yields a lower price of \$52, but this may still be too high for the current market and competitors may be undercutting this price (thus answering Alec's question – Why is our business shrinking?).

Hence a price of \$48 per hour appears more appropriate and should be charged for the coming year. Although this predicts a return of 9.6% (and does not quite meet BOB's 10% ROCE target) this appears to be the best return achievable, and a ROCE of 9.6% is probably acceptable, given the 'fiercely competitive environment' facing BOB.

Full supporting reasons for using a market-based price of \$48:

The market based pricing method takes into account both the variable cost and the market demand predictions and avoids the danger of setting the price that is too high in a 'fiercely competitive market'.

The market-based pricing method results in the lowest price (both cost plus methods result in higher prices). A low price makes sense in the competitive market and improves the competitiveness of BOB in respect of their negotiations with "big construction companies who have the upper hand in price negotiations and...are very price sensitive".

Cost plus pricing is inadequate as it does not take market demand into account. It is especially dangerous when output is falling (BOB's output has fallen from 100,000 to 80,000 labour hours) as it can trigger the *death spiral* (lower demand leads to higher OAR and hence fixed costs per hour, and hence higher prices, which triggers still lower demand, etc.)

Actually any of the advantages of market based pricing could be restated as the reasons for the recommended market price, i.e.

- The approach is balanced as it considers both demand/market considerations and supply or cost factors.
- Ignores fixed costs and hence prices do not depend on arbitrary allocation methods and are not distorted by the existence of spare capacity.
- Neither the cost-plus 25% method to pricing in (a) nor the rate of return method in (b) take any account of the effect of prices on market demand. They both ignore the competitive environment and the prices set by competitors. This is a dangerous thing to do, especially in a recession when demand is low and the historical norms for setting prices in the industry are likely to be disrupted.

Rotorua Hospital

BACKGROUND

The Rotorua Hospital is administered by the Lakes District Health Board and management are under constant pressure to control costs. The pressure is particularly in respect of non-health care costs and there is a drive to improve budgetary control in relation to all ancillary services. The Rotorua Hospital Laundry is no exception and you have been asked to advise on possible improvement to the current budgetary control procedures at The Hospital Laundry.

DETAILS

Rotorua is a popular tourist location that is particularly popular in the summer months which show that the population of the region is trebled for the months of January, February and March. From past experience, this influx of visitors doubles the activity of the hospital during these months. The annual budget for the hospital's laundry department is broken down into four quarters, namely April-June, July-September, October-December and January-March, dividing the annual budgeted figures by four. This budgeting work has been undertaken for the current year, by a recently recruited assistant in the hospital's administration office, using the previous year's figures and adding 16%.

It is realised by Lakes District Health Board that management information for control needs to be improved, and you have been recruited to help introduce a system of real accounting.

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You establish that performance reports are produced each quarter in the following format:-

Rotorua Hospital - Laundry department Cost report for quarter ended 31 March			
	Budget	Actual	Variance
Patients days	9,000	12,000	3,000
Weight processed (Kg)	180,000	240,000	60,000
Costs:			
Wages	\$ 8,800	\$ 12,320	\$ 3,520
Overtime premium	1,400	2,100	700
Detergents and other supplies	1,800	2,700	900
Water, water softening and heating	2,000	2,500	500
Maintenance	1,000	1,500	500
Depreciation of plant	2,000	2,000	-
Manager's salary	1,250	1,500	250
Overhead, apportioned:			
for occupancy	4,000	4,250	250
for administration	5,000	5,750	750

You have been unable to establish the basis for apportionment of overheads for occupancy and administration, but these are considered to be fixed costs and beyond the control of the laundry department manager. The manager received an unbudgeted \$250 bonus in February. The manager's salary and depreciation are fixed costs, the fixed element of wages is \$4,300 and of water, water softening and heating is \$500. All other costs are considered to vary with activity levels.

REQUIRED:

Produce an initial report for the hospital management committee including the following:-

- Your critique of the current approach to the preparation of quarterly budgets and of incremental budgeting in general. Suggest how the budget preparation process could be improved, clearly highlighting the advantages of any approach you suggest.
- A flexed budget for the quarter ended 31st March. Calculate and explain the total activity/volume variance (between original and flexed budget) and provide an explanation of the main variances between flexed budget and actual results. Outline the key advantages of using flexible budgeting compared to a static budgeting approach.
- Your recommendations for amendments to current budgetary control practices in use at the Rotorua Hospital Laundry. In particular explain how your proposals will ensure that the laundry manager's performance is more accurately assessed.

