

# Control and Planning Systems for Performance Measurement

# Divisionalized organizational structure

- Large companies produce and sell a wide variety of products throughout the world.
- Because of the complexity of operations, it is difficult for top management to directly control operations.
- It may therefore be appropriate to shape a **divisionalized organizational structure**:
  - Divide a company into separate self-contained segments or divisions.
  - Allow divisional managers to operate with a great deal of independence.
  - A divisional manager has responsibility for both the production and marketing activities of the division.
- The danger in creating autonomous divisions is that divisional managers might not pursue goals that are in the best interests of the company as a whole.

# Investment centres, profit centres and cost centres

- The creation of separate divisions may lead to the delegation of different degrees of authority; for example, in some organizations a divisional manager may also have responsibility for making capital investment decisions. Where this situation occurs, the division is known as an **investment centre**.
- Alternatively, where a manager cannot control the investment and is responsible only for the profits obtained from operating the assets assigned to him or her by corporate headquarters, the segment is referred to as a **profit centre**.
- In contrast, the term **cost centre** is used to describe a **responsibility centre** where a manager is responsible for costs but not profits.

# Investment centres, profit centres and cost centres

- Divisionalization can improve the decision-making process both from the point of view of the quality of the decision and the speed of the decision.
  - Decisions can be made by the person who is familiar with the situation and who should therefore be able to make more informed judgements than central management who cannot be intimately acquainted with all the activities of the various segments of the business.
  - Speedier decisions should also occur because information does not have to pass along the chain of command to and from top management. Decisions can be made on the spot by those who are familiar with the product lines and production processes and who can react to changes in local conditions in a speedy and efficient manner.
  - Delegation of responsibility to divisional managers provides them with greater freedom, thus making their activities more challenging and providing the opportunity to achieve self-fulfilment and greater motivation.
- The major potential disadvantage of divisionalization is that there is a danger that:
  - Divisions may compete with each other excessively.
  - Divisional managers may be encouraged to take action that will increase their own profits at the expense of the profits of other divisions and the company as a whole.

# Distinguishing between the managerial and economic performance of the division

- Before deciding the measures of evaluating divisional profitability; one must decide whether the primary purpose is to measure the performance of the division or that of the divisional manager.
  - A manager may be assigned to an ailing division to improve performance, and might succeed in substantially improving the performance of the division. However, the division might still be unprofitable because of industry factors, such as overcapacity and a declining market.
  - Conversely, a division might report significant profits but, because of management deficiencies, the performance may be unsatisfactory when the favourable economic environment is taken into account.
- If the emphasis is no the managerial performance of the division: only those items directly controllable by the manager should be included in the profitability measure.

## **Distinguishing between the managerial and economic performance of the division – performance at Siemens**

From on the previous Real World View, you know that Siemens operates in many countries and has quite a diverse product offering. With such complex and broad operations, there are many factors which can affect the performance of a business sector or division. In their 2010 Annual Report, Siemens refer to their performance under a number of headings derived from their One Siemens performance measurement system and their Fit42010 strategy. The One Siemens framework reports performance measures under four headings; sustainable value creation, innovation-driven growth, get closer to customers and use the power of Siemens. Throughout the 2010 Annual Report, the targets set under One Siemens and the Fit42010 strategy programme as well as actual performance, are referred to with reference to the global economic recession. For example, on p. 54, the report

states: 'These targets were established with normal business cycles in mind, i.e., without taking into account the global recession caused by the financial crisis and its after-effects on our business over the past two fiscal years.' Another example is on p. 100: 'The target range for our capital structure ratio is 0.8–1.0 for fiscal 2010. We set this target based on normal business cycles, before global recessionary conditions and the adverse effects of the financial crisis.'

### **Questions**

- 1 If the performance of a divisional manager at Siemens falls short of target due an economic recession, should the manager be held accountable?
- 2 How might the actual assessment of divisional performance differ in recessionary times?

### **References**

Annual Report 2010, Siemens AG, available at [http://www.siemens.com/investor/en/financials/annual\\_reports.htm](http://www.siemens.com/investor/en/financials/annual_reports.htm)  
[http://www.siemens.com/about/en/index/vision\\_strategy/one\\_siemens.htm](http://www.siemens.com/about/en/index/vision_strategy/one_siemens.htm)

# Distinguishing between the managerial and economic performance of the division

- For measuring managerial performance; controllable profit is the most appropriate measure.
  - **Controllable profit = divisional revenues - costs that are controllable by a divisional manager**
  - Controllable profit: a measure of divisional managerial performance based on managerial ability to use only those resources under managerial control effectively.
- It should be evaluated relative to a budgeted performance, so that market conditions and size (in terms of assets employed) are taken into account.
- It should not be interpreted in isolation if it is used to evaluate the performance of a divisional manager.
- Controllable profit provides an incomplete measure of the economic performance of a division, since it does not include those costs that are attributable to the division but which are not controllable by the divisional manager

# Return on investment

- Instead of focusing purely on the absolute size of a division's profits, most organizations focus on the return on investment (ROI) of a division.
- ROI is an accounting measure of income divided by an accounting measure of investment.
- **Return on investment (ROI) = divisional profit over assets employed in the division**

$$\begin{array}{ccc} \text{Return on investment} & & \text{Income} \\ \text{(ROI)} & = & \frac{\quad}{\text{Investment}} \end{array}$$

- Assets employed can be defined as total divisional assets, assets controllable by the divisional manager or net assets.
- ROI is the most popular approach to incorporating the investment base into a performance measure. ROI appeals conceptually because it blends all the major ingredients of profitability (revenues, costs and investment) into a single number.
- ROI can be compared with the rate of return on opportunities elsewhere, inside or outside the company.



