

STRATEGIC PERFORMANCE MANAGEMENT

PROFESSIONAL 2 EXAMINATION - APRIL 2009

NOTES:

You are required to answer **ALL** Questions

Time Allowed

3.5 hours plus 10 minutes to read the paper

Examination Format

This is an open book examination. Hard copy material may be consulted during this examination subject to the limitations advised on the Institute's website.

Reading Time

During the reading time you may write notes on the examination paper but you may not commence writing in your answer booklet.

Marks

Marks for each question are shown. A mark of 50 or more is required to achieve a pass in this paper.

Answers

Start your answer to each question on a new page.

You are reminded that candidates are expected to pay particular attention to their communication skills. Care must be taken regarding the format and literacy of the solutions. The marking system will take into account the content of the candidates' answers and the extent to which the answers are supported with relevant legislation, case law or examples where appropriate.

Answer Booklets

List on the cover of each answer booklet, in the space provided the number of each question attempted. Additional instructions are shown on the front cover of each answer booklet.

THE INSTITUTE OF CERTIFIED PUBLIC ACCOUNTANTS IN IRELAND

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Instructions to candidates:
Read the following case study (“Arthur Equipment Ltd.”)
and answer the questions which follow.

Case study: “Arthur Equipment Ltd.”

Arthur Equipment Ltd. manufactures a wide range of specialised farm equipment. The company was formed in the late 1970s, when its founders observed that significant numbers of European farmers were adopting a highly businesslike approach to agriculture, including making significant investments in capital equipment where this was justified in order to facilitate more intensive farming methods and / or the management of large amalgamated farm holdings.

The founders of Arthur Equipment Ltd. provided the company with significant amounts of capital for research and development (R&D) purposes. As a result, the company was able to develop several models of equipment which it manufactured (in essentially unmodified form) during the first two decades of the company’s life. However, the company achieved only minimal profitability during most of the 1990s, for several reasons. First, competition from other farm equipment manufacturers increased. Second, changing trends in farming meant that the market for farm equipment became smaller and changed in character. For example, the emergence of organic farm units meant that some farmers had less need for large items of farm equipment, and expected those items which they bought to be customised to their particular requirements.

Martha O’Connor was appointed Managing Director of Arthur Equipment Ltd. in 2000. She believes that she and her predecessors responded well to the challenges which emerged in the 1990s and subsequently. In support of this view, Martha points to the financial recovery experienced by the company from 2000 onwards. In Martha’s opinion, this can be attributed to several factors, especially (i) the company’s good choice of business strategy and (ii) effective control systems which ensure that the chosen business strategy is implemented as intended. Martha also acknowledges that luck has played some part in the company’s recent success. For example, new markets for some of the company’s more traditional products emerged in the middle of the present decade, when there was significant consolidation of small farms into larger units in some of the new EU member states.

Martha explains that the main planks of the company’s business strategy have been a continued emphasis on R&D, along with a willingness to customise basic product designs to meet specific customer needs. In addition, the company has treated some of the products designed in the 1990s as cash cows, by mass-producing and selling them mainly for markets in new EU member states.

When asked about systems for control and motivation of employees, Martha replied that in her view the most effective approach is to hire individuals who are inherently motivated to be high achievers. She has applied this principle to the recruitment of individuals for all key functions in the organisation, including sales and R&D. Nevertheless, she recognises that even highly motivated individuals expect their performance to be formally measured and rewarded, and as such she has put in place a number of formal mechanisms for doing so. For example, the performance measure for each individual salesperson is the level of sales revenue which he or she generates. Most business unit managers (who typically have responsibility for managing and marketing specific product lines) are evaluated on a profit centre basis, although a small number of business units are evaluated as investment centres.

1. Two of the company's most successful salespeople (Alice Marshall and Brian Sargent) are responsible for selling the same four items of equipment in two different geographical markets. The following information is available concerning the four products:

	Product 1	Product 2	Product 3	Product 4
Selling price (per unit)	€5,000	€6,000	€8,000	€10,000
Variable production cost (as % of selling price)	25%	40%	50%	60%

Salespeople do not have authority to vary the selling price, but can agree to customers' requests for product customisation if they judge that this is necessary and appropriate in order to close a sale. In the factory in which these products were manufactured, a total of 14,000 units of various products were customised last year at a cost to the company of €2,800,000.

