

Chapter 5 - Decision Making

Case Scenario 7 – Non-Ethical Considerations

ABC Limited specializes in the manufacture of chemical intermediaries in a very competitive business environment. ABC is a public listed company, with majority of its shareholders being institutional investors like mutual funds, banks and insurance companies.

It is located in a water scarce zone in Tamil Nadu. There are restrictions on the tapping and usage of groundwater under the relevant laws. Penal provisions of the law will apply in case of violations. The production process requires water and the amount of water that the company can draw is limited to 19,000 kilo-litres (1 Kilo-litre is 1,000 litres). Purchase of water is not an option as availability is highly erratic and exorbitant on cost.

The company manufactures two types of chemicals “A” and “B” and these are sold in kilograms. The company is in the process of making the business plan for the year 2021.

Based on the actual operating data for 2020 and taking into consideration the inflation and possible price increases that it can obtain from the market, the following product costing details have been arrived at:

Product	A	B
Capacity Volume kg. (not inter-changeable)	8,25,000	9,30,000
Selling Price per kg.	₹2,000	₹1,000
Variable Cost per kg.	₹1,500	₹650
Water (litre/ kg.)	12.5	10

Under the relevant income tax laws prevalent, companies with a turnover of ₹250 Cr. (Crores) or less are taxed at a lower rate of 25% as against the normal 30%. The company intends to keep its sales for 2021 equal to ₹250 Cr. or slightly lesser to avail this concessional income tax benefit.

With capacity constraints, the company has calculated that it would be still beneficial for the company to stick to ₹250 Cr. as only a marginal increase in turnover is possible over ₹250 Cr.; after a higher tax @30%, the PAT would be still lower than the PAT arrived at after doing just ₹250 Cr. and availing the lower income tax rate.

CFO asked management consultant to work out the volumes in kg. of products “A” and “B” which would give an optimal (maximum) contribution given the constraints on capacity, water usage and turnover to avail the concessional income tax benefit.

Consultant work out with the following product mix using Linear Programming. She also proposes another mix which does not meet the constraint on water usage where the company could end up drawing excess water than permitted by 113 kilo-litres but would result in an increase of ₹30 lacs in contribution. She says that it is easily possible to do this by managing reporting to the water authorities.

Product		Optimal	Suggested
A (Volume in kg.)		8,00,000	7,85,000
B (Volume in kg.)		9,00,000	9,30,000
Contribution in ₹Cr.		71.5	71.8
	Constraints		
Sales	<= 250 Cr.	250	250
Volume of "A" in kg.	<= 8,25,000	8,00,000	7,85,000
Volume of "B" in kg.	<= 9,30,000	9,00,000	9,30,000
Water usage (in KL)	<= 19,000	19,000	19,113

Required

The CFO is not satisfied with the calculations. He wants you (Sr. Finance Manager) to come up with a proper DISCUSSION.

Solution

Primary goal of investor –owned firms is shareholder wealth maximisation, which translates to stock price maximisation. Management Consultant’s plan is looking good for the ABC as there is a positive impact on the profitability (30 lacs) of the company. Also, ABC operates in a competitive environment so for its survival, it has to work on plans like above.

There is second side of coin that cannot also be ignored i.e., business ethics. It is easily possible to manage drawing of excess water, but it is not an ethical practice as the company has responsibilities towards use of natural resources like water and protecting the environment.

Besides, a whistle-blower complaint to the water authorities can land the company into trouble in terms of penalties, a financial impact and also such penalties are disallowed for income tax purposes. It is possible that such a violation may be reported in the media causing disrepute to the name of the company. It can also make investors in the share market stay away from the company as it has ethical governance issues. The company will face challenges in obtaining other government approvals when it will plan expansion as this violation may have to be reported on the applications seeking approvals.

Overall

May be ABC would be able to earn profit due to this plan in short run, but it will tarnish the image of the ABC which would hurt profitability in long run. Therefore, before taking any decision on this plan, ABC should analyse both qualitative and quantitative factors.

Skill based – Q1 – Profitability Analysis

First Source (FS) is a firm engaged in making glass based high value exotic artefacts targeting premium segment market. Its major supplies thus go to retail shops in shopping malls in cities like New Delhi, Mumbai, and Chennai where such artefacts put on display with a premium price tag.

FS sources most of its glass ware components from a local supplier in Delhi and assembles the same in small dimensional structures within its shop floor. Later these artefacts are given exotic designs,

and embedded with glitter stones, fritter and such other items by five well trained artisans in the shop floor.