# Return on investment: example

Annual financial data for Hôtels Desfleurs for 2004

	Vaison hotel (1)	Perpignan hotel (2)	La Rochelle hotel (3)	Total (4) = (1) + (2) + (3)
Hotel revenues (sales)	€1 200 000	€1 400 000	€3 185 000	€5 785 000
Hotel variable costs	310 000	375 000	995 000	1 680 000
Hotel fixed costs	650 000	725 000	1 680 000	3 055 000
Hotel operating profit	<u>€240 000</u>	<u>€300 000</u>	<u>€510 000</u>	1 050 000
Interest costs on long-term debt at 10%	-	-	-	450 000
Profit before income taxes	-	-	-	600 000
Income taxes at 30%	-	-	-	180 000
Net profit	-	-	-	<u>€420 000</u>
Average book values for 2005				
Current assets	€400 000	€500 000	€600 000	€1 500 000
Long-term assets	600 000	1 500 000	2 400 000	4 500 000
Total assets	<u>€1 000 000</u>	<u>€2 000 000</u>	<u>€3 000 000</u>	<u>€6 000 000</u>
Current liabilities	€50 000	€150 000	€300 000	€500 000
Long-term debt	-	-	-	4 500 000
Stockholders' equity	-	-	-	1 000 000
Total liabilities and shareholders' equity				<u>€6 000 000</u>



Hotel	Operating profit	÷	Total assets	=	ROI
Vaison	€240 000	÷	€1 000 000	=	24%
Perpignan	€300 000	÷	€2 000 000	=	15%
La Rochelle	€510 000	÷	€3 000 000	=	17%



# Return on investment: Dupont analysis

- ROI can often provide more insight into performance when it is divided into the following components:

$$\frac{\text{Revenues}}{\text{Investment}} \times \frac{\text{Income}}{\text{Revenues}} = \frac{\text{Income}}{\text{Investment}}$$

- This approach is widely known as the DuPont method of profitability analysis.
- The DuPont approach recognises that there are two basic ingredients in profit making: using assets to generate more revenue, and increasing income per euro of revenue. An improvement in either ingredient without changing the other increases return on investment.
- Consider the ROI of each of the three Hôtels Desfleurs in previous slide:

Hotel	Operating profit	÷	Total assets	=	ROI
Vaison	€240 000	÷	€1 000 000	=	24%
Perpignan	€300 000	÷	€2 000 000	=	15%
La Rochelle	€510 000	÷	€3 000 000	=	17%

- Assume that the top management at Hôtels Desfleurs adopts a 30% target ROI for the Vaison hotel. How can this return be attained?

# Return on investment: Dupont analysis

	Revenues	x	Operating profit			Operating profit
	Revenues		Total assets			Total assets
<i>Present situation</i>	€1 200 000		€240 000	=	1.20 x 0.20	= 0.24 or 24%
	€1 000 000		€1 200 000			
<i>Alternatives</i>						
A. Decrease assets (for example, debtors) keeping revenues and operation profit per euro of revenue constant	€1 200 000	x	€240 000	=	1.50 x 0.20	= 0.30 or 30%
	€ 800 000		€ 1 200 000			
B. Increase revenues (by selling more rooms) keeping assets and operating profit per euro of revenue constant	€1 500 000	x	€ 300 000	=	1.50 x 0.20	= 0.30 or 30%
	€ 1 000 000		€ 1 500 000			
C. Decrease costs (for example, via efficient maintenance) to increase operating profit per euro of revenue, keeping revenues and assets constant	€1 200 000	x	€300 000	=	1.50 x 0.25	= 0.30 or 30%
	€1 000 000		€1 200 000			

## Exercise 19.11

Récré-Gaules SARL produces and distributes a wide variety of recreational products. One of its divisions, the Idefix Division, manufactures and sells 'menhirs', which are very popular with cross-country skiers. The demand for these menhirs is relatively insensitive to price changes. The Idefix Division is considered to be an investment centre and in recent years has averaged a return on investment of 20%. The following data are available for the Idefix Division and its product:

Total annual fixed costs	€1000 000
Variable costs per menhir	€300
Average number of menhirs sold each year	10000
Average operating assets invested in the division	€1600000

### Required:

1 What is the minimum selling price per unit that the Idefix Division could charge in order for Marie-Aimée Obelix, the division manager, to get a favourable performance rating? Management considers an ROI below 20% to be unfavourable.