The numbers of units of each product sold by each salesperson last year were as follows:

	Product 1	Product 2	Product 3	Product 4
Alice Marshall	20	25	40	50
Brian Sargent	40	40	40	10

Alice explained that she pursued her salesperson's professional instinct to promote sales of the higher-priced products as much as possible. As part of this approach, she allowed an average of 2 customisations for each unit of Product 3 and Product 4 sold but refused all customer requests to customise Products 1 or 2. In contrast, Brian agreed to customer requests for an average of one customisation of each unit of every product sold.

REQUIRED:

- (a) Prepare calculations to indicate how the performance of each salesperson would be measured by the company's control system and to show (in as much detail as possible) the profitability to the company of each salesperson's activities.
- (b) Critically discuss the company's current approach to control and evaluation of its salespeople, and suggest appropriate improvements. Use the example of Alice Marshall and Brian Sargent to illustrate your answer.

(13 marks)

(7 marks)

[Total : 20 marks]

2. Arthur Equipment Ltd. identified a market in a new EU member state for two products which had been developed by the company's R&D teams during the 1990s. The products were no longer produced by the company because they had reached the end of their lifecycle in western European markets, so the company purchased a factory in the new EU member state so as to commence production of the two products for that market. The factory is treated as a profit centre for performance evaluation purposes.

When the factory was acquired, Arthur Equipment Ltd. made the following estimates of the quantities which it and its competitors would sell of the two products, in the country in question, in the first year of operations:

	Product X	Product Y
Estimated sales units (Arthur Equipment Ltd.)	12,000	18,000
Estimated sales units (competitors)	28,000	42,000

At the same time, Arthur Equipment Ltd. made an estimate of the variable costs of production of each product and then set its selling prices so as to achieve estimated contribution margins per unit of €500 (Product X) and €300 (Product Y). Fixed costs of the operation in the first year were estimated at €3,000,000.

During the course of the year, the pace of agricultural change in the country in question was more rapid than either Arthur Equipment Ltd. or its competitors had expected, and as a result demand for these two products (which are relatively old fashioned) was significantly less than expected:

	Product X	Product Y
Actual sales units (Arthur Equipment Ltd.)	9,000	16,000
Actual sales units (competitors)	10,000	25,000

Arthur Equipment Ltd. reduced its selling prices somewhat in response to the falling demand, so that the contribution margins were €480 per unit for Product X and €285 per unit for Product Y. In addition, although the company had not originally planned to carry out any R&D work on the two products, during the year it decided to carry out some minor design modifications in order to update the products somewhat and thus prolong their product lifecycles. This had the effect of increasing the fixed costs of the operation in the year to €4,500,000.

It has been observed that the competitor companies adopted a very different approach to the problem of declining demand for the products. Specifically, they decided not to make any cuts in selling price or spend any more money on product development, in the belief that it would be unwise to do so when the products were clearly coming to the end of their lifecycle.

REQUIRED:

- (a) Calculate the estimated and actual profits of the factory for the year, and then use variance analysis to reconcile them in as much detail as is possible from the information provided. (17 marks)
- (b) It is sometimes suggested that a weakness in using variance analysis for purposes of profit centre control is that it encourages the Profit Centre Manager to focus solely on achieving the budget targets set at the beginning of the budget period and does not incentivise the Manager to adapt the strategy as necessary to changing circumstances.

Evaluate the performance of the Profit Centre Manager in this case, using the results of your calculations in part (a) to illustrate your answer. Then, explain what the Senior Management of Arthur Equipment Ltd. should do in order to avoid the problem referred to in the previous paragraph.

