CMA DECEMBER, 2019 EXAMINATION
PROFESSIONAL LEVEL - IV
SUBJECT: 402. STRATEGIC MANAGEMENT ACCOUNTING

MODEL SOLUTION

Solution of the Question No.
Required 1 (a):

This situation reflects the critical issue in interpreting a situation where events were not as expected. The argument hinges on two things. First, it is unreasonable to expect managers to be responsible for things beyond their control -- what is often called the controllability principle in management accounting. Second, the events that occurred in this situation were beyond the managers' control.

Many people believe that the controllability principle is fundamental because it appeals to a common sense of fairness, namely that people should only be held accountable for what they do or control. However, some people have argued that making people accountable for whatever happens motivates them to search for ways to gain control over their environment. Therefore, while rejecting the controllability principle at first seems harsh and conflicting with a common view of equity, there may be good behavioral reasons for doing this.

However, for the sake of discussion here, let us assume that the controllability principle is applied. There are two issues in this case: first, whether or not these managers should reasonably have anticipated the arrival of the new competitors and second, what would the results of the new competitor have been if the organization had not built the new warehouse. These issues are problematic and would have to be resolved by reference to the facts in the particular situation including what other competitors were doing, public announcements by the competitor, and what analysts who were following this market were writing and saying.

Required 1(b):

No. The ability of a management accounting and control system to diagnose out-of-control situations sufficient for proper control. We will require to make proper control from beginning instead of when it will be out of control situations.

Required 1(c):
A well-designed management accounting and control system (MACS) focus on more than manufacturing. It helps for all organizations including service industries.

MACS can be defined as part of the global information system, through which it is collected, processed, analyzed and communicated information (financial and nonfinancial, internal and external) used for planning, monitoring and control of different organizational activities, to optimize the use of resources, to support the process of decision making and to the performance evaluation process.
In this way, the concept of MACS embrace the entire array of control mechanisms used by organizations.

1(d)
Required (i)

1. Layout reorganization estimates include a decrease in work-in-process inventory because cellular manufacturing streamlines production flows. When products flow immediately from one processing stage to the next, there is less build-up of work-in-process inventories.
2. When products flow immediately from one processing stage to the next, workers downstream can identify an upstream problem in that component almost immediately and correct it before it leads to the production of more defective components. Early detection of defective units reduces the amount of raw materials needed for rework, which results in decreased direct material costs as a percentage of sales.
3. A streamlined manufacturing operation leads to reduced manufacturing cycle times, improved quality, and a shorter lead-time for orders. Quicker delivery to customers and higher quality products usually result in increased customer sales.

Required (ii)

1. Carrying reduced levels of work-in-process inventory results in a projected cost savings of $9,600.

Before the change: $200,000 x 12% =	$24,000
After the change: $120,000 x 12% =	14,400
Cost savings	$ 9,600

2. As a result of the layout reorganization, incremental manufacturing costs are projected to decrease by $5,000.

Before the change: $700,000 x 25% =	$175,000
After the change: $850,000 x 20% =	170,000
Cost savings	$ 5,000

3. As a result of switching to a cellular manufacturing operation, total benefits are projected to increase by $164,600.

	Before the Change	**After the Change**	**Difference**
Sales	$700,000	$850,000	$150,000
Manufacturing costs*	(175,000)	(170,000)	5,000
WIP inventory carrying costs**	(24,000)	(14,400)	9,600
Total benefits	$501,000	$665,600	$164,600

* Before the change: $700,000 x (10% + 6% + 9%) = $175,000
After the change: $850,000 x (9% + 4% + 7%) = $170,000

** Before the change: $200,000 x 12% = $24,000
After the change: $120,000 x 12% = $14,400

Solution of the Question No. 2(a)

The causes may be customer satisfaction with sales staff (poor sales skills), delivery problems (not on time), accounting problems (poor billing and collection procedures), or poor returns and allowance policies.

The causes may be detected by comparing nonfinancial measures of the company with those found in the industry. These might include measures of: number of shipments incorrect or not on time, number of customer complaints about certain areas (billing, shipping, etc.), response time to customer complaints, or a questionnaire about why former customers quit buying from the company.