2 Assume that Récré-Gaules judges the performance of its investment centre managers on the basis of residual income rather than ROI, as was assumed in requirement 1. The company's required rate of return is considered to be 15%. What is the minimum selling price per unit that the Idefix Division should charge for Obelix to receive a favourable performance rating?

# Exercise 19.11

## Suggested solution:

$$ROI = \frac{\text{Income}}{\text{Investment}} = \frac{\text{Revenues}}{\text{Investment}} \times \frac{\text{Income}}{\text{Revenues}}$$

$$\text{Operating profit} = ROI \times \text{Investment}$$

$$[\text{No. of menhirs sold} (\text{Selling price} - \text{Var. cost per unit})] - \text{Fixed costs} = ROI \times \text{Investment}$$

Let  $X$  = minimum selling price per unit to achieve a 20% ROI.

$$1 \quad 10,000 (X - \text{€}300) - \text{€}1,000,000 = 20\% (\text{€}1,600,000)$$

$$10,000X = \text{€}320,000 + \text{€}3,000,000 + \text{€}1,000,000$$

$$= \text{€}4,320,000$$

$$X = \text{€}432$$

$$2 \quad 10,000 (X - \text{€}300) - \text{€}1,000,000 = 15\% (\text{€}1,600,000)$$

$$10,000X = \text{€}240,000 + \text{€}3,000,000 + \text{€}1,000,000$$

$$= \text{€}4,240,000$$

$$X = \text{€}424$$

## Exercise 19.12

Salvador SA assembles motorcycles and uses long-run (defined as 3-5 years) average demand to set the budgeted production level and costs for pricing. Prices are then adjusted only for large changes in assembly wage rates or direct materials prices. You are given the following data:

Direct materials, assembly wages and other variable costs	€1 320 per unit
Fixed costs	€300 000 000 per year
Target return on investment	20%
Normal utilisation of capacity (average output)	1 000 000 units
Investment (total assets)	€900 000 000

### Required:

1. What operating profit percentage on revenues is needed to attain the target return on investment of 20%? What is the selling price per unit?
2. Using the selling price per unit calculated in requirement 1, what rate of return on investment will be earned if Salvador assembles and sells 1500 000 units? 500 000 units?
3. The company has a management bonus plan based on yearly division performance. Assume that Salvador assembled and sold 1000 000 units, 1500 000 units and 500 000 units in three successive years. Each of three people served as divisional manager for one year before being killed in a car accident. As the principal heir of the third manager, comment on the bonus plan.

# Exercise 19.12

## Suggested solution:

$$\begin{aligned}
 1 \quad \text{ROI} &= \frac{\text{Operating profit}}{\text{Investment}} \\
 20\% &= \frac{\text{Operating profit}}{\text{€900,000,000}}
 \end{aligned}$$

$$\text{Operating profit} = \underline{\underline{\text{€180,000,000}}}$$

Target revenues:

Fixed overhead	€300,000,000
Variable costs, 1,000,000 × €1,320	1,320,000,000
Desired operating income	<u>180,000,000</u>
Revenues	<u><u>€1,800,000,000</u></u>

Operating profit as a percentage of revenues is  $\frac{\text{€180,000,000}}{\text{€1,800,000,000}}$  or 10%.

The selling price per unit is  $\text{€1,800,000,000} \div 1,000,000 \text{ units} = \text{€1,800}$ .

# Exercise 19.12

## Suggested solution:

2

	ROI at various sales volumes over 3 years		
Units sold.	<u>1,000,000*</u>	<u>1,500,000*</u>	<u>500,000*</u>
Revenues, €1,800 per unit	<u>€1,800**</u>	<u>€2,700**</u>	<u>€900**</u>
Variable costs, €1,320 per unit	1,320	1,980	660
Fixed costs	<u>300</u>	<u>300</u>	<u>300</u>
Total costs	<u>1,620</u>	<u>2,280</u>	<u>960</u>
Operating profit	<u>€ 180</u>	<u>€420</u>	<u>€(60)</u>
Return on investment	20%	46.67%	-6.67%

\*Row not directly used in calculations.  
 \*\*All revenues, costs and operating profit are in millions of euros.

A summary analysis of these three cases follows:

Volume	$\frac{\text{Operating Profit}}{\text{Revenues}}$	$\times$	$\frac{\text{Revenues}}{\text{Total Assets}}$	Return on investment
1,000,000	10.00%	$\times$	2	20.00%
1,500,000	15.55%	$\times$	3	46.65%
500,000	-6.67%	$\times$	1	-6.67%

- 3 One year may often be too short a time span in the use of an operating income measure for gauging performance or for paying bonuses. For instance, motorcycle sales may be heavily influenced by general economic conditions that are not controllable by the division managers whose bonuses are significantly affected thereby. Also, some short-run savings in manufacturing costs may have long-run damaging effects. Examples include repairs, maintenance, quality control and exerting severe pressures on employees for productivity.

Thus, the heir to the third manager may have much justification for being unhappy with any bonus plan that is tied solely to a one-year operating income measure.