(8 marks)

[Total: 25 marks]

3. Because of the central role of R&D in Arthur Equipment Ltd.'s strategy, the company has put considerable effort and funding into this area in recent years. There are a number of organisational R&D sub-units within the organisation, including some attached to individual production plants (which tend to emphasise product development and modification) and another at the company's headquarters (which has a more long-term research focus).

Martha O'Connor explains the approach to staffing and funding these R&D units in the following terms. First, the company endeavours to hire only highly qualified and motivated R&D engineers. Second, funding of each R&D unit is generous. As a minimum, each R&D unit is given a budget each year equal to its budget in the previous year plus an increment for inflation. Furthermore, an individual R&D unit can request additional funding for particular projects and a high proportion of these requests are granted so long as the likely technical success of the project can be demonstrated. In principle, an R&D unit could announce that it was discontinuing a major project and a proportion of its basic budget would be cut, but this never happens.

A consultant has expressed the view to Martha that a significant amount of current R&D expenditure may be wasteful and has suggested a new budgetary approach in order to reduce this problem. This would involve two steps. First, only 80% of each unit's previous year's budget would be renewed automatically for the current year. Second, although R&D units would remain free to request additional funding for particular projects, the evaluation of these projects would become much more rigorous. In particular, funding would only be considered where specific non-financial performance measures were specified in advance. During the life of each funded project, the progress of the project would be assessed continuously by reference to the agreed non-financial performance measures, with a view to discontinuing any project where the promised performance was not being achieved.

REQUIRED:

- (a) Explain fully, three significant ways in which the performance of R&D units might be improved if the consultant's solution were implemented.

(7 marks)

- (b) Martha O'Connor has asked the consultant to illustrate his idea of using non-financial performance measures to assess R&D projects while they are still ongoing. She has referred to the case of a new type of production technology which is currently being developed by an R&D unit. The purpose of this technology is to facilitate easier customisation of products in response to customer requests. The technology will not be ready for commercial application until 2012, but the R&D staff are testing and refining it under simulated conditions in a laboratory.

Explain two non-financial performance measures which could be used to measure the performance of this R&D project at six-monthly intervals while it is still in the laboratory.

(4 marks)

- (c) Identify one example of R&D expenditure which is not amenable to the type of control suggested by the consultant, and suggest how (if at all) an organisation can exercise control over it.

(4 marks)

[Total: 15 marks]

4. Some divisions of Arthur Equipment Ltd. are evaluated on an investment centre basis, using Residual Income as the performance measure. The following figures relate to two divisions for the year ended 31st December 2008:

	Division A	Division B
Sales	€3,000,000	€1,100,000
Divisional variable costs	€1,700,000	€500,000
Divisional fixed costs	€420,000	€400,000
Divisional contribution to corporate profits	€880,000	€200,000
Allocation of corporate fixed costs	€340,000	€90,000
Divisional profit	€540,000	€110,000

For purposes of performance evaluation, taxation is ignored and it can be assumed that the cost of capital is 8% in both divisions. Fixed assets are measured at Net Book Value for purposes of the Residual Income calculation. The following are the summary balance sheets of the divisions at 31st December 2008:

	Division A	Division B
Fixed assets (net book value)	€2,500,000	€1,000,000
Current assets	€1,800,000	€500,000
Current liabilities	€650,000	€280,000

Both divisions engaged in major marketing campaigns during 2008 to promote their brand images. This expenditure (amounting to €60,000 by Division A and €84,000 by Division B) is expected to benefit the divisions commercially in the years 2008 to 2011 inclusive.

Division B spent significant amounts on R&D expenditure in 2007 and 2008 which were written off as divisional fixed costs in the year of expenditure. The amounts were €90,000 in 2007 and €225,000 in 2008. Despite the accounting treatment adopted, the Divisional Manager believes that each of these expenditures is likely to benefit the division commercially over a six-year period beginning in the year of expenditure. R&D expenditures by Division A were negligible and can be ignored.