The sales in the past six months have not shown an encouraging trend and working capital is in crunch position. The management of FS has received the feedback from most the mall owners that this demand crisis is due to reduced footfalls.

The current position of FS is provided as follows:

	Artefact 1 ₹	Artefact 2 ₹
Maximum retail price per unit (MRP)	3,000	6,000
Rent to be paid to malls per unit	50	55
Facilitation costs to be paid to malls per unit	10	15
Present lower selling price per unit	2,350	4,800
Cost of glassware per unit	900	1,120
Cost of assembly per unit	500	650
Artisan costs per unit	700	1,000
Variable overhead	200	240
Fixed overheads per unit	600	900
Inventories in malls (in number of units)	621 units	121 units

Good artisans are hard to find, and the artisans that are employed with FS are associated on long term basis, so giving any temporary layoff is also not possible.

Required

ADVISE the management on profitability in current scenario.

Solution

From the circumstances in the present scenario, it is clear that FS is facing a muted demand for its products, due to reduced footfalls. This may be primarily due to a slowdown in the associated market for premium products that have only exotic (as opposed to actual) value.

Artefact 2 is having a positive contribution margin even at low selling prices. Artefact 1 is having a negative contribution margin. Therefore, the management of FS should consider the following points:

To renegotiate with the mall owners on rental costs. If that is not possible, then the management has no choice but to sell the Artefact 1 at present price at earliest possible way.

To promote Artefact 1 by making a combination offer with Artefact 2 at a discounted price, taking advantage of the fact that Artefact 2 is still able to generate profit on a standalone basis. Hence a combined offer may help to boost its sagging sales.

Discontinuance of further production of Artefact 1 should be done only for a temporary period. The work in progress (if any) should be put on hold, and the management should rigorously find out cost cutting methods in its assembly shop. In striving to reach the cost goal, myriad managerial techniques and tools like Vale Analysis, Kaizen Costing, Six Sigma etc. can be used. These techniques are being used to control cost in order to meet the target without compromising the quality and value to be derived from the product.

Computation of the Contribution in Current Scenario

Particulars	Artefact1	Artefact2
Inventories in malls (in units) - (a)	621	121
Rent to be paid to malls per unit - (b)	50	55
Rental Cost - (a) × (b) – I	31,050	6,655
Facilitation costs to be paid to malls per unit - (c)	10	15
Gross facilitation cost - (a) × (c) – II	6,210	1,815
Total variable costs (refer W.N.1) – III	14,28,300	3,64,210
Marginal Costs (I + II + III)	14,65,560	3,72,680
Present Lower Selling Price per unit	2,350	4,800
Present Sales	14,59,350	5,80,800
Contribution margin (+ / -)	-6,210	2,08,120

W.N.1

Cost of glassware per unit	900	1,120
Cost of assembly per unit	500	650
Artisan costs per unit	700	1,000
Variable overheads per unit	200	240
Total Variable Costs	2,300	3,010
Units	621	121
Total Variable Costs	14,28,300	3,64,210

Skill Based – Q6 – Profitability Analysis

XEE Ltd. is a company which manufactures two types of material for engineering applications. It makes these two types of materials in two production lines: Line 1 and Line 2. Line 2 has a different process and is easier in terms of 'getting this fixed at the customers end' and has longer life (1.5 times the life of Line 1 product).

These are sold in kg. Line 1 has a capacity to produce 6,50,000 kg. per annum and Line 2 has a capacity to produce 2,40,000 kg. per annum. The company management has given a directive to the CEO, CFO and the Sales Head that in no circumstance the Contribution Margin to Sales shall fall below 40%.

Currently, Line 1 is running at about 92% capacity (3 shifts) and Line 2 at about 33% capacity (1 shift).

The Capacity, costs and profitability data for the year 2018-19 are as follows:

Particulars	Line 1	Line 2	Total
Capacity kg.	6,50,000	2,40,000	
Production/ Sales kg.	6,00,000	80,000	
Unit Price/ Costs per kg. in Rs			
Selling Price	180	315	
Variable Cost	(108)	(189)	
Contribution	72	126	
Contribution%	40%	40%	

	Lacs	Lacs	Lacs
Selling Price	1,080.00	252.00	1,332.00
Variable Cost	(648.00)	(151.20)	(799.20)
Contribution	432.00	100.80	532.80
Overheads			(240.00)
Depreciation			(93.00)
Profit			199.80
Profit %			15%

Scenario 1

At a meeting of the CEO, Sales Head and the CFO; the Sales Head informs the team that there is a potential of a one-time 80,000 kg. of Line 2 product order from a large customer who can commit on delivery schedules for the whole of 2019-20 kg. at a price of 250 per kg.