## Exercise 19.19

User Friendly Computer is one of the largest personal computer companies in the world. The board of directors was recently (March 2005) informed that User Friendly's president, Felix Lechat, was resigning to 'pursue other interests'. An executive search firm recommends that the board consider appointing Peter Diamond (current CEO of Computer Power) or Rachida Kamel (current CEO of Plum Computer). You collect the following financial information on Computer Power and Plum Computer for 2003 and 2004 (in millions):

	Computer Power		Plum Computer	
	2003	2004	2003	2004
Total assets	€360.0	€340.0	€160.0	€240.0
Revenues	€400.0	€320.0	€200.0	€350.0
Costs				
R&D	36.0	16.8	18.0	43.5
Design	15.0	8.4	3.6	11.6
Production	102.0	112.0	82.8	98.6
Marketing	75.0	92.4	36.0	66.7
Distribution	27.0	22.4	18.0	23.2
Customer service	45.0	28.0	21.6	46.4
Total costs	300.0	280.0	180.0	290.0
Operating profit	€100.0	€40.0	€20.0	€60.0

## Exercise 19.19

In early 2005, a computer magazine gave Plum Computer's main product five stars (its highest rating on a five-point scale). Computer Power's main product was given three stars, down from five stars a year ago because of customer-service problems. The computer magazine also ran an article on new-product introductions in the personal computer industry. Plum Computer received high marks for new products in 2004. Computer Power's performance was called 'mediocre'. One 'unnamed insider' of Computer Power commented: 'Our new-product cupboard is empty.'

### **Required:**

- 1 Use the DuPont method to analyse the ROI of Computer Power and Plum Computer in 2003 and 2004. Comment on the results.
- 2 Calculate the percentage of costs in each of the six business-function cost categories for Computer Power and Plum Computer in 2003 and 2004. Comment on the results.
- 3 Rank Diamond and Kamel as potential candidates for CEO of User Friendly Computer.

# Exercise 19.19

## Suggested solution:

1.

<i>Computer Power</i>			
2003	1.111	0.250	0.278
2004	0.941	0.125	0.118
<i>Plum Computer</i>			
2003	1.250	0.100	0.125
2004	1.458	0.171	0.250

Computer Power's ROI has declined sizably from 2003 to 2004, largely because of a decline in operating profit to revenues. Plum Computer's ROI has doubled from 2003 to 2004, in large part due to an increase in operating profit to revenues.

# Exercise 19.19

## Suggested solution:

2.

Business function	Computer Power		Plum Computer	
	2003	2004	2003	2004
R&D	12.0%	6.0%	10.0%	15.0%
Design	5.0	3.0	2.0	4.0
Production	34.0	40.0	46.0	34.0
Marketing	25.0	33.0	20.0	23.0
Distribution	9.0	8.0	10.0	8.0
Customer service	15.0	10.0	12.0	16.0
Total costs	100.0%	100.0%	100.0%	100.0%

Business functions with increases/decreases in the percentage of total costs from 2003 to 2004 are:

	Computer Power	Plum Computer
Increases	Production	R&D
	Marketing	Design
		Marketing
		Customer service
Decreases	R&D	Production
	Design	Distribution
	Distribution	
	Customer service	

Computer Power has decreased expenditures in several key business functions that are critical to its long-term survival, notably research and development and design. These costs are (using the Chapter 8 appendix terminology) discretionary and can be reduced in the short run without any short-run effect on customers, but such action is likely to create serious problems in the long run.

## Exercise 19.19

### Suggested solution:

3.

Based on the information provided, Kamel is the better candidate for president of User-Friendly Computer. Both Computer Power and Plum Computer are in the same industry. Kamel has headed Plum Computer at a time when it has considerably outperformed Computer Power: The ROI of Plum Computer has increased from 2003 to 2004 while that of Computer Power has decreased.

The computer magazine has increased the ranking of Plum Computer's main product, while it has decreased the ranking of Computer Power's main product.

Plum Computer has received high marks for new products (the lifeblood of a computer company), while Computer Power new-product introductions have been described as 'mediocre'.

# Return on investment and goal congruence

- Despite the widespread use of ROI, several problems exist when this measure is used to evaluate the performance of divisional managers.
- Evaluating divisional managers based on ROI may not encourage goal congruence.
- Example: Assume neither project will result in any changes in non-controllable costs and that the overall cost of capital for the company is 15 %.

	<i>Division X</i>	<i>Division Y</i>
Investment project available	£10 million	£10 million
Controllable contribution	£2 million	£1.3 million
Return on the proposed project	20%	13%
ROI of divisions at present	25%	9%

- The manager of Division X would be reluctant to invest the additional £10 million because the return on the proposed project is 20 per cent, and this would reduce the existing overall ROI of 25 per cent.
- The manager of Division Y would wish to invest the £10 million because the return on the proposed project of 13 per cent is in excess of the present return of 9 per cent, and it would increase the division's overall ROI.
- The managers of both divisions would make decisions that would not be in the best interests of the company. The company should accept only those projects where the return is in excess of the cost of capital of 15 %.