Division B needs regular use of delivery vehicles. Arthur Equipment Ltd. would have been willing to fund the purchase of these vehicles, but instead the divisional manager opted to obtain them through short-term lease arrangements which are renewed on an on-going basis. As a result, the divisional fixed costs include €40,000 in respect of payments on these leases. It is estimated that if the vehicles had been purchased then their Net Book Value would have been €200,000 at 31st December 2008 after deducting depreciation for the year of €25,000.

REQUIRED:

- Calculate the Residual Income of each division for 2008. (4 marks)
- Calculate the Economic Value Added ® of each division for 2008. (12 marks)
- Discuss whether Arthur Equipment Ltd. should use Economic Value Added ® rather than Residual Income to evaluate investment centre performance. Use the information about Division A and Division B to illustrate your answer. (9 marks)

[Total: 25 marks]

5. At one of Arthur Equipment Ltd.'s business units, production and sale of a new farm equipment cleaning machine (FECM) will commence on 1st January 2010. Following an analysis of the design specifications, it has been estimated that costs of production will be €200 per unit (variable) plus €100,000 per annum (fixed). In line with the prices charged by competitors for similar products, it has been provisionally decided that the FECM will be sold for €700 per unit under one of the company's own brand names. Sales are uncertain, but a Marketing Consultant has provided the following estimates for 2010:

Demand (units)	900	800	500
Probability	0.4	0.2	0.4

However, the Manager of the business unit which will manufacture and sell the FECM has recently been approached by a major retail chain which has suggested an alternative product distribution arrangement for the product. Arthur Equipment Ltd. would not after all sell the product under one of its own brand names, but would instead supply the product (without a brand label) to the retail chain. The price paid by the retail chain to Arthur Equipment Ltd. would be only €500 per unit, and the number of units bought by the chain would depend on its customers' demand for the product. Nevertheless, the Business Unit Manager is attracted by this alternative distribution arrangement, because he believes that the strong market position of the retail chain creates a likelihood of selling a significantly higher number of units in 2010, as the following estimates show:

Demand (units)	2,000	1,000
Probability	0.4	0.6

REQUIRED:

Present an analysis to facilitate the Business Unit Manager in deciding which of the two distribution arrangements is to be preferred. Assume that the two distribution arrangements are mutually exclusive. Your analysis should include both appropriate calculations and discussion of subjective and qualitative considerations.

[Total: 15 marks]

END OF PAPER

SUGGESTED SOLUTIONS

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Arthur Equipment Ltd.

SOLUTION 1: Alice Marshall and Brian Sargent

(a) Contribution margins:

	Product 1	Product 2	Product 3	Product 4
Selling price	€5,000	€6,000	€8,000	€10,000
Variable production cost	€1,250	€2,400	€4,000	€6,000
Contribution margin	€3,750	€3,600	€4,000	€4,000

Cost driver rate for product customisation = $\text{€}2,800,000 / 14,000 = \text{€}200$ per customisation.

Performance measure (total sales): Alice Marshall:

$= (20 * \text{€}5,000) + (25 * \text{€}6,000) + (40 * \text{€}8,000) + (50 * \text{€}10,000)$
 $= \text{€}1,070,000.$

Performance measure (total sales): Brian Sargent:

$= (40 * \text{€}5,000) + (40 * \text{€}6,000) + (40 * \text{€}8,000) + (10 * \text{€}10,000)$
 $= \text{€}860,000.$

Profitability to the company of Alice Marshall's sales:

Number of customisations = $(40 + 50) * 2 = 180.$

Product 1 contribution:	$(20 * \text{€}3,750) = \text{€}75,000$
Product 2 contribution:	$(25 * \text{€}3,600) = \text{€}90,000$
Product 3 contribution:	$(40 * \text{€}4,000) = \text{€}160,000$
Product 4 contribution:	$(50 * \text{€}4,000) = \text{€}200,000$
Less: customisation cost:	$(180 * 200) = \text{€}36,000$
Contribution	€489,000

Profitability to the company of Brian Sargent's sales:

