
Answers

1 To: The CEO of Folt Manufacturing (Folt)
From: An Accountant
Date: September 20X5
Subject: Performance measurement and outsourcing of manufacturing at Folt

This report recommends a set of key performance indicators (KPIs) for the identified critical success factors (CSFs) associated with the new strategy and evaluates these as a set of measures of the strategic performance of Folt. Further, in preparation for the negotiation of the outsourced manufacturing contract, advice is given on the use of target costing; the attribution of responsibility for areas of quality and the information required to monitor the quality of production.

(i) Recommended KPIs for CSFs

The chief executive officer (CEO) has identified three critical success factors (CSFs) for the medium term. Performance towards these requires to be measured and so KPIs are recommended as follows:

1. Keep capital providers satisfied

There are two capital providers, the debt is all provided by the venture capitalist (VC) and the equity is provided by the management team and the VC combined with the management team taking the majority. A widely used and understood metric for performance would be return on capital employed (ROCE) which measures the returns to all capital providers as a group. It is defined as operating profit/capital employed. In order to properly understand performance, a target measure should be set for this, possibly by using an industry average as benchmark.

To break this down further would probably require return on equity and cost of debt measures and would, therefore, break the desire to keep the performance information brief. As there are only two capital providers and ROCE neatly summarises this, no other KPIs are suggested.

2. Build a world-class software development team

This is a difficult factor to measure with precision. Building a team could be measured by an increasing number of employees or number of projects undertaken. However, the important element in this CSF is the 'world-class' quality of the team. This could be measured by the input cost of the team, provided that they are recruited at competitive market rates, since higher wages would imply higher skills. Alternatively, it could be measured by the team's output in terms of commercial success (sales) or technical achievement (industry design awards).

Overall, therefore, being led by the output of the team, it is recommended that we use growth in number of projects undertaken and the number of industry design awards won as the KPIs for this CSF.

3. Ensure that quality of the imaging devices meets market standards

Again, this is a difficult factor to measure. Financial measures of quality are possible by looking at the effect on sales volume and profitability (both likely higher for higher quality). However, these are lagging indicators where quality effects can take some considerable time to trickle through to customer perceptions.

A more direct measure of the quality of current manufacturing would be through customer returns and product failure rates on factory testing. However, it can be difficult to obtain benchmarking information which will allow judgement of whether this is meeting market standards. Given that the company already does manufacture successfully, it should have historic data which, if products are selling at the required margins, would suggest that these data on failure rates and returns would be acceptable to the market. As the business is moving to outsourcing its manufacturing, it is the external failure rate data of the customer returns which will be more appropriate as Folt will retain the key contact with the customer.

Overall, it is recommended that gross profit (a measure of both volume and profitability) of products and value of customer returns be used as KPIs. Both of these will need to be benchmarked to historic values in order to judge the maintenance of standards.

Performance measurement system

The KPIs suggested are:

- ROCE
- growth in number of projects undertaken
- growth in number of industry design awards won
- gross profit and
- value of customer returns.

The question of whether this is a suitable set of metrics to measure strategic performance really asks, does this measure the achievement of Folt's overall objective 'to provide an adequate return to its capital providers while growing the business into a world-class supplier in its areas of expertise'.

This objective can be broken down into:

- to provide an adequate return to its capital providers
- growing the business
- being a world-class supplier in its areas of expertise.

These KPIs do address the first part through ROCE and the second part partly, through building the software team. However, the overall growth of the business is not measured financially through sales or profits and its target of being world-class is not measured through the number of markets which it has entered and is considered a leader. The final two KPIs have a more supporting role to play for the overall objective and these could be replaced by others measuring the concepts of growth and world-class supplier in order to provide a strategic view for the board of whether the company's mission is being achieved.

[**Tutor note:** Credit is given for suitably justified metrics and then a consistent discussion of this in relation to the objectives of Folt.]

(ii) Outsourced manufacturing: target costing

Working (per unit):

	\$	\$
Target price		175·0
Target profit		35·0
Target cost		140·0
Costs:		
Software	40·0	
Materials	37·0	
Machine costs	35·2	
Labour	12·5	
Packaging and delivery	8·0	
Design	8·0	
Inspections	0·8	
Reworking costs	0·5	
Total costs		142·0
Cost gap		2·0

[**Note:** It is assumed that it is the total design costs which are relevant to pricing the product although it would also be possible to consider the original design costs as sunk and so only include the redesign element.]

The target cost is calculated as the estimate of a competitive product price less the desired profit margin.