The Sales Head also informs that the new customer is aware of the price of product from Line one, the fact that the line capacity is full and the Line 2 product can deliver life which is 1.5 times of the Line 1 product.

The Sales Head also informs that he may have to reduce price by 5 per kg. for the existing customers i.e., from 315 per kg. to 310 per kg.

To a question from the CEO that this would involve additional overheads, the CFO checks on his laptop and informs that for an additional shift of operation of line 2, the incremental overheads would be 6.20 Lacs p.a. per shift (shift supervisors, lighting etc.) and depreciation will increase by 16.00 Lacs p.a. per shift.

The CEO poses the following questions to both the CFO and the Sales Head:

1. Given that the order is one time, what will happen to the fixed overheads committed in 2019-20 and the loss of profits due to reduction in price to existing customers which cannot be increased in the subsequent years?
2. The CEO is also concerned about the reduction in contribution % from the management stipulated 40%. To address the issue the CEO asks both the CFO and the Sales Head to come up with an acceptable pricing for Line 2 for the new one-time customer. He indicates to them that the price should be such that the % to Sales to Profit achieved in 2018-19 is maintained.
3. Further, the CEO mentions that the new customer should also be convinced of the price to be quoted. He also mentions that the sales from Line 1 for 2019-20 will be at the same level (6,00,000 kg.) and at the same price. There are no changes in costs (both variable and fixed) too.

Required

You are the deputy to the CFO and you are requested to come up with RECOMMENDATIONS on:

- (i) Ideal Price to be quoted for the new customer with reasons to be proposed by Sales Head to the new customer to convince him to accept the price so quoted.
- (ii) Reasons to be mentioned to the management on why the price to be so quoted is acceptable despite the fact that it would result in a lower contribution margin % than that prescribed by the management.

(iii) Recommend a strategy in consultation with the Sales Manager to make up for the fixed overheads and loss of profits due to reduction in price for the existing customers of Line 2 product for subsequent years.

(iv) Also arrive at a price to the new customer at or below which it does not make financial sense to quote and get the order from the new customer with explanations.

Scenario 2

In a different scenario where volumes for the year 2019-20 are assumed to be exactly same as in 2018-19 but price of raw material has increased by Rs 12 per kg for both products manufactured out of Line 1 and Line 2. A price increase by Rs 12 kg for each of the products will result in a drop in contribution % below 40% for both the products. Calculations indicate that the contribution margin can be retained at 40% if the prices are increased by Rs 20 per kg.

Required

You are requested to indicate which price increase; obtained from the customer and why?

Solution

Scenario 1

(i) The ideal price would be Rs 260 per kg to be quoted to the customer. While the customer has asked for a price of Rs 250 per kg, the price of Rs 260 per kg is still beneficial to the customer as the life of Line 2 product is 1.5 times Line 1 product priced at Rs 180 per kg.

1.5 times 180 is 270 and the customer would benefit even at a price of Rs 270 per kg. but is getting a good bargain at Rs 260 per kg. This has to be explained to the customer to get him accept the price of Rs 260 per kg. as against Rs 250 per kg sought by him.

(ii) At this price while the contribution for Line 2 product drops to about 34% but the overall Profitability at profit level is maintained at 15%. The reason for profitability remaining at 15% despite the drop in contribution to about 34% is because overheads and depreciation increase only incrementally and the accretion to contribution at the price of Rs 260 from the new customer is at Rs 56.80 lacs is far higher than the incremental overheads plus depreciation which is Rs 22.20 lacs (6.20 lacs + 16.00 lacs). This has to be explained to the management.

(iii) As this is a one-time order, the company would be saddled with Rs 6.20 lacs (predominantly manpower supervision cost) and a loss of contribution of Rs 4.00 lacs due to sale of Line 2 product at Rs 5 less per kg. in subsequent years too. Also, a price once reduced cannot be increased easily. To make up for this, the Sales Head should sell at least 15,000 kg. of Line 1 product. This is arrived at by dividing 10.20 lacs (6.20 lacs + 4.00 lacs) by contribution per unit of Line 1 product which is Rs 72, 14,167 kg. (10.20 lacs/ 72), rounded off to 15,000 kgs for which capacity is available (50,000 kgs) within the 3rd shift. Depreciation cost for the 2nd shift will not be incurred as Line 2 will be back to single shift operation after 2019-20.