Number of customisations = $(40 + 40 + 40 + 10) = 130.$

Product 1 contribution:	$(40 * \text{€}3,750) = \text{€}150,000$
Product 2 contribution:	$(40 * \text{€}3,600) = \text{€}144,000$
Product 3 contribution:	$(40 * \text{€}4,000) = \text{€}160,000$
Product 4 contribution:	$(10 * \text{€}4,000) = \text{€}40,000$
Less: customisation cost:	$(130 * 200) = \text{€}26,000$
Contribution	€468,000

(b)

- One part of the company's approach involves recruiting individuals who are highly motivated to make sales. Both Alice and Brian seem to have this motivation, since they achieved high sales revenues in absolute terms.
- Unfortunately one consequence of the existing approach is that rewards salespeople's instinct to maximise total sales revenues, without paying attention to the difference in profitability of the various products. For example, Product 4 has the highest selling price but the lowest contribution, even before the cost of customisations is allowed. This problem is reflected in the fact that while the performance measurement system (based on sales) ranks Alice's performance ahead of Brian's, the figures show that Brian's sales have earned more profit for the company.
- To maximise goal congruence, the performance measurement system for salespeople needs to be modified to reflect the variations in profitability from each product and from the degree of customisation which each salesperson allows. However, it would not be appropriate to treat each salesperson as a profit centre as they have control over too few variables (e.g., they cannot vary price even if they feel that to do so would improve overall profitability, and they do not control variable production costs).
- A more appropriate approach would be to treat each salesperson as a pseudo-profit centre, i.e., calculate the profitability of their sales using actual data for those variables which they control (e.g., number of units of each product sold; number of customisations allowed) and standard data for those variables which they do not control (e.g., selling price per unit, variable production cost per unit, cost driver rate per customisation).
- The company should also consider whether performance could be improved by giving the salespeople more discretionary powers. For example, at present a salesperson can allow a customisation in order to close a sale (which generates a significant cost to the company) but cannot offer the customer a small price reduction instead (even though this might ultimately be cheaper for Arthur Equipment Ltd. than carrying out a customisation).

Tutorial notes

- Purpose of question: To test candidates' ability to demonstrate and evaluate the effects of a particular performance measurement system, and to suggest improvements to it. (Syllabus topic 4).
- Options: There is scope for variation in the answer to part (b), especially as regards the improvements proposed.
- Essential components: Candidates need to be able to perform the calculations required for parts (a). Also, in part (b), some of the weaknesses of the existing system are fundamental and therefore must be mentioned, especially the problem that the current system does not encourage emphasis on the profitability of sales.

SOLUTION 2:

Factory in a new EU member state

(a)

- Budget profit = $(12,000 * €500) + (18,000 * €300) - €3,000,000 = €8,400,000$.
- Actual profit = $(9,000 * €480) + (16,000 * €285) - €4,500,000 = €4,380,000$.
- Sales price variance:

	Reduction in selling price	Actual sales units	Variance
X:	€20	9,000	€180,000 U
Y:	€15	16,000	€240,000 U
Total:			€420,000 U

- Fixed cost (R & D spending) variance:

Estimated fixed cost	Actual fixed cost	Variance
€3,000,000	€4,500,000	€1,500,000 U

- Sales mix variance:

	Actual sales units	Actual sales units in estimated mix [12:18]	Estimated contribution margin	Variance
X:	9,000	10,000	€500	€500,000 U
Y:	16,000	15,000	€300	€300,000 F
Total:	25,000	25,000		€200,000 U

- Sales quantity variance:

	Actual sales units in estimated mix [12:18]	Estimated sales units in estimated mix	Estimated contribution margin	Variance
X:	10,000	12,000	€500	€1,000,000 U
Y:	15,000	18,000	€300	€900,000 U
Total:	25,000	30,000		€1,900,000 U

Analysis of sales quantity variance into market share and market size effects:

- Market share variance:
 - Total estimated sales by Arthur = $12,000 + 18,000 = 30,000$ units.
 - Total estimated sales by competitors = $28,000 + 42,000 = 70,000$ units.
 - Hence: total estimated market size = 100,000 units.
 - And: estimated market share = $30 / 100 = 30\%$.
 - Total actual sales by Arthur = $9,000 + 16,000 = 25,000$ units.
 - Total actual sales by competitors = $10,000 + 25,000 = 35,000$ units.
 - Hence: total actual market size = 60,000 units.
 - Standard share of actual market = $30\% * 60,000 = 18,000$ units.
 - Weighted average contribution = $(12/30)(€500) + (18/30)(€300) = €380$.
 - Market share variance = $(25,000 - 18,000) * €380 U = €2,660,000 F$.
- Market size variance:
 $= (18,000 - 30,000) * €380 = €4,560,000 U$.