## Exercise 19.16

Thor-Equip AS specialises in the manufacture of medical equipment, a field that has become increasingly competitive. Approximately two years ago, Knut Solbaer, president of Thor-Equip, decided to revise the bonus plan (based, at the time, entirely on operating profit) to encourage divisional managers to focus on areas that were important to customers and that added value without increasing cost. In addition to a profitability incentive, the revised plan also includes incentives for reduced rework costs, reduced sales returns and on-time deliveries. Bonuses are calculated and awarded semi-annually on the following basis. A base bonus is calculated at 2% of operating profit. The bonus amount is then adjusted by the following amounts:

- a
  - (i) Reduced by excess of rework costs over 2% of operating profit.
  - (ii) No adjustment if rework costs are less than or equal to 2% of operating profit.
- b Increased by €5000 if over 98% of deliveries are on time, by €2000 if 96-98% of deliveries are on time and by €0 if on-time deliveries are below 96%.
- c
  - (i) Increased by €3000 if sales returns are less than or equal to 1.5% of sales.
  - (ii) Decreased by 50% of excess of sales returns over 1.5% of sales.

Note: If the calculation of the bonus results in a negative amount for a particular period, the manager simply receives no bonus and the negative amount is not carried forward to the next period.



## Exercise 19.16

Results for Thor-Equip's Kari and Sih Divisions for the year 2004, the first year under the new bonus plan, follow. In the previous year, 2003, under the old bonus plan, the Karl Division manager earned a bonus of €27 060 and the Siri Division manager a bonus of €22 440.

	Kari Division			Siri Division	
	1 January 2004 to 30 June 2004	1 July 2004 to 31 December 2004		1 January 2004 to 30 June 2004	1 July 2004 to 31 December 2004
Sales	€4 200 000	€4 400 000		€2 850 000	€2 900 000
Operating profit	€462 000	€440 000		€342 000	€406 000
On-time delivery	95.4%	97.3%		98.2%	94.6%
Rework costs	€11 500	€11 000		€6 000	€8 000
Sales returns	€84 000	€70 000		€44 750	€42 500

### Required:

1. Why did Knut need to introduce these new performance measures? That is, why does he need to use these performance measures over and above the operating profit numbers for the period?
2. Calculate the bonus earned by each manager for each six-month period and for the year 2004.
3. What effect did the change in the bonus plan have on each manager's behaviour? Did the new bonus plan achieve what he desired? What changes, if any, would you make to the new bonus plan?

# Exercise 19.16

## Suggested solution:

1

Operating income is a good summary measure of short-term financial performance. By itself, however, it does not indicate whether operating income in the short run was earned by taking actions that would lead to long-run competitive advantage. For example, Thor-Equip's divisions might be able to increase short-run operating income by producing more product while ignoring quality or rework. Knut, however, would like to see division managers increase operating income without sacrificing quality. The new performance measures take a balanced scorecard approach by evaluating and rewarding managers on the basis of direct measures (such as rework costs, on-time delivery performance and sales returns). These motivate managers to take actions that Knut believes will increase operating income now and in the future. The non-operating income measures serve as surrogate measures of future profitability.

# Exercise 19.16

**Suggested solution:**

2 The semi-annual installments and total bonus for the Kari Division are calculated as follows:

## Kari Division Bonus Calculation for the year ended 31 December 2004

1 January 2011 to 30 June 2011		
Profitability	(0.02) (€462,000)	€9,240
Rework	$(0.02 \times €462,000) - €11,500$	(2,260)
On-time delivery	No bonus – under 96%	0
Sales returns	$[(0.015 \text{ v } €4,200,000) - €84,000] \times 50\%$	<u>(10,500)</u>
Semi-annual installment		<u>(3,520)</u>
Semi-annual bonus awarded		<u>€0</u>
1 July 2011 to 31 December 2011		
Profitability	(0.02) (€440,000)	€8,800
Rework	$(0.02 \times €440,000) - €11,000$	(2,200)
On-time delivery	96–98%	2,000
Sales returns	$[(0.015 \text{ v } €4,400,000) - €70,000] \times 50\%$	<u>(2,000)</u>
Semi-annual installment		<u>6,600</u>
Semi-annual bonus awarded		<u>€ 6,600</u>
Total bonus awarded for the year		<u>€ 6,600</u>

# Exercise 19.16

## Suggested solution:

The semi-annual installments and total bonus for the Siri Division are calculated as follows:

### Siri Division Bonus Calculation for year ended 31 December 2004

1 January 2011 to 30 June 2011		
Profitability	(0.02) (€342,000)	€ 6,840
Rework	$(0.02 \times €342,000) - €6,000$	0
On-time delivery	Over 98%	5,000
Sales returns	$[(0.015 \times €2,850,000) - €44,750] \times 50\%$	<u>(1,000)</u>
Semi-annual bonus installment		<u>€10,840</u>
Semi-annual bonus awarded		<u>€10,840</u>
1 July 2011 to 31 December 2011		
Profitability	(0.02) (€406,000)	€ 8,120
Rework	$(0.02 \times €406,000) - €8,000$	0
On-time delivery	No bonus – under 96%	0
Sales returns	$[(0.015 \times €2,900,000) - €42,500]$ which is greater than zero, yielding a bonus of	<u>3,000</u>
Semi-annual bonus installment		<u>€11,120</u>
Semi-annual bonus awarded		<u>€11,120</u>
Total bonus awarded for the year		<u>€21,960</u>