(iv) The incremental costs are the variable costs plus loss of margin on existing customers plus the incremental overheads and depreciation totalling to Rs 26.20 lacs. If these are recovered, then there is no loss. The price to be obtained will be Rs 221.75. This will be variable cost of Rs 189 per kg plus Rs 32.75 per kg which is Rs 26.20 divided by 80,000 kgs. At this price there is no loss or gain but it is not worth the effort of running the 2nd the customer is a hard negotiator and has alternatives, the price to

be accepted for reasons other than profits (for example gaining a big customer where there is a possibility of big orders in future) cannot be less than 221.75.

Scenario 2

With a raw material price increase at Rs 12 per kg, no customer will pay more than Rs 12 per kg as the XEE Ltd will have to justify. Though there is a fall in contribution %, to there is no loss to the company as the price increase in variable costs amounting to 12 per kg is fully recovered.

Workings

	Line 1	Line 2	Line 2	Total
		Existing Customers	New Customers	
Capacity kgs.	6,50,000	2,40,000	2,40,000	
Production/ Sales kg.	6,00,000	80,000	80,000	
Unit Price/ Costs per kg. in				
Selling Price	180	310	260	
Variable Cost	(108)	(189)	(189)	
Contribution	72	121	71	
Contribution%	40%	39%	27%	
	Lacs	Lacs	Lacs	Lacs
Selling Price	1,080.00	248.00	208.00	1,536.00
Variable Cost	(648.00)	(151.20)	(151.20)	(950.40)
Contribution	432.00	96.80	56.80	585.60
Overheads				(246.20)
Depreciation				(109.00)
Profit				230.40
Profit %				15%

The price of Rs 260 per kg. has been derived as follows:

Assume the price to new customer be "X". Hence

Sales less Variable costs less Overheads less Depreciation = 15% of Sales

$$(1,080.00 + 248.00 + X \times 0.80) - 950.40 - 246.20 - 109.00 = 15\% \text{ of } (1,080.00 + 248.00 + X \times 0.80)$$

$$\text{Or } 22.40 + 0.80X = 199.20 + 0.12X$$

$$\text{Or } 0.68X = 176.80$$

$$\text{Or } X = 176.80 / 0.68 = 260$$

Skill Based – Q19 – Special Order

'Pristine Makers' is one of the largest laundry service provider for Suits. The firm has set a price of Rs 510 for cleaning the "suit set". 'Pristine Makers' derived this price as follows: cleaning materials 35, labour (3 hrs. @ 50 per hr.) 150, variable overheads 70, fixed overheads (3 hrs. @ 15 per hr.) 45 plus mark-up 70% on total cost. 'Pristine Makers' is known for its quality work and timely delivery; hence, customers are willing to pay this premium price. Firm's employees receive a fixed salary. The "hourly rate" 50 is arrived by dividing the total salary by the total number of hours available. Variable overheads depend on the number of suits cleaned whereas fixed overheads rate is derived at by dividing the total cost of all related expenses by the number of labour hours available. Fixed overheads generally include office rent and administrative salary.

A local hotel approached 'Pristine Makers' as the regular cleaners of these suits are on strike, about the possibility of cleaning 130 suits in coming week and they need the work done on a rush basis. 'Pristine Makers' has sufficient quantity of required cleaning material in stock for special order. It perceives that it could complete 60% of the special order during normal working hours. However, to complete the remaining 40%, some employees will have to work overtime. Overtime hours are paid at premium, which could be time and half the normal hourly rate.

Required

- (i) ADVISE the price it shall quote for the special order?
- (ii) Does special order decision deal with excess supply or excess demand? ANALYSE.
- (iii) Whether such special order be accepted on rush basis? COMMENT.

Solution

(i) Firms can face situations where they are confronted with the opportunity of offering for a one-time special order. In this situation only the incremental costs of undertaking the order should be taken into consideration. Quote should be made at prices that exceeds incremental costs. Any excess of revenues over incremental costs will provide a contribution to committed fixed cost which would not otherwise have been gained.

'Pristine Makers' can use the incremental cost numbers for pricing the 'rush order'. The minimum price that firm would charge is Rs 195 per suit (= 25,350/130). This price is well below normal price of Rs 510.