The illustrative calculation above shows that the current estimated cost is \$2 per unit too high and so the product or the manufacturing process will need to be redesigned to cut these costs in order to meet the desired margin.

The costs will be split under the contract between the two parties. Therefore, Folt could press Xela to make cuts in its costs to meet the cost gap as the gap is not large (2·3% of the total costs for manufacturing [i.e. excluding software, design and packaging and delivery]) and it is stated that Ceeland is a lower cost environment than Beeland for manufacturing. However, it may be dangerous to Folt's strategy if these cuts adversely affect product quality.

(iii) Responsibility for quality areas within outsourced manufacturing

This discussion relates to the quality of the manufactured device and should exclude issues with the software, packaging and delivery which remain Folt's responsibility. Taking each of the four areas of quality costs in turn, the cost area is defined and the appropriate treatment under the contract discussed:

- Prevention costs are incurred to prevent the production of products which do not conform to specification (e.g. design of the product and manufacturing process). The product design costs will obviously lie with Folt and the costs for design of the manufacturing process will lie with Xela, although it would be sensible for Xela to replicate Folt's current process and indeed this may be required in order to maintain quality. However, Xela may want autonomy on this in order to make further gains from streamlining processes. There will need to be liaison between Folt and Xela to ensure that process designs are acceptable to both parties.
- Appraisal costs are costs to ensure that the products output by the manufacturer conform to standards. These costs will mostly lie with Xela as it will be the manufacturer. However, Folt will have to oversee this appraisal by checking on the quality data which Xela will supply under the contract.
- Internal failure costs arise when poor products are identified before despatch. These costs will remain the responsibility of the manufacturer (Xela) as they have control of the manufacturing facility and the appraisal operation there.
- External failure costs arise when poor products are identified after despatch to the customer. Where these costs relate to repair or replacement of faulty hardware products, they should lie with the manufacturer. It is worth noting in price negotiations that there are additional costs for Folt from these failures beyond immediate reworking costs, such as the impact on Folt's brand.

There may be reasonable argument from Xela that Folt should bear some of the non-conformance costs (internal and external failure) if the faults can be attributed to faulty product design work.

Obviously, all of these matters are subject to negotiation before the contract is finalised.

(iv) Impact of sources of quality information

The maintenance of quality standards is a critical success factor for Folt. The ability to ensure this is based on the SLAs in the manufacturing contract with Xela. The monitoring of these SLAs will be done through information systems and so the quality and reliability of the information is critical to Folt's success.

The outsourcing contract must stipulate agreed quality metrics and also the targets for performance. These will have to be measured and reported by Xela to Folt. Xela does not at present have information systems which are capable of capturing the non-financial data which is likely to be required by the SLAs. It must therefore be a condition of the contract that suitable systems are put in place by Xela.

In fact, a simple solution would be for Xela to duplicate the existing systems at Folt. This would avoid the need for Folt to authorise (under the contract) any new system as it would then have a familiar one. It will also mean that the format of the reports is familiar and this too will ease the handover of operations.

However, this new system will be owned and operated by Xela and so Folt will need to have access to it in order to verify that data is being input, processed and reported accurately. The detailed type of system audit work may be new to Folt. However, again by using the same system as currently exists, it should be possible to identify managers who monitor quality at Folt's existing manufacturing operation, to perform this task.

In summary, it will be important that any metrics and targets for these which are used under the contract are unambiguous. It will also be important to stipulate in the contract that Folt be given access to verify that this information is being produced accurately. This will help to avoid the possibility of gaming the contract by Xela.

Ultimately, customer complaints and returns will represent an external source of information on the quality of the products manufactured. However, it would be more effective to identify and address problems before they reach customers.

2 (a) Activity based management

Activity based management (ABM) applies activity based costing (ABC) principles in order to satisfy customer needs using the least amount of resources. Activity based costing groups overheads into cost pools for an activity and identifies the cost driver for each activity. This gives a more accurate calculation of product costs.

ABM makes it possible to better control costs by controlling the activities which drive the costs. ABM would also help Vunderg to identify value added activities and non-value added activities. Activities which do not add value should be reduced, which would allow cost reduction without affecting the quality of service or product for Vunderg's customers.

Choosing which products to manufacture

ABM can help to improve Vunderg's performance in terms of deciding which products to manufacture. This is particularly important where a large proportion of a company's costs are overheads. This is the case in Vunderg, where overheads relating primarily to procurement, customer administration and product design are high. By understanding the cost of a product, and therefore its profitability, Vunderg can decide whether to discontinue an unprofitable product or whether to produce a new one. This will be relevant for the proposed large windows for commercial buildings. These are bespoke items and the cost will include a large amount of overheads, such as design.