Solution of the Question No. 2(b)

i.

Current Budget		$ 800,000
Additions: Training	$110,000	
Additions: Supplies	60,000	170,000
Savings: 200,000 x $2		(400,000)
Adjusted budget		$ 570,000

ii.

Current budget $100 x 0.03 x 600,000 =	$1,800,000
Savings rate	x 0.40
Net savings (reduction in internal failure costs)	$ 720,000

iii.

Current budget $120 x 0.01 x 600,000 =	$ 720,000
Savings rate	x 0.60
Net savings (reduction in external failure budget)	$ 432,000

Solution of the Question No. 2(c)

(i)

Sales:		
External (1,200,000 x $4)	$4,800,000	
Internal (800,000 x $4)	3,200,000	$8,000,000
Cost of goods sold:		
Variable (2,000,000 x $1.74)	$3,480,000	
Fixed (2,000,000 x $0.40)	800,000	4,280,000
Operating income		$3,720,000

(ii)

Sales:		
External (1,200,000 x $4)	$4,800,000	
Internal (800,000 x $2.14)	1,712,000	$6,512,000
Cost of goods sold:		
Variable (2,000,000 x $1.74)	$3,480,000	
Fixed (2,000,000 x $0.40)	800,000	4,280,000
Operating income		$2,232,000

(iii) Due to current demand in excess of the capacity, the Olive Oil Division should not be penalized by having to sell inside. All sales equivalent to the current external demand of 1,400,000 liters should be at the market price.

Current external demand	1,400,000
Current internal demand	800,000
Total demand	2,200,000
Capacity	2,000,000
Excess demand	200,000
Internal demand	800,000
Noncompetitive internal demand	600,000

Sales:		
External (1,200,000 x $4)	$4,800,000	
Internal (200,000 x $4)	800,000	
Internal (600,000 x $2.14)	1,284,000	$6,884,000
Cost of goods sold:		
Variable (2,000,000 x $1.74)	$3,480,000	
Fixed (2,000,000 x $0.40)	800,000	4,280,000
Operating income		$2,604,000

Solution of the Question No. 3

(a)

NPV method uses a reinvestment rate close to its current cost of capital, the reinvestment assumptions of the NPV method are more realistic than those associated with the IRR method. In conclusion, NPV is a better method for evaluating mutually exclusive projects than the IRR method

$79,310/$22,000 = 3.605, which is the present value factor for an annuity over five years when the interest rate is 12%.

IRR on the project is 12%

(b)

$$\frac{\text{Net present value to be offset}}{\text{Present value factor}} = \frac{\$1{,}040{,}000}{0.104} = \$\ 10{,}000{,}000$$

This equation can be used to determine that if the salvage value of the supertanker is at least $10,000,000, the net present value of the investment would be positive and therefore acceptable.

While the salvage value is not known with certainty, the ten million dollars figure offers **a useful reference point** for making the decision.

(c)

	Years	Cash Flows	14% Factor	Present Value
Investment in machine	Now	$ (100,000)	1.000	$ (100,000)
Annual net cash inflows	1-4	10,000	2.914	29,140
Annual intangible benefits	1-4	24,317	2.914	70,860
Net present value				$ (0)

So, annual intangible benefits will be $ 24,317.

(d)

	Years	Cash Flows	14% Factor	Present Value
Investment in equipment	Now	$ (250,000)	1.000	$ (250,000)
Working capital needed	Now	(20,000)	1.000	(20,000)
Annual net cash inflows	1-4	120,000	2.914	349,680
Upgrading of equipment	2	(90,000)	0.769	(69,210)
Salvage value of equip.	4	10,000	0.592	5,920
Working capital released	4	20,000	0.592	11,840
Net present value				$ 28,230

Solution of the Question No. 4

(a) Downsizing (also called rightsizing) is an integrated approach configuring processes, products, and people to match costs to the activities that need to be performed to operate effectively and efficiently in the present and future. Downsizing is an attempt to eliminate unused capacity.

A partial productivity measure is the quantity of output produced divided by the quantity of an individual input used (e.g., direct materials or direct manufacturing labor).