Particulars	Amount (₹)
Cleaning materials (130 × 35)	4,550
Labour (130 × 3 × 40% × 50 × 1.5)	11,700
Variable overheads (130 Suits × 70)	9,100
Incremental cost	25,350

However, in decision making other conditions are equally important. For instance, if this is a one-time deal with no prospect of repeat business, then 'Pristine Makers' might well charge a premium over the normal price. Long-term implications also matter. The prospect of "getting a foot in the door" to quote for future business would push the price downward. Therefore, 'Pristine Makers' can price based on both the short-run benefits from accepting the order and the long-run consequences.

(ii) Such special order definitely gives 'Pristine Makers' opportunity to earn more profits, however, other aspects also need to be analysed. There is excess of cleaning material, if the current special order does not use up available stock, the firm could store the cleaning material for later use. It is most likely that 'Pristine Makers' fixed overhead costs will not change due to the special order which mainly consists of rent and administrative salaries. If 60% of the special order could be completed during normal working hours, then the firm clearly has some excess capacity in terms of labour hours. However, for the remaining 40% of the special order, labour will have to work overtime and will be paid 1.5 times. This clearly indicates that different resources in the 'Pristine Makers' have differing capacity levels; a decision may impose constraints on particular resource. It is necessary to consider the opportunity cost of each resource when computing the total cost of a special order.

(iii) There are two sides in this scenario. On the one side, firm can earn more profits by taking the special order. On the other side, the order received needs to be delivered urgently. Therefore, accepting such rush orders may affect the quality of service and also timely delivery may not be complied with. Hence, the goodwill and brand name will be affected which in turn will affect the future profitability. Though immediate monetary benefits are seen, long time consequences also need to be analysed before accepting such rush orders. The firm manager would need to consider both the short-run benefits from accepting the order and the long-run consequences on profitability.

Skill Based – Q24 – Relevant Cost – CA Student Journal

An apparel manufacturing company has raw material inventory of polyester fabric bales that was initially procured to be used in manufacture of shirts. Later, keeping in mind the current fashion trend, the design department suggested manufacture of cotton shirts instead. Therefore, the bales of polyester fabric are now not required. It was procured at ₹1,00,000 few months back, the scrap value if sold in the external market would be ₹45,000 (alternative 1). The fabric has alternative uses:

Alternative 2:

The material can be used to make polyester jackets. This would require the following additional work and materials:

Material A	500 bales of material
Material B	1,000 units
Direct Labor	3,000 hours unskilled
	2,000 hours semi-skilled
	1,000 hours highly skilled
Extra selling and delivery expenses	₹50,000
Extra advertising	₹25,000

This conversion can produce 1,000 units of polyester jackets that can be sold at ₹400 each. Material A is already in stock and widely used within the company. Although present stock will be sufficient to meet normal production requirements, extra material used to facilitate alternative will need to be replaced immediately. This will avoid any loss due to stock out of Material A for the products under regular production. Material B is an imported dye item, which cannot be very easily procured due to import restrictions. At present Material B is used in the production of high-end fashion clothing that on an average gives a gross contribution of ₹750 per unit of such clothing (without the cost of Material B). Each unit high-end fashion clothing requires 5 units of Material B.

	Material A	Material B
Acquisition cost at the time of purchase	₹87 per bale	₹75 per unit
Net realizable value	₹85 per bale	₹45 per unit
Replacement cost	₹90 per bale	---

Alternative 3:

The company also manufactures curtains for which it uses polyester fabric of a different variety and texture. The bale of polyester fabric currently lying as obsolete inventory can also be used as a substitute to the regular polyester material that is used to make curtains. For this, certain modifications to the texture are required to be done along with certain other procedures that will make the material suitable for utilization in curtain production.

The substitute will contribute towards production of about ~10% of the monthly curtain production. The following would be the additional work and material required:

Material C	1,000 units
Direct Labor	1,500 hours unskilled 500 hours semi-skilled 500 hours highly skilled

In a month, 15,000 bales of regular polyester fabric used for curtain production is procured at a rate of ₹80 per bale. This month, due to the substitution, only 13,000 bales of regular polyester fabric would be required. With reduced procurement for the current month, the supplier will reduce the bulk discount given on regular purchases. Accordingly, the procurement rate of regular polyester fabric will be at a rate of ₹85 per bale for the current month.