Loss making products identified using ABM are often those which are highly customised and produced in low volumes, such as the conservatories. By using ABC principles, Vunderg could identify the high overhead costs of the sourcing of special materials and finishes for these by the procurement department. Using ABM, Vunderg could take action to reduce these costs, for example, by standardising the range of materials and finishes used, so that the procurement department spends less time sourcing them. The conservatories earn 8% of Vunderg's total contribution in 20% of the factory space. This implies that conservatories account for a disproportionate level of factory overheads.

Review of costs, prices and designs

By understanding what drives the costs of a product, Vunderg can take actions to make an unprofitable product profitable, for example, in response to the initial quality problems when the glasshouses were first manufactured, but which now command premium prices. The use of ABM may have led to a faster resolution of these initial quality problems by identifying the causes, or drivers, of the product cost and taking action to manage these.

ABM will also help identify products which may need to be re-priced. For example, customers may be prepared to pay more for the use of special materials and finishes in the conservatories. Vunderg could charge customers more for the use of special materials and finishes to cover the high overhead cost associated with procuring them.

ABM may identify possible improvements to the design of a product by focusing on activities which add value for the customer and eliminating those which do not. Selling leaking conservatories does not add value to the customer and incurs rectification costs. The improvement in design to prevent the leaks occurring in the first place is an example of how ABM can be used to make the conservatories business more profitable.

Customer profitability analysis

Customer profitability analysis (CPA) involves apportioning overhead costs to different types of customers, or categories of customers, using ABM principles. This enables a better understanding of the profitability of selling to different customers and can help Vunderg to decide whether to stop selling to certain customers or take other actions to improve their profitability.

At Vunderg, CPA would be most useful for the glasshouses which are sold through 40 different retailers. Some of the costs of selling to these customers, such as trade discounts, should be relatively easy to identify. Other overhead costs, such as those driven by the number of customer orders processed, may only be identified using ABM principles and may differ considerably between customers as the size of orders they place varies greatly.

The profitability of selling to the 40 retailers will therefore also vary considerably. Vunderg could act to improve the profitability of the least profitable ones. This could include insisting on minimum order sizes to reduce the costs driven by the number of orders processed. They could also offer more product training or contribution towards advertising costs to increase sales volumes.

(b) Limitations of using the ABM method

Identifying key activities and drivers

It may be difficult to separately identify all of the key activities and what drives them, which makes the application of ABC principles difficult. It may also be hard to assign responsibilities for individual cost pools which may cut across departmental boundaries.

Limited use

ABM is most useful where products are customised and contain high overhead costs such as design, procurement and customer administration. While the use of ABM may be worthwhile for the conservatories business, which is highly customised, and for the bespoke windows for commercial buildings, 84% (9,800/11,679) of Vunderg's contribution is from windows used in residential housing. These are highly standardised and are likely to include few overhead costs, for example, relating to design and after sales service. The manufacturing process after many years will already be efficient. The costs may already be well understood and controlled, in which case the implementation of ABM may not be worthwhile. Vunderg does, however, need a good understanding of the overhead costs, as the residential windows market is competitive.

As windows are highly standardised, Vunderg may be unable to pick and choose which items to produce. Design, specification and size will be dictated by the large construction companies who buy them and who will expect Vunderg to supply a complete range of windows. These companies would just buy from a competitor if Vunderg stopped producing the items they needed. As this market is very competitive, there may be little Vunderg could do to improve profitability, for example, by increasing prices, so the use of ABM to choose which products to sell could therefore be of little use. Similarly, as there are only a few large construction companies, the use of ABM may also not be worthwhile as Vunderg could not realistically stop trading with any one of them, nor could it raise prices because of the competitive market.

Incorrect decisions

Despite the difficulties in using ABC, for example, in identifying cost drivers, the use of cost drivers to charge overhead costs to conservatories should give a clearer indication of their profitability than under the current system. Vunderg can then take action to increase the profitability of these products, for example, by increasing the prices or reducing the costs.

The decision on whether these products should be discontinued should, however, take into account the effect on glasshouse sales as customers like to buy glasshouses which match the materials used in the conservatories. Discontinuing conservatories could reduce contribution from glasshouses by up to 17.1% (650/3,800), a total loss of contribution of approximately \$166,000 (17.1% of \$969,000), which is significant. As conservatories are at the start of their life cycle, expecting them to be profitable immediately could be unrealistic.