- The hospital laundry's quarterly budgets should reflect seasonal differences in volumes and expected costs.
- Increases in budgeted costs compared to past actuals should be clearly justified and the laundry manager should be asked to participate in the budget setting process.
- Variances that are effective for control purposes need to be calculated by comparing actual expenditure to a budget *flexed* for actual volumes (see below). This flexible budget approach eliminates the effect of volume changes (that are outside management control) and hence more accurately measures efficiency.
- It is recommended that:
 - A flexible budgeting approach should be adopted, with more accurate, seasonally adjusted, line by line estimates replacing incremental budgeting crudely based on total costs.
 - The advantages and disadvantages of using ZBB or ABB should be investigated.
 - The laundry manager should participate in the budgeting process and the manager's performance should be assessed against only the costs that are in the manager's control.

Critique of current methods of preparing quarterly budgets:

- Dividing annual budget by four is inaccurate – budget should be seasonally adjusted.
- Last year's actuals plus 16% is a poor approach – 16% a very high increase (has activity increased by this percentage, what was cost inflation?) – The incremental approach reinforces previous inefficiencies.
- The method of overhead apportionment should be disclosed. Is it appropriate? Are these overheads actually in the laundry manager's control?
- Inaccurate budgeting leads to poor planning and this may lead to inadequate provision of resources. For example, was appropriate labour in place for the busy season?
- The manager doesn't participate in the budgetary process, so is it accurate? Will the manager be willing to be monitored against an 'imposed' budget?
- The report could expand on 'the benefits of participative budgeting' by discussing any of the following advantages:
 - Represent views of people from all levels of the organization
 - More accurate than estimates prepared by top managers that may be 'out of touch'.
 - Higher motivation towards achieving budgetary targets, thus can lead to an increase in managerial efficiency and firm performance
 - Reduces the chance of upward blaming (i.e. Manager says: someone else set an inaccurate budget, it's not my fault it was not achieved.)

b) Rotorua Hospital Laundry – Cost report for the quarter to 31 March.

	Original budget	Flexed budget	Actual	Variance
Patient days	9,000	12,000	12,000	
Weight Processed (Kgs)	180,000	240,000	240,000	
Controllable costs:				
Wages ¹	\$ 8,800	\$ 10,300	\$ 12,320	\$ -2,020
Overtime Premium ²	1,400	1,867	2,100	-\$233
Detergents, etc. ³	1,800	2,400	2,700	-\$300
Water, etc. ⁴	2,000	2,500	2,500	0
Maintenance ⁵	1,000	1,333	1,500	-\$167
Depreciation	2,000	2,000	2,000	0
Manager's salary	1,250	1,250	1,500	-\$250
Totals (in manager's control)	18,250	21,650	24,620	-\$2,970
Volume variance		-3,400		
Uncontrollable costs:				
Overheads (allocated)	9,000	9,000	10,000	-\$1,000
Department Total	27,250	30,650	34,620	-\$3,970

Notes on calculation of flexed budget:

- Fixed costs of $4,300 + (8,800 - 4,300) \times 240/180$
- Original variable costs of $1,400 \times 240/180$
- Original variable costs of $1,800 \times 240/180$
- Fixed costs of $500 + (2,000 - 500) \times 240/180$
- Original variable costs of $1000 \times 240/180$

Discussion of variances:-

i) Variances in manager's control = \$2,970 adverse.

Given the problems with budget setting it is likely that a proportion of all variances against the flexed budget could be due to poor estimates, but if we assume the flexed budget is a reasonable estimate:

Wages: \$2,020 (20%) above flexed budget - perhaps because of poor initial planning and hence the need to later employ temporary labour quickly at premium rates (e.g. at agency rates).

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Overtime premium: \$233 (12%) above flexed budget - again could be due to bad planning resulting in inadequate staffing levels and hence the need for more than expected overtime.

Detergent: \$300 (12.5%) above flexed budget - perhaps due to inadequate training or poor supervision of temporary labour.