Material C has to be made in-house since it cannot be procured as such from the external market. The standard cost per unit of Material C would be as follows:

Direct labor, 2 hours unskilled labor	₹10
Raw materials	₹09
Variable overhead: 1 hours at ₹1 per hour	₹01
Fixed overhead: 1 hours at ₹3 per hour	₹03
Total standard cost of production	₹23

The wage rate and overhead recover rates for the company are as follows:

Variable overhead	₹1 per direct labor hour
Fixed overhead	₹2 per direct labor hour
Unskilled labor	₹5 per direct labor hour
Semi-skilled labor	₹10 per direct labor hour
Skilled labor	₹15 per direct labor hour

The unskilled labor can be procured on contract basis to meet the exact production requirements. The contract expires once the work is done. Semi-skilled labor is part of the permanent labor force, but the company has excess supply of this type of labor at the present time. Highly skilled labor is in short supply and cannot be increased significantly in the short term. This labor force is presently engaged in

the manufacture of upholstery. Each unit of upholstery requires 4 hours of highly skilled labor. The contribution from sale of each unit of upholstery is ₹36. To cater Alternative 2 or 3, they need to discontinue production of upholstery until the work is completed.

Required

Present cost information by giving detailed ANALYSIS whether the obsolete bale of polyester fabric should be sold (Alternative1), used production of jackets (Alternative2) or used as a substitute for curtain cloth production (Alternative 3).

Solution

The textile company has to take a decision whether to–

- (i) sell the bale of obsolete polyester fabric;
- (ii) produce jackets by using this obsolete polyester fabric; or
- (iii) use obsolete polyester fabric as substitute for curtain cloth production.

To make a decision, the company has to consider the relevant cost for each option, along with any additional expenses that need to be incurred. The alternative that yields the highest cash contribution/benefit should be chosen.

Alternative 1: If obsolete bale of polyester fabric is sold as scrap in the external market it would yield cash return of ₹45,000. The original procurement cost is a sunk cost that needs to be ignored.

Alternative 2: Utilize the obsolete polyester fabric to make jackets. In addition to the polyester material, Material A and B would be added to the production process. It would also require the work of additional labor.

Calculation of net cash contribution from Alternative 2:

Particulars	Amount (₹)
Sales proceeds (1,000 jackets × ₹400 each)	4,00,000
Material A (note 2.1)	45,000
Material B (note 2.2)	1,50,000
Direct labor - unskilled (note 2.3)	15,000
Direct labor - semiskilled (note 2.4)	-
Direct labor - highly skilled (note 2.5)	24,000
Variable overhead (note 2.6)	6,000
Extra selling and delivery	50,000
Extra advertising	25,000
Net contribution	85,000

Note 2.1: Material A is already in stock and widely used within the company. However, if this is used to make jackets as per alternative 2, it has to be replaced immediately so that other normal production activities are not impacted. Therefore, the relevant cost for Material A would be its current

replacement cost at ₹90 per bale. Alternative 2 uses 500 bales of Material A. Therefore, relevant cost = 500 bales × ₹90 per bale = ₹45,000.

Note 2.2: Material B is a scarce material due to import restrictions. It can alternatively be used to make high-end fashion apparel. Gross contribution from high-end apparel clothing is ₹750 per unit sold. Each unit requires 5 units of Material B. Therefore, the gross contribution per unit of Material B would be ₹750 / 5 = ₹150.

Alternative 2 uses 1,000 units of Material B. Therefore, relevant cost = 1,000 units × ₹150 per unit of Material B = ₹1,50,000.

Note 2.3: Unskilled labor is hired on contract basis to meet exact production requirements. The contract expires once the work is done. Relevant cost = payment made to labor hired specially for this purpose = 3,000 hours × ₹ 5 per hour = ₹15,000.

Note 2.4: Semi-skilled labor is part of the permanent labor force, but the company has excess supply of this type of labor at the present time. This means that there is spare capacity within this workforce, their idle time can be used towards making jackets as per Alternative 2. Therefore, there is no additional cost incurred for the 2,000 hours of work needed for Alternative 2. Therefore, relevant cost = nil.

Note 2.5: Skilled labor is a scarce resource, additional labor cannot be hired easily in the short term. Therefore, relevant cost will include the payment made for the current work plus opportunity cost incurred due to diverting this scarce resource. Each unit of upholstery requires 4 hours of highly skilled labor. The contribution from sale of each unit of upholstery is ₹36. Therefore, the contribution per hour of highly skilled labor is ₹36 / 4 = ₹9 per hour of skilled labor. Alternative 2 requires 1,000 hours of skilled labor. Therefore, opportunity cost = 1,000 hours × ₹9 per hour = ₹9,000. In addition, the skilled labor is paid ₹15 per hour, the pay for making jackets as per alternative 2 = 1,000 hours × ₹15 per hour = ₹15,000.