Reconciliation:

Budget profit		€8,400,000
Selling price variance		€420,000 U
Fixed cost (R & D spending) variance		€1,500,000 U
Sales mix variance		€200,000 U
Market share variance	€2,660,000 F	
Market size variance	€4,560,000 U	
Sales quantity variance		€1,900,000 U
Actual profit		€4,380,000

(b)

- Actual profit was only about half of the estimated level. However, the analysis in part (a) suggests that the profit centre manager implemented a highly successful adaptive strategy and thus achieved a result which was very favourable in the light of the prevailing circumstances.
- The rapid pace of agricultural change led to a demand for decline in the products. Thus, there was a loss of profits amounting to €4.56M due to this factor which was largely outside of the factory manager's control. However, the factory manager achieved a significant success by recouping some of these lost profits through winning market share from competitors, who adopted a "no change" strategy.
- Specifically, the benefit to the company of this increased market share was an extra contribution of €2.66M. Of course this was achieved at a cost (viz., selling price reductions costing €420,000 and extra product development spending of €1.5M). Even in the short term, however, these three factors led to an increase in controllable contribution of €740,000.
- Furthermore, it is mentioned in the case that the product development work is likely to prolong the products' lifecycles. Thus, the company may gain further contribution from them even after demand for products of competitors (who have not updated their products) has ceased.
- Thus, there is no reason for variance analysis to lead to problems in profit centre control, so long as the analysis is detailed enough to enable a distinction to be made between uncontrollable factors (such as the market size variance) and the controllable factors (the other variances in this case, which capture the benefits to the company of the adaptive strategy implemented by the profit centre manager). It is only if the comparison is limited to very aggregate figures (e.g., estimated versus actual bottom-line profit) that the benefits of the adaptive strategy are concealed.

Tutorial notes

- Purpose of question: To test candidates' ability to perform advanced variance analysis, to critically evaluate the weakness of this approach in a modern manufacturing environment, and to evaluate alternative competitive strategies. (Syllabus topics 2 and 4).
- Options: There is scope for variation in the points made in answer to part (b).
- Essential components: In part (a), candidates need to be able to identify the variances which it is possible and appropriate to calculate, and to perform those calculations. In part (b), they must be able to provide a comprehensive evaluation, making use of the information from part (a) as appropriate.

SOLUTION 3: Control over R & D units

(a)

- The approach might actually increase levels of innovation among R & D staff. A unit which cannot come up with ideas for significant additional programs, identify measureable milestones for them, and convince their superiors to fund them will find that their units shrink in size by 20%. This creates a potential loss of prestige and resources which R & D staff will be keen to avoid.
- The approach might also encourage efficiency in R & D units. If existing projects must be completed from a shrinking pot of funds, this creates an incentive for R & D staff to complete projects without waste of time and funds.
- Even assuming that the company's policy of hiring only well qualified and motivated R & D engineers is effective in itself, there is nothing in the existing control system which creates a particular incentive for them to concentrate on projects with the greatest commercial potential. Not only is funding renewed automatically, but funding for an additional project requires only that its likely technical success be demonstrated. Technical success is no guarantee of commercial value. For example, an engineer may find it more professionally interesting and challenging to work on the development of large items of farm equipment, even though it is clear from the case that demand is shifting towards smaller and customised items. An advantage of the consultant's proposal is that the performance measures could be chosen for their relevance to the commercial success of the R & D project.