Maintenance: \$167 (12.5%) above flexed budget - could be due to overloading or other misuse of laundry equipment by the poorly trained temporary labour.

Manager's salary: \$250 over budget - an unplanned bonus, the reason for this needs investigation.

ii) Variances not considered in manager's control - \$4,400 adverse.

Volume variance: \$3,400 adverse. Reflects expected increase in laundry department costs due to actual volumes of laundry processed being higher than originally planned (by 60,000 kgs). This explains a proportion of the cost increase against original budget that the laundry - the part the manager should not be held accountable for, as he has no control over the required volume of laundry.

Apportioned overheads: \$1,000 (10%) above budget - perhaps because there were absorbed on some measure of activity...but they are more than likely fixed costs and outside the manager's control, so such arbitrary allocation is not meaningful.

Key advantages of a flexible budget approach, compared to fixed/static budgeting.

- The likely effect of actual volume changes on expected expenditure is identified and hence relevant cost targets are set.
- The risk that volumes may change is recognised and prepared for.
- The cost structure is analysed and managers are aware of committed/fixed costs and costs that may change with volume.
- Departmental efficiency and manager's performance can be more accurately measured.
- Flexible budgets lead to better cost control and less dysfunctional behaviour by managers.

c) Recommendations:

- Seasonally adjust the budget to match with expected activity levels - split fixed and variable costs to facilitate understanding of cost behaviour.
- Do not use incremental budgeting until control is well established and inefficiencies reduced.
- Investigate the merits of using ZBB and/or ABB*.
- Even if use incremental budgeting do not apply an across the board increase - consider necessary increases (or decreases) line by line (i.e. apply specific estimating of changes).

- Manager's efficiency can only be measured against a budget flexed to actual activity levels and including only controllable costs. Apportioned overheads are not in manager's control so the only value in such apportionment is to measure economic performance of the unit (not the manager's efficiency).
- Manager should participate in the setting of budgets. This not only gains the benefit of the manager's expert knowledge, but also facilitates "buy in" to the control mechanism. However, such participation may lead to some bias being introduced by the manager (setting an easy budget to make subsequent achievements look good) so detailed justifications will be required for appropriately scrutinised by higher management and the budget will need to be "negotiated" and amended as necessary (This can be a costly/frustrating process).

- The report could expand on the benefits of ZBB and ABB along the following lines:

Benefits of Zero-based budgeting (ZBB):

- Allows top-level strategic goals to be implemented into the budgeting process by tying them to specific functional areas of the organization.
- Budgets are built around what is needed for the upcoming period, regardless of whether the budget is higher or lower than the previous one → better achievement of strategic goals
- Departments/functions need to justify their resource needs to meet strategic goals to top management → better morale in achieving targets, and better cost control

Benefits of Activity-based budgeting (ABB)

- Overhead assigned based on activity needs of cost objects (known as Cost Consumption approach, rather than Cost Assignment approach)
- focuses on activities and process improvements through exposing non-value added costs
- Focused on used capacity rather than allocating full capacity cost to activities and cost objects → better utilization of capacity, reduce budget padding and enable more accurate budgeting
- Allow for both incremental and radical changes in customer and market demands in budgeting, thus more useful in volatile environments.

Kit-tab

BACKGROUND

When James Beech, a skilled carpenter, was made redundant he set-up KitTab Limited to produce a self-assembly dining table, the *Constable*. A few years later he introduced the *Monet*, also a self-assembly kit, and for several years KitTab achieved steady growth in turnover and profits selling the two tables to DIY stores. Increased competition in the self-assembly furniture market forced James to design the *Dali*, a more complex, adjustable table but still in kit form. The *Dali* has proved a success, its sales increasing as the demand for the *Constable* and the *Monet* declined. Moreover the *Dali* continues to sell surprisingly well despite a recent price increase. Ongoing demand for the *Constable* and the *Monet* appears to be dependent on maintaining old prices and as overall profitability falling James is considering phasing out these and concentrating on the *Dali* and other new tables of more unusual design.

James is, however, worried that his present product costing system is flawed and he has called you in as a consultant to advise him.

DETAIL

You establish that James runs an organised workshop using a batch production system, making each table type in alternate batches. To minimise the number of set ups of his machines he produces in batches larger than the sales order quantities and holds the excess in stock for the next order. Each table uses different types of wood and fittings.