Relevant cost = opportunity cost + pay = ₹9,000 + ₹15,000 = ₹24,000.

Note 2.6: Variable overhead cost will be ₹1 per direct labor hour. Direct labor hours will equal the hours spent by unskilled, semi-skilled and highly skilled labor = 3,000 + 2,000 + 1,000 hours = 6,000 hours. Therefore, variable overhead cost = 6,000 hours × ₹1 per hour = ₹6,000.

Alternative 3: Use the obsolete bales of polyester fabric as a substitute to make curtain cloth material.

In addition to the obsolete bales of polyester fabric, this would require in-house manufacture of Material C, in addition to extra labor. The change in procurement rate of input regular polyester material should also be considered.

Calculation of net cash contribution from Alternative 3:

Particulars	Amount (₹)
Net savings in procurement cost for the current month (note 3.1)	95,000
Material C (Note 3.2)	20,000
Direct Labor - unskilled (note 3.3)	7,500
Direct Labour - semiskilled (note 3.4)	-
Direct Labour - highly skilled (note 3.5)	12,000
Variable overhead (note 3.6)	2,500
Net contribution	53,000

Note 3.1: In a month, 15,000 bales of regular polyester fabric used for curtain production are procured at a rate of ₹80 per bale. This month, due to the substitution, only 13,000 bales of regular polyester fabric would be procured at a higher procurement rate of ₹85 per bale for the current month.

The original cost of procurement = 15,000 bales × ₹80 per bale = ₹12,00,000
 Cost of procurement for current month = 13,000 × ₹85 per bale = ₹11,05,000
 Therefore, savings in procurement cost due to substitution = ₹ 95,000

Note 3.2: Cost of in-house production of Material C. Material C costs ₹23 per unit to be produced internally. Fixed overhead cost of ₹3 per unit has to be ignored since it is a sunk cost for this decision. Therefore, for analysis, the in-house cost of production of Material C would be ₹20 per unit. Alternative 3 requires 1,000 units of Material C. Therefore, the cost of Material C = 1,000 units × ₹20 per unit = ₹20,000.

Note 3.3: Unskilled labor is hired on contract basis to meet exact production requirements. The contract expires once the work is done. Relevant cost = payment made to labor hired specially for this purpose = 1,500 hours × ₹ 5 per hour = ₹ 7,500.

Note 3.4: As explained in note 2.4 above, there is no additional cost in the utilization of semi- skilled labor force. Their idle time is used towards this extra production as per Alternative 2 or Alternative 3. Therefore, there is no additional cost incurred for the 500 hours of work needed for Alternative 3. Therefore, relevant cost = nil.

Note 3.5: As explained in note 2.5 above, skilled labor is paid at ₹15 per hour for this work. The opportunity cost of diverting this scarce resource from regular production of upholstery material is ₹9 per hour. Therefore, relevant cost for alternative 3 = 500 hours × (₹15 + ₹9) per hour = 500 × ₹24 per hour = ₹12,000.

Note 3.6: Variable overhead cost will be ₹1 per direct labor hour. Direct labor hours will equal the hours spent by unskilled, semi-skilled and highly skilled labor = 1,500 + 500 + 500 hours = 2,500 hours. Therefore, variable overhead cost = 2,500 hours × ₹1 per hour = ₹2,500

To summarize the net cash contribution from various alternatives:

Alternative 1: sell as scrap → ₹45,000.

Alternative 2: Make of 1,000 jackets → ₹85,000

Alternative 3: Substitute in curtain cloth production → ₹53,000.

Conclusion: Alternative 2 yields the highest net cash contribution. Therefore, the obsolete inventory should be used to make polyester jackets.

Skill Based – Q25 – Manufacture or Sub Contract (July 21 ICAI Exam)

DAC manufactures 'motor rotors' in two operations: casting and bonding. Following information is furnished:

	Casting	Bonding
Annual capacity	75,000 units	60,000 units
Annual production	60,000 units	60,000 units
Fixed operating costs (excluding direct materials)	Rs 2,40,00,000	Rs 1,50,00,000
Fixed operating costs per unit produced (Rs. 2,40,00,000/ 60,000 units, Rs. 1,50,00,000/ 60,000 units)	Rs 400	Rs 250

Each motor rotor sells for Rs 3,600 and has direct material costs of Rs 1,600 incurred at the start of the casting operation. DAC has no other variable costs. DAC can sell whatever output it produces. The following requirements refer only to the preceding data. There is no connection between the requirements.