(b) The performance measures chosen should simulate the experience which would occur when a customer requested modification of a product and this technology was used to facilitate that customisation. Thus, at six-monthly intervals, a set of customisation specifications should be developed, and the technology programmed to customise a prototype product. The degree of improvement in the customisation process could be measured by reference to improvements in each of the following measures at the six-monthly intervals on the basis of parameters such as:

- Elapsed time between finalisation of customisation specifications and completion of the finished product.
- Conformity of the actual finished product to the customised specifications (e.g., the customisation may relate to weight, length, etc.).

(c) Research expenditure of a "speculative" or long-term nature (such as much of that carried out at the R & D unit in the company's headquarters) would be of this type. For example, without having any particular new product or process improvement in mind, an R & D engineer might decide to test the properties of various metals which the company has not previously used in its products in the hope of stumbling across one which might be useful for some as-yet unforeseen purpose in the company.

Performance metrics of the type suggested would not be an appropriate form of control since they would discourage the long-term focus of this type of effort, where breakthroughs are likely to be sporadic rather than periodic. A typical means of controlling this type of activity is to make a discretionary fixed budgetary allocation of time and funds to it, e.g., allow each of several R & D engineers to spend one day per week on this type of activity. Of course, this only defines the amounts which may be spent on the activity and is of no help in ensuring effectiveness. The practice of hiring only well motivated and qualified engineers is one of the few ways of ensuring that resources devoted to this activity are not wasted and do not become an idle time cost. Thus, indirectly, it should help to create some likelihood of effectiveness in this type of activity.

Tutorial notes

- Purpose of question: To test candidates' ability to apply their knowledge of two aspects of budgetary control (specifically, control of discretionary cost centres and zero-based budgeting) to a specific proposal for the control of R & D units in an organisation. (Syllabus topic 2).
- Options: All three parts require candidates to provide their own examples, so a wide variety of answers is acceptable.
- Essential components: Notwithstanding the statement in the previous paragraph, it is essential that the points made by candidates should be substantial, relevant, and convincingly explained.

SOLUTION 4: Residual Income and Economic Value Added ®

(a)		Division A	Division B
	Fixed assets (net book value)	€2,500,000	€1,000,000
	Current assets	€1,800,000	€500,000
	Current liabilities	€650,000	€280,000
	Net assets	€3.65M	€1.22M
		Division A	Division B
	Divisional profit	€540,000	€110,000
	Capital charge	8% * €3.65M = €259,600	8% * €1.22M = €97,600
	Residual income	€248,000	€12,400

(b)	Adjusted profit:		
		Division A	Division B
	Divisional profit	€540,000	€110,000
	Add back: Capitalised marketing expenditure(3/4) * €60K = €45,000		(3/4) * €84K = €63,000
	Add back: Capitalised 2008 R & D expenditure		(5/6) * €225K = €187,500
	Less: Amortisation of 2007 R & D expenditure		-(1/6) * €90K = - €15,000
	Add back: Lease payments		€40,000
	Less: Notional depreciation of fixed assets		- €25,000
	Adjusted profit	€585,000	€360,500

Adjusted net assets:		
	Division A	Division B
Net assets per Balance Sheet	€3.65M	€1.22M
Unamortised advertising expenditure	€45,000	€63,000
Unamortised R & D expenditure		€187,500 + [(4/6) * €90K] = €247,500
Vehicles		€200,000
Adjusted net assets	€3.695M	€1.7305M

Economic value added ®:		
	Division A	Division B
Adjusted profit	€585,000	€360,500
Capital charge	8% * €3.695M = €292.00	8% * €1.7305M = €138,440
EVA	€289,400	€222,060