All production overhead is currently absorbed on a machine hour basis but you ascertain that KitTab's processes involve four main activities. The budgeted costs and revenues, and cost driver information for a typical month are as follows:

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Activities	Costs \$	Cost Drivers	
Machining	13,400		
Set-up	4,400	machine hours	
Purchasing and Materials Handling	6,000	production runs	
Packing and Dispatch	4,200	purchase orders	
		sales orders	
		Constable	Monet
Sales Units		150	160
Sales Revenue (\$)	21,000	20,800	80
Direct Costs:			12,800
Materials (\$)	5,250	7,680	4,000
Labour (\$)	1,800	2,880	1,760
Machine Hours	525	315	160
Production Runs	3	3	4
Purchase Orders	10	10	8
Sales Orders	5	8	8

REQUIRED

Your report to James Beech covering the following:

- f) An explanation of any evidence you find to support his suspicions that the present product costing system is flawed.
- g) A calculation of total profits, analysed by product, using the present (machine hour absorption) costing system. Highlight return on sales (profit margin) in total and by product.
- h) A similar analysis using appropriate activity based costing methodology and burden rates. Highlight the amended return on sales (profit margin) of each product.
- i) Your explanation for the differences in product profit margins observed.
- j) Your recommendations to KitTab, including your advice on the future product and production strategies that KitTab should adopt as a consequence of the ABC analysis.

- The addition of the *Dali* Kit to the product range has added considerable complexity and diversity and hence KitTab now shows several of Cooper's symptoms of a flawed costing system.

- Using the present costing system total profits were \$3,230 at a net profit margin of 5.9%. The *Constable* makes of loss of \$750 whilst the *Monet* and the *Dali* have positive net margins of 6.8% and 20% respectively.

- ABC does not change overall profits but it re-apportions overheads such that product profits and margins are revised to the following:

	Constable	Monet	Dali
Net Profit	\$3,095	\$1,599	-\$1,464
Net Margin	14.7%	7.7%	-11.4%

- Using a single volume related absorption base, like machine hours, over-costs high volume products like *Constable* and *Monet* and under-costs the low volume product *Dali*, because the high production support costs caused by *Dali* are incorrectly traced to the other products.

- KitTab should consider implementing ABC to improve the accuracy of product costs. The price of *Dali* should be increased and/or its costs reduced.

- As *Dali* is making a positive contribution to costs that are likely to be fixed in the short term it should not be dropped unless it can be replaced by more profitable products and there are no qualitative reasons for retaining it.

MAIN REPORT

- a) *An explanation of any evidence you find to support his suspicions that the present product costing system is flawed.*

KitTab's present costing system is producing some anomalous results and may therefore be flawed. The addition of the *Dali* to the original two models has added considerable complexity and diversity, especially as this new product is at lower volume. KitTab shows several of Cooper's symptoms of a flawed costing system:

- The *Dali* is selling "surprisingly" well in a competitive market and its high gross margin (%) is difficult to explain. Perhaps the cost, and hence gross margin, is wrong.
- Given *Dali*'s high gross margin, why are competitors not attacking it?
- Sales have increased despite a recent price increase. This defies the rules of economics unless prices are far too low.
- Sales appear to be moving from the higher volume old models to the lower volume new model, a dangerous change as economies of scale are lost.
- Despite increased sales of the "higher margin" *Dali*, profitability is declining, hence reported *Dali* costs and margins must be incorrect.

- b) *A calculation of total profits, analysed by product, using the present (machine hour absorption) costing system. Highlight return on sales (profit margin) in total and by product.*

Current costing system (absorbing overheads on machine hours)

Basis of Absorption: Total Overheads (\$ 28000) Total machine hours 1000 Absorption rate = \$28 per machine hour

	Constable	Monet	Dali	Total
Revenue	21000	20800	12800	54600
Direct costs:				
Materials	5250	7680	4000	16930
Labour	1800	2880	1760	6440
Contribution	13950	10240	7040	31230
Overheads	14700	8820	4480	28000
Profit	-750	1420	2560	3230
Net Margin	-3.6%	6.8%	20.0%	5.9%

- c) *A similar analysis using appropriate activity based costing methodology and burden rates. Highlight the amended return on sales (profit margin) of each product.*