Just because a large proportion of factory space is dedicated to manufacturing conservatories does not mean that these costs will be saved in the short term if the products are discontinued. The depreciation or lease costs of the factory are fixed. Vunderg's main business is saturated and there is no prospect that the factory space could be better used in making other products. The factory may already not be fully utilised.

Problems of implementing ABM

Resource and cost impact

As Vunderg does not have an ABM system, considerable resources and management time will be needed to set this up. There may be resistance from staff, for example, because they do not want to change from the current costing system, which has been in use for a long time. Staff may not understand the benefits of ABM, or how it works. They would need training, which is expensive and it may take a considerable time before ABM is working effectively.

As Vunderg has only basic information systems, it may need to invest in these in order to collect large volumes of data on costs. Vunderg will have to consider whether the benefits of implementing ABM are greater than the costs of doing so.

3 (a) Advantages of the current budgeting system

CRC managers use the previous year results as a starting point when drafting their budgets and increase the variable costs according to any anticipated growth in volumes. This is an example of incremental budgeting.

An advantage of incremental budgeting is that it is quick and easy to prepare. The budgeting system at CRC has remained unchanged for a long time and it is unlikely managers will have experience in any other method of budget setting. While CRC was growing steadily, and relatively slowly at approximately one new store approximately every two years (approximately 18 years/10 stores), the use of incremental budgeting may have been appropriate. But as CRC is now entering new locations, such as out of town shopping centres and possibly food retailing, incremental budgeting is unlikely to be appropriate.

Incremental budgets can also be flexed according to anticipated activity levels. The manager of the central warehouse has done this, rather simplistically, by increasing costs of running the warehouse to reflect the anticipated increase in volumes in 20X6.

Disadvantages of current budgeting system

The use of incremental budgets can encourage slack. This includes incorporating extra costs into the budget to make it more achievable, or spending up to the budgeted amount to ensure that a larger budget is set next year. This may be particularly so at CRC, as managers are appraised based on achieving their budget. The manager of the central warehouse appears to be building in slack by increasing the budget for heating and lighting when the general rate of inflation is zero. This will make it more likely that the manager will receive a positive appraisal next year as it will be easier to achieve the budget.

Incremental budgeting does not encourage CRC to look for new and innovative ways of doing things. The level of automation in the warehouse is lower than in competitors and CRC appears to have just increased the budget for more staff to manually handle items in response to increased volumes. The introduction of the RFID system is, though, an example of the use of technology to increase efficiency in the warehouse.

Incremental budgeting is only appropriate where costs are already well controlled and operations are efficient. Otherwise, poorly controlled costs and inefficiencies are just incorporated into the next period's budget. Staff resistance to the introduction of the RFID system, and their difficulties in using it, suggest that this might not be the case.

Advantages of activity-based budgeting (ABB)

The principle of ABB is that it is activities, such as the goods inwards and goods outwards in the central warehouse, which drive costs. By understanding what drives the cost, such as the number of receipts from suppliers and the number of despatches to stores, CRC can take action to control the drivers of the costs and eliminate activities which are not value adding. ABB is particularly useful where overhead costs form a large part of total costs.

ABB can help identify critical success factors which CRC must do well, such as being able to put items away in the warehouse quickly and accurately and to retrieve them efficiently. This is more likely to be done right first time as ABB focuses on the whole of an activity.

ABB is useful as CRC is changing the nature of its operations. It is undergoing rapid expansion by opening four new stores a year. There is also likely to be a change in the nature of its business, with the opening of its first out of town store and possible acquisition of a food retailing business. The incremental approach to budgeting may no longer be appropriate given the scale and nature of these changes. ABB may be more suitable as the business becomes more complex.

Disadvantages of activity-based budgeting (ABB)

One of the main disadvantages of ABB is the time and resources which are needed to implement it, for example, by identifying activities and their costs drivers. In the short term, overheads may not be controllable which will reduce the benefits of implementing ABB.

CRC has used all its financial resources to fund its expansion and has only old and basic IT systems compared to its competitors. Its current systems are not enterprise resource planning systems (ERPS), unified databases or networked systems. Significant investment in CRC's IT systems will be needed to collect and process large volumes of data on cost drivers and activities which would be required to implement ABB. There may also be resistance to the change from staff, who may also require extensive training, as they will be unfamiliar with the ABB approach.

Conclusion

CRC should adopt ABB, mainly as a response to the significant changes in the business and its increasing complexity.