- (c)
- EVA ® reflects the economic performance of each business unit in a more realistic way. For example, the Residual Income figures suggest that Division B is doing little better than break even. However, the EVA ® figures indicate that Division B is earning a significant return in excess of the cost of capital, when allowance is made for the fact that (for example) much of its current expenditure on marketing and R & D will bring a long-run economic return.
 - Another advantage of using EVA ® to evaluate performance is that it is less likely than Residual Income to encourage short-term dysfunctional behaviours. For example, the Division B manager's preference for leasing vehicles on a short-term basis is very likely motivated by a preference for off-balance-sheet financing, which avoids (in the Residual Income calculation) a capital charge to the division in respect of the purchase or long-term leasing of the vehicles. No such avoidance occurs in the EVA ® calculation, so there is no incentive to engage in the short-term dysfunctional behaviour in the first place.
 - One disadvantage of EVA ® is that it involves more subjective estimates than the Residual Income calculation. In this example, the EVA ® calculation has required an estimate of the number of future years over which divisions will benefit commercially from current-year marketing and R & D expenditures. In practice, such estimates are difficult to make.

Tutorial notes

- Purpose of question: To test candidates' ability to calculate two measures of divisional performance (Residual Income and Economic Value Added ®), and to make well-argued recommendations as to which measure is preferable (Syllabus topic 3).
- Options: There is scope for variation in the points made in answer to part (c).
- Essential components: Candidates need to be able to perform the calculations and adjustments in parts (a) and (b). In part (c), they need to make convincing arguments as to the practical reasons why EVA ® is preferable to Residual Income (or vice-versa) as a divisional performance measure.

SOLUTION 5: FECM

FECM distributed under company's brand name:

- Contribution = €700 - €200 = €500.

- Payoff table:

States:	D = 900	D = 800	D = 500
Payoff:	$(900 * €500) - €100K$ = €350K	$(800 * €500) - €100K$ = €300K	$(500 * €500) - €100K$ = €150K
Probability:	0.4	0.2	0.4

FECM distributed through retail chain:

- Contribution = €500 - €200 = €300.

- Payoff table:

States:	D = 2,000	D = 1,000
Payoff:	$(2,000 * €300) - €100K = €500K$	$(1,000 * €300) - €100K = €200K$
Probability:	0.4	0.6

Analysis of figures:

- Expected values:
 - FECM distributed under company's brand name \Rightarrow EV
 $= (0.4 * €350K) + (0.2 * €300K) + (0.4 * €150K) = €260K$.
 - FECM distributed through retail chain \Rightarrow EV
 $= (0.4 * €500K) + (0.6 * €200K) = €320K$.
 - On the EV basis, the retail chain option is to be preferred.
- Risk analysis:
 1. Another advantage of the retail chain distribution channel is that it offers less downside risk. The payoff cannot be less than €200,000 with this distribution channel, whereas it could be as low as €150,000 if the company distributes the product under its own brand name.
 2. Furthermore, the retail chain distribution channel is also to be preferred in terms of upside risk. The payoff could be as high as €500,000 with this distribution channel, whereas it cannot exceed €350,000 if the company distributes the product under its own brand name.

Other considerations:

- A disadvantage of distributing through the chain store arrangement is that the company is losing the opportunity to label the product with one of its own brand names. Such branding can be valuable in building up the reputation of the company and its products generally, so there may be an opportunity cost which is not captured in the figures.
- The figures analysed are for 2010 only. However, since the FECM is a new product, it is likely to have a lifecycle of several years. The decision as to which distribution channel would be most profitable should be made on a whole-lifecycle basis and not just on the analysis of a single year.
- The proposed distribution method makes Arthur Equipment Ltd. dependent on the retail chain store, and the latter may exploit this. For example, it may feel that it can offer lower prices in 2011 and later, especially since there are apparently several competitor products.

Tutorial notes

- Purpose of question: To test candidates' ability to identify and perform the forms of analysis which are appropriate in a decision-making situation where there are both short-term under uncertainties and long-term qualitative considerations (Syllabus topic 1).
- Options: There is scope for variation in the points made in relation to qualitative and long-run considerations in the decision.
- Essential components: Candidates need to analyse the implications of the decision for 2010 in terms of expected value and upside and downside risk, and to draw the conclusion that all of these analyses point towards the same choice of distribution channel. However, they also need to make substantial and convincing points about qualitative considerations which are also likely to impact on the decision.