Proposed Activity-based costing system:

Activities:	Costs \$	Cost Drivers		Burden rates \$
Machining	13400	Machine hours	1000	13.4
Set-up	4400	Production runs	10	440
Purchasing & M.H.	6000	Purchase orders	40	150
Packing & Dispatch	4200	Sales orders	21	200

	Constable	Monet	Dali	Total
Revenue	21000	20800	12800	54600
Direct costs:				
Materials	5250	7680	4000	16930
Labour	1800	2880	1760	6440
Contribution	13950	10240	7040	31230
Overheads:				
Machining	7035	4221	2144	13400
Set-up	1320	1320	1760	4400
Purchasing & M.H.	1500	1500	3000	6000
Packing & Dispatch	1000	1600	1600	4200
Total overheads	10855	8641	8504	28000
Profit	3095	1599	-1464	3230
Net Margin	14.7%	7.7%	-11.4%	5.9%

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d) Your explanation for the differences in product profit margins observed.

ABC turns the net margin for Constable from -ve to +ve and turns the net margin for Dali from +ve to -ve. The net margin for Monet rises slightly.....because:

The high volume products, Constable and Monet, account for most (84%) of the total machine hours and consequently, the present costing system allocates these products most of the overhead costs. Machining accounts for less than 50% of total overheads and it is inappropriate to absorb the non-machining overheads (non- volume related) on a machine hour basis (volume related) as it is not machine hours that "drives" or "causes" these costs.

Constable and Monet are produced in larger batches and hence cause less production runs and hence less set-up activity. Setting up the saws and planning machines for a new production run is time consuming and therefore costly. The ABC system recognises this and allocates the Dali with the biggest proportion (40%) of the set-up costs.

Similarly, the Dali is sold in small order sizes and hence causes more packing and dispatch costs, as is reflected through the ABC cost driver "number of sales orders". Dali is particularly "expensive" in this respect and collects 38% of these costs, the same as for the Monet but for only half the units sold.

Finally, the Dali is a more complex product with more individual parts and hence causes much purchasing and materials handling activity, ABC reflects this by allocating purchasing and MH costs on the basis of purchase orders.

c) Your recommendations to KitTab, including your advice on the future product and production strategies that KitTab should adopt as a consequence of the ABC analysis.

Recommendations:

Implement an ABC costing system and obtain better costing information to inform management decisions.

To the extent that the ABC system more accurately traces overhead costs to products, on a basis that reflects the causes of those costs, it is likely to provide more useful information for management. But note that this is "full cost" information. Drury would argue that this should be treated as "attention directing" information only. Hence further analysis (on a marginal costing basis) will be necessary before it is decided to drop a product. If KitTab is operating at below full capacity any product that provides a positive contribution to genuinely fixed costs should be retained.

However, Cooper would argue that management should rely on the ABC information and drop unprofitable products. This would only really seem to be valid if KitTab were operating at full capacity and dropping the Dali would make room for production and sales of more profitable products. [Unless there was some important qualitative reason for retaining the Dali – customers want all 3 tables, the Dali will open a market for similar, more profitable, tables that will follow.]

Future product and production strategy

Clearly it would have been a disaster to "phase out" the older products, much of the overhead allocated to them by the present costing system are not caused by them and would not be avoided if the products were dropped. Replacing them with more products similar to the Dali is likely to further add to production complexity and increase production support costs considerably. The ABC costings confirm that it is the Dali that is causing the majority of production support costs and current prices do not reflect this. However, all products make a positive contribution and there would be no advantage in dropping the Dali unless it can be replaced by something better. So what can be done?

- Revise prices such that customers pay for the resources they demand – so increase the price of the Dali.
- Reduce costs, e.g. James may be able to "educate" customers into reducing their demands, e.g. by placing fewer, but larger, orders.
- Redesign the Dali to have less components and hence cause less purchasing and materials handling activity.
- Produce the Dali in larger batches, this will reduce set-up costs. (but cause extra stocking costs!)

Cooper's symptoms of a flawed costing system:

- Achieved gross margins not easily explained.
- Little objection to price increases.
- Apparently high margin products not being attacked by competitors.
- Product mix moving from high volume to low volume products.
- Product mix apparently moving from low margin to high margin products – but overall profitability declining!