The out of town store and the food retailing business will both be supplied from CRC's existing central warehouse. The nature of these businesses may be different from the existing business. For example, out of town stores may require despatches each containing a larger number of items from the goods outwards section. Food retailers may require smaller, more frequent despatches to prevent spoilage. The current approach of incremental budgeting, in the central warehouse at least, is unlikely to be appropriate. The benefits of implementing ABB do, however, need to be compared to the financial cost and disruption of doing so.

(b) Activity-based budget for the central warehouse for YE 30 June 20X6

	Total \$	Goods inwards \$	Goods outwards \$	Other \$
Warehouse manager's salary*	55,000	–	–	55,000
Lease of RFID system*	75,000	45,000	30,000	–
RFID tagging (W1)	72,000	72,000	–	–
Warehouse staff wages (W2)	315,000	157,500	157,500	–
Heating and lighting (W3)	10,000	–	–	10,000
Total	<u>527,000</u>	<u>274,500</u>	<u>187,500</u>	<u>65,000</u>
Annual number of receipts into goods inwards expected		9,000		
Cost (\$) per receipt into goods inwards		30.50		
		(274,500/9,000)		

*As already calculated by the analyst

Comments on variance analysis

The total expected cost for receipts into goods inwards for July 20X5 was \$19,825 (\$30.50 budgeted cost per receipt x 650 receipts). The actual cost was \$18,000 giving a favourable variance of \$1,825. It cannot be identified, on the basis of the information available, the cause of the \$1,825 variance, as the breakdown of the \$18,000 actual cost would be required.

100,000 items were processed in July 20X5 which is the same as the budgeted amount. However, the number of receipts budgeted was 750 (9,000/12), whereas the actual number of receipts was only 650, equivalent to \$27.69 (\$18,000/650) per receipt. This is a favourable variance of \$2.81 per receipt.

It appears that the favourable variance may be due to the receipt of larger quantities of items from suppliers in each delivery. If some of the goods inwards costs are variable with the number of items this would result in a cost saving. This could be because of the reduction in the number of suppliers, with fewer suppliers individually supplying more items.

W1 – RFID tagging

Expected volume of items received in the month = 100,000

Each member of staff can tag 35,000 items per month, so 2.86 (100/35) staff are required – say 3

Annual wages cost is 3 x \$24,000 = \$72,000

W2 – Warehouse staff wages

Number of staff required in budget year = 14 (12 + 2)

Total warehouse staff wages = 14 x \$22,500 = \$315,000

Of which \$157,500 (50% of \$315,000) relate to each of goods inwards and goods outwards

W3 – Heating and lighting

As inflation is zero the cost included in the budget should be \$10,000.

- 1 (i) Recommended KPIs – up to 4 marks for each CSF, must be justified in answer
Staying within maximum of 2 KPIs per CSF – 1 mark
Evaluation as a complete system for Folt – up to 6 marks
Maximum 16 marks
- (ii) **Target costing**
Target cost 1 mark
Design 1 mark
Inspections 1 mark
Reworking 1 mark
Other costs 1 mark
Cost gap 1 mark
Definition of target cost 1 mark
Conclusion 1 mark
Impact on contract negotiations – up to 4 marks
Maximum 10 marks
- (iii) 1 mark per point
For each of the four quality cost areas:
Defining the cost area with illustration of how it applies to the scenario and giving a justified recommendation of its treatment under the contract
Maximum 11 marks
- (iv) 1 mark per point:
Importance of quality information – up to 2 marks
Need for systems at Xela – up to 2 marks
Use Folt's systems – up to 2 marks
Need for monitoring – up to 3 marks
Impact on the contract (SLAs) – up to 2 marks
Other sources of information – up to 2 marks
Maximum 9 marks
- Professional presentation: up to 4 marks

Total 50 marks

- 2 (a) 1 mark per point:
Defining ABM – up to 2 marks
Choosing which products to manufacture – up to 4 marks
Review of costs, prices and designs – up to 4 marks
Customer profitability analysis – up to 4 marks
Maximum 13 marks
- (b) 1 mark per point:
Limitations of the ABM method – up to 9 marks
Implementation – up to 5 marks
Maximum 12 marks

Total 25 marks

- 3 (a)** 1 mark per point:
Advantages and disadvantages of current system – up to 8 marks
Advantages and disadvantages of ABB – up to 8 marks
Conclusion – up to 2 marks
Maximum 13 marks
- (b)** Calculations:
RFID tagging – 2 marks
Warehouse staff wages – 2 marks
Heating and lighting – 1 mark
Cost per receipt – 1 mark
Total variance – 2 marks
Variance per receipt – 2 marks
Commentary on the variances – up to 4 marks
Maximum 12 marks

Total 25 marks