(b) No. Total factor productivity (TFP) and partial productivity measures work best together because the strengths of one offset weaknesses in the other. TFP measures are comprehensive, consider all inputs together, and explicitly consider economic substitution among inputs. Physical partial productivity measures are easier to calculate and understand and, as in the case of labor productivity, relate directly to employees' tasks. Partial productivity measures are also easier to compare across different plants and different time periods.

(c) (i) Gerhart Company's partial productivity ratios in 2012 are as follows:

Direct materials partial productivity

= Quantity of output produced in 2012 / Yards of direct materials used in 2012

= 2,646, 000 / 1, 764, 000 = 1.5 wallets per yard

Conversion costs partial productivity

= Quantity of output produced in 2012 / Units of manuf. capacity in 2012

= 2,646, 000 / 2,700, 000 = 0.98 wallets per unit of capacity

To compare partial productivities in 2012 with partial productivities in 2011, we first calculate the inputs that would have been used in 2011 to produce year 2012's 2,646,000 units of output assuming the year 2011 relationship between inputs and outputs.

$$\text{Direct materials} = 2{,}000{,}000 \text{ yards (2011)} \times \frac{2{,}646{,}000 \text{ output units in 2012}}{2{,}520{,}000 \text{ output units in 2011}}$$

$$= 2{,}000{,}000 \text{ yards} \times 1.05 = 2{,}100{,}000 \text{ yards}$$

Alternatively, we can calculate direct materials that would have been used in year 2011 to produce year 2012's 2,646,000 output as

2,000,000 yards ÷ 2,520,000 units = 0.79365 yards per unit × 2,646,000 units = 2,100,000 yards.

Manufacturing capacity = 3,307,500 units of capacity, because manufacturing capacity is fixed, and adequate capacity existed in 2011 to produce year 2012 output.

Partial productivity calculations for 2011 based on year 2012 output (to make the partial productivities comparable across the two years):

Direct materials partial productivity

$$= \frac{\text{Quantity of output produced in 2012}}{\text{Yards of direct materials that would have been used in 2011 to produce year 2012 output}}$$

= 2,646, 000 / 2,100,000

= 1.26 wallets per yard

Conversion costs partial productivity

$$= \frac{\text{Quantity of output produced in 2012}}{\text{Units of manufacturing capacity that would have been used in 2011 to produce year 2012 output}}$$

= 2,646, 000 / 3,307,500

= 0.8 wallets per unit of capacity

The calculations indicate that Gerhart improved the partial productivity of direct materials and conversion costs between 2011 and 2012 via efficiency improvements and by reducing unused Manufacturing capacity.

Required (ii) - a

Total factor productivity for 2012 using 2012 prices

= Quantity of output produced in 2012 / Costs of inputs used in 2012 based on 2012 prices

= 2,646,000 / (1,764,000 × $3.70) + (8,370, 000)

= 2, 646, 000 / ($6,526,800+$8,370,000)

=2,646,000 / $14,896,800

= 0.1776 units of output per dollar of input

ii- b

By itself, the 2012 TFP of 0.1776 units per dollar of input is not particularly helpful. We need something to compare the 2012 TFP against. We use, as a benchmark, TFP calculated using the inputs that Gerhart would have used in 2011 to produce 2,648,000 units of output calculated in requirement 1 at 2012 prices. Using the current year's (2012) prices in both calculations controls for input price differences and focuses the analysis on the adjustments the manager made in the quantities of inputs in response to changes in prices.

2012 price of capacity = Cost of capacity in 2012 / Capacity in 2012

= $8,370,000 / 2,700,000 units

= $3.10 per unit of capacity

Benchmark TFP = <u>Quantity of output produced in 2012</u>

Costs of inputs that would have been used in 2011

to produce 2012 output at year 2012 input prices

= 2,646,000 / (2,100,000 × $3.70) + (3,307,500 × $3.10)

= 2,646,000 / $7,770,000 + $10,253,250

= 2,646,000 / $18,023,250

= 0.1468 units of output per dollar of input

Using year 2012 prices, total factor productivity increased 21.0% [(0.1776 − 0.1468) ÷ 0.1468] from 2011 to 2012.

= THE END =