# Exercise 19.16

## Suggested solution:

3

The manager of the Kari Division is likely to be frustrated by the new plan as the division bonus is more than €20,000 less than in the previous year. However, the new performance measures have begun to have the desired effect – both on-time deliveries and sales returns improved in the second half of the year while rework costs were relatively even. If the division continues to improve at the same rate, the Kari bonus could approximate or exceed what it was under the old plan.

The manager of the Siri Division should be as satisfied with the new plan as with the old plan as the bonus is almost equivalent. However, there is no sign of improvements in the performance measures instituted by Knut in this division; as a matter of fact, on-time deliveries declined considerably in the second half of the year. Unless the manager institutes better controls, the bonus situation may not be as favourable in the future. This could motivate the manager to improve in the future but currently, at least, the manager has been able to maintain his bonus without showing improvements in the areas targeted by Knut.

# Exercise 19.16

## **Suggested solution:**

3

Knut's revised bonus plan for the Kari Division fostered the following improvements in the second half of the year despite an increase in sales:

increase of 1.9% in on-time deliveries

€500 reduction in rework costs

€14,000 reduction in sales returns.

However, operating income as a percentage of sales has decreased (11–10%).

# Exercise 19.16

## Suggested solution:

- 3
- The Siri Division's bonus has remained at the status quo as a result of the following effects:
  - an increase of 2.0% in operating income as a percentage of sales (12–14%)
  - decrease of 3.6% in on-time deliveries
  - €2,000 increase in rework costs
  - €2,250 decrease in sales returns.

This would suggest that there needs to be some revision to the bonus plan. Possible changes include:

Increasing the weights put on on-time deliveries, rework costs and sales returns in the performance measures whereas decreasing the weight put on operating income.

A reward structure for rework costs that are below 2% of operating income that would encourage managers to drive costs lower.

Reviewing the year in total. The bonus plan should carry forward the negative amounts for one six-month period into the next six-month period, incorporating the entire year when calculating a bonus.

Developing benchmarks and then giving rewards for improvements over prior periods and encouraging continuous improvement.



# Residual income

- To overcome some of the dysfunctional consequences of ROI, the residual income approach can be used.
- **Residual income = Income - (Required rate of return x Investment):**
  - **Residual income (divisional managers) = controllable profit less a cost of capital charge on the investment controllable by the divisional manager.**
  - **Residual income (economic performance of division) = divisional profit contribution less a cost of capital charge on the total investment in assets employed by the division**
- If residual income is used to measure the managerial performance of investment centres, there is a greater probability that managers will be encouraged, when acting in their own best interests, also to act in the best interests of the company.
- Residual income suffers from the disadvantages of being an absolute measure, which means that it is difficult to compare the performance of a division with that of other divisions or companies of a different size. For example, a large division is more likely to earn a larger residual income than a small division. To overcome this deficiency, targeted or budgeted levels of residual income should be set for each division that are consistent with asset size and the market conditions of the divisions.

# Residual income

- Example: Assume neither project will result in any changes in non-controllable costs and that the overall cost of capital for the company is 15 %.

	<i>Division X</i>	<i>Division Y</i>
Investment project available	£10 million	£10 million
Controllable contribution	£2 million	£1.3 million
Return on the proposed project	20%	13%
ROI of divisions at present	25%	9%

	<i>Division X</i> (£)	<i>Division Y</i> (£)
Proposed investment	10 million	10 million
Controllable contribution	2 million	1.3 million
Cost of capital charge (15% of the investment cost)	1.5 million	1.5 million
Residual income	0.5 million	-0.2 million

The manager of Division X would invest, whereas the manager of Division Y would not. These actions are in the best interests of the company as a whole.

# Economic Value Added (EVA™)

- During the 1990s residual income was refined and renamed as economic value added (EVA™) by the Stern Stewart consulting organization and they registered EVA™ as their trademark.
- The Economist (1997) reported that more than 300 firms worldwide had adopted EVA™ including Coca-Cola, AT&T, ICL, Boots and the Burton Group.
- The EVA™ concept extends the traditional residual income measure by incorporating adjustments to the divisional financial performance measure for distortions introduced by generally accepted accounting principles (GAAP).
- Economic value added equals after-tax operating profit minus the (after-tax) weighted- average cost of capital multiplied by total assets minus current liabilities:

$$\text{Economic value added (EVA}^{\text{TM}}) = \text{AFTER-TAX operating profit} - \left[ \text{Weighted-average cost of capital} \times \left( \text{Total assets} - \text{Current liabilities} \right) \right]$$

- EVA™ substitutes the following numbers in the residual-income calculations: (1) income equal to after-tax operating profit, (2) a required rate of return equal to the weighted-average cost of capital and (3) investment equal to total assets minus current liabilities.

# Economic Value Added (EVA™)

## *How the use of EVA™ analysis transformed Armstrong's financial performance*

The financial mission of a company should be to invest and create cash flows in excess of the cost of capital. If an investment is announced that is expected to earn in excess of the cost of capital, then the value of the firm will immediately rise by the present value of that excess – as long as the market understands and believes the available projections. The question is: What is the best way to measure this?

Traditional measures of return, such as ROI, actually could unwittingly motivate and reward managers to shrink the value of the company. Therefore, the concept EVA™ was developed. In a nutshell, EVA™ is designed to measure the degree to which a company's after-tax operating profits exceed – or fall short of – the cost of capital invested in the business. It makes managers think more about the use of capital and the amount of capital in each business.

Armstrong World Industries Inc. is a multibillion-dollar manufacturer and supplier of floor coverings, insulation products, ceiling and wall systems and installation products. In 1993 the decision was made to discontinue the ROI concept and use EVA for strategic planning, performance measurement, and compensation. EVA™ is computed from straight-forward adjustments to convert book values on the income

statement and balance sheet to an economic basis. Armstrong used about a dozen adjustments.

Armstrong considered EVA™ to be the best financial measure for accurately linking accounting measures to stock market value and performance, making it ideal for setting financial targets. Changes in behaviour have become focused on three basic actions: (1) improving profit without more capital; (2) investing in projects earning above the cost of capital; and (3) eliminating operations unable to earn above the cost of capital.

On a higher strategic level, EVA™ allowed Armstrong to step back to see where the company was losing value. In what the company called its 'sunken ship' chart it was clear that businesses earning above the cost of capital were providing huge amounts of EVA™. However, the ship was being dragged down because of negative EVA™ businesses and corporate overhead. By selling or combining negative EVA™ businesses and by growing and further reducing costs in its positive EVA™ businesses, the company provided the potential to more than double its EVA™.

## *Questions*

- 1 Can you provide examples of accounting adjustments required to compute EVA™?
- 2 Why is EVA™ preferred to ROI?

## *References*

'Report on Financial Analysis Planning and Reporting', Institute of Management & Administration, September 2002.



# Economic Value Added (EVA™): example

Annual financial data for Hôtels Desfleurs for 2004

	Vaison hotel (1)	Perpignan hotel (2)	La Rochelle hotel (3)	Total (4) = (1) + (2) + (3)
Hotel revenues (sales)	€1 200 000	€1 400 000	€3 185 000	€5 785 000
Hotel variable costs	310 000	375 000	995 000	1 680 000
Hotel fixed costs	650 000	725 000	1 680 000	3 055 000
Hotel operating profit	€240 000	€300 000	€510 000	1 050 000
Interest costs on long-term debt at 10%	-	-	-	450 000
Profit before income taxes	-	-	-	600 000
Income taxes at 30%	-	-	-	180 000
Net profit	-	-	-	€420 000
Average book values for 2005				
Current assets	€400 000	€500 000	€600 000	€1 500 000
Long-term assets	600 000	1 500 000	2 400 000	4 500 000
Total assets	€1 000 000	€2 000 000	€3 000 000	€6 000 000
Current liabilities	€50 000	€150 000	€300 000	€500 000
Long-term debt	-	-	-	4 500 000
Stockholders' equity	-	-	-	1 000 000
Total liabilities and shareholders' equity				€6 000 000

- The after-tax cost of debt financing equals  $0.10 \times (1 - \text{tax rate}) = 0.10 \times (1 - 0.30) = 0.10 \times 0.70 = 0.07$ , or 7%.
- Assume Suppose that Hôtels Desfleurs' cost of equity capital is 15%.



WACC	=	$(0.07 \times €4 500 000) + (0.15 \times €3 000 000)$	
		€4 500 000 + €3 000 000	
	=	$\frac{€315 000 + €450 000}{€7 500 000}$	= $\frac{€765 000}{€7 500 000}$
	=	0.102 or 10.2%	



# Economic Value Added (EVA<sup>TM</sup>): example

$$\begin{aligned}
 \text{WACC} &= \frac{(0.07 \times \text{€}4\,500\,000) + (0.15 \times \text{€}3\,000\,000)}{\text{€}4\,500\,000 + \text{€}3\,000\,000} \\
 &= \frac{\text{€}315\,000 + \text{€}450\,000}{\text{€}7\,500\,000} = \frac{\text{€}765\,000}{\text{€}7\,500\,000} \\
 &= 0.102 \text{ or } 10.2\%
 \end{aligned}$$



Hotel	After-tax operating profit	- [Weighted-average cost of capital x (Total Current assets - liabilities)]	= Economic value added (EVA <sup>®</sup> )
<u>Vaison</u>	€240 000 x 0.7	- [10.2% x (€1000000-€50000)] =€168 000-€96 900	= €71 100
Perpignan	€300 000 x 0.7	- [10.2% x (€2 000 000-€150 000)] = €2 100 00 - €188 700	= € 21 300
La Rochelle	€510 000 x 0.7	- [10.2% x (€3 000 000-€300 000)] = €357000-€275 400	= €81 600

## Economic Value Added (EVA<sup>TM</sup>): some considerations

- If the purpose is to evaluate the performance of the divisional manager then only those assets that can be directly traced to the division and that are controllable by the divisional manager should be included in the asset base.
- The term controllable investment is used to refer to the net asset base that is controllable or strongly influenced by divisional managers.
- Calculation of required return on assets: Original cost or written down value?

	1 (£)	2 (£)	3 (£)	4 (£)	5 (£)
Net cash flow	350 000	350 000	350 000	350 000	350 000
Depreciation	200 000	200 000	200 000	200 000	200 000
Profit	150 000	150 000	150 000	150 000	150 000
Cost of capital (10% of WDV)	100 000	80 000	60 000	40 000	20 000
EVA <sup>(TM)</sup>	50 000	70 000	90 000	110 000	130 000
Opening WDV of the asset	1 000 000	800 000	600 000	400 000	200 000
ROI	15%	18.75%	25%	37.5%	75%

Assume that profits and cost of capital remain stable:

- If the asset is valued at the original cost, both the investment base and EVA(TM) will remain stable.
- if the cost of capital charge is based on the written-down value of the asset, the investment base will decline each year, and EVA(TM) will increase.



## Exercise 19.13

Intervilles SA operates two divisions, a Lorry Rental Division that rents to individuals and a Transportation Division that transports goods from one city to another. Results reported for the last year are as follows:

	Lorry Rental Division	Transportation Division
Total assets	€650 000	€950 000
Current liabilities	120 000	200 000
Operating profit before tax	75 000	160 000

### Required:

1. Calculate the residual income for each division using operating profit before tax and investment equal to total assets minus current liabilities. The required rate of return on investments is 12%.
2. The company has two sources of funds: long-term debt with a market value of €900 000 at an interest rate of 10% and equity capital with a market value of €600 000 at a cost of equity of 15%. Intervilles' income tax rate is 40%. Intervilles applies the same weighted-average cost of capital to both divisions, since each division faces similar risks. Calculate the economic value added (EVA<sup>®</sup>) for each division.
3. Using your answers to requirements 1 and 2, what would you conclude about the performance of each division? Explain briefly.

# Exercise 19.13

## Suggested solution:

1.

	Lorry Rental Division	Transportation Division
Total assets	€650 000	€950 000
Less: current liabilities	120 000	200 000
Investment	€530 000	€750 000
Required return (12% x investment)	63 600	90 000
Operating profit before tax	75 000	160 000
Residual income (profit - return)	€11 400	€70 000

2.

After-tax cost of debt financing =  $(1 - 0.4) \times 10\% = 6\%$

After-tax cost of equity financing = 15%

Weighted average cost of capital = 9.6%

Required return for EVA<sup>®</sup>:

	Lorry Rental Division	Transportation Division
Investment	€530 000	€750 000
9.6% x investment	50 880	72 000
Operating profit before tax = 0.6 x operating profit before tax	45 000	96 000
EVA <sup>®</sup> (profit after tax - required return)	(€5 880)	€24 000

3

Both the residual profit and the EVA<sup>®</sup> calculations indicate that the Transportation Division is performing better than the Lorry Rental Division. The Transportation Division has a higher residual profit (€70000 versus €11400) and a higher EVA<sup>®</sup> (€24 000 versus negative €5880). The negative EVA<sup>®</sup> for the Lorry Rental Division indicates that on an after-tax basis the division is destroying value - the after-tax economic return from the Lorry Rental Division's assets is less than the required return. If EVA<sup>®</sup> continues to be negative, Intervilles may have to consider shutting down the Lorry Rental Division.

# Return on sales

- The income-to-revenue (sales) ratio, often called return on sales (ROS), is a frequently used financial performance measure.
- ROS is one component of ROI in the DuPont method of profitability analysis.
- To calculate the ROS of each of the Desfleurs hotels, we use operating profit divided by revenues. The ROS for each hotel is:

Hotel	Operating profit	÷	Revenues (sales)	=	ROS
Vaison	€240 000	÷	€1 200 000	=	20.0%
Perpignan	€300 000	÷	€1 400 000	=	21.4%
La Rochelle	€510 000	÷	€3 185 000	=	16.0%

## Company examples of key financial performance measures

<b>Company name</b>	<b>Country headquarters</b>	<b>Product/ business</b>	<b>Key financial performance measures</b>
Quaker Oats	USA	Food products	EVA <sup>®</sup>
Guinness	Ireland	Consumer products	Profit and ROS
Krones	Germany	Machinery/equipment	Sales and income
Mayne Nickless	Australia	Security/transportation	ROI and ROS
Mitsui	Japan	Trading	Sales and income
Pirelli	Italy	Tyres/manufacturing	Income and cash flow
Swedish Match	Sweden	Consumer products	ROI

*Source: Business International (1989, 1992b); Stewart (1994)*