Required

ANALYSE the following situations independently:

- (i) DAC is considering using some modern jigs and tools in the bonding operation that would increase annual bonding output by 750 units. The annual cost of these jigs and tools is Rs. 11,25,000. Should DAC acquire these tools ?
- (ii) The production manager of the casting department has submitted a proposal to do faster setups that would increase the annual capacity of the casting department by 7,500 units and would cost Rs. 1,87,500 per year. Should DAC implement the change?
- (iii) An outside contractor offers to do the bonding operation for 9,000 units at Rs. 500 per unit, double the Rs. 250 per unit that it costs DAC to do the bonding in-house. Should DAC accept the subcontractor's offer ?
- (iv) XYZ company offers to do casting process for 3,000 units at Rs. 200 per unit, half the 400 per unit that it costs DAC to do the casting process in-house. Should DAC accept XYZ company's offer ?
- (v) Assume, DAC produces 1,500 defective units at the casting operation. What is the cost to DAC of the defective items produced?
- (vi) Assume, DAC produces 1,500 defective units at the bonding operation. What is the cost to DAC of the defective items produced ?

Solution

(i) Bonding is a bottleneck operation. Therefore, producing 750 more units will generate additional throughput contribution and operating income.

Increase in throughput contribution $(3,600-1,600) \times 750 = \text{Rs. } 15,00,000$ Incremental costs of the Jigs and tools = Rs. 11,25,000

Net benefits of investing in Jigs and tools = Rs. 3,75,000

DAC should invest in the modern Jigs and tools because the benefit of higher throughput contribution of Rs. 15,00,000 exceeds the cost of Rs. 11,25,000.

(ii) The Casting department has excess capacity and is not a bottleneck operation. Increasing its capacity further will not increase throughput contribution. There is, therefore, no benefit from spending Rs 1,87,500 to increase the Casting department capacity by 7,500 units. DAC should not implement the change to do setup faster.

(iii) Bonding is a bottleneck operation. Therefore, getting an outside contractor to produce 9,000 units will increase throughput contribution:

Increase in throughput contribution $(3,600-1,600) \times 9,000 = \text{Rs. } 1,80,00,000$

Incremental contracting costs $500 \times 9,000 = \text{Rs. } 45,00,000$

Net benefit of contracting 9,000 units of Bonding = Rs 1,35,00,000

DAC should contract with an outside contractor to do 9,000 units of Bonding at Rs 500 per unit because the benefit of higher throughput contribution of Rs 1,80,00,000 exceeds the cost of Rs 45,00,000. The fact that the cost of Rs 500 per unit is double DAC's Bonding cost of Rs 250 per unit is irrelevant.

(iv) Operating costs in the Casting department of Rs 2,40,00,000 or Rs 400 per unit, are fixed costs. DAC will not save any of these costs by subcontracting Casting of 3,000 units to XYZ. Total costs will be greater by Rs 6,00,000 (Rs 200 per unit \times 3,000 units) under the subcontracting alternative. Casting more 'motor rotors' will not increase throughput contribution, which is constrained by the Bonding capacity. DAC should not accept XYZ's offer. The fact that XYZ's cost of Casting per unit are half of what it costs. DAC in house is irrelevant.

(v) Cost of defective units at Casting operation which is not a bottleneck operation is the loss in direct materials of Rs 1,600 per unit. Producing 1,500 units of defectives does not result in loss of throughput contribution. Despite the defective production, Casting can produce and transfer 60,000 units to Bonding. **Therefore, cost of 1,500 defective units at the Casting operation is $1,600 \times 1,500 = \text{Rs } 24,00,000$.**

(vi) A defective unit produced at the bottleneck Bonding operation costs DAC material costs plus the opportunity cost of lost throughput contribution. Bottleneck capacity not wasted in producing defective units could be used to generate additional sales and throughput contribution. Cost of 1,500 defective units at the Bonding operation is:

Loss of direct materials $1,600 \times 1,500 = \text{Rs } 24,00,000$

Foregone throughput contribution $(3,600-1,600) \times 1,500 = \text{Rs } 30,00,000$

Total cost of 1,500 defective units Rs 54,00,0000

Alternatively, the cost of 1,500 defective units at Bonding operation can be calculated as the lost revenue of $3,600 \times 1,500 = \text{Rs } 54,00,000$. This line of reasoning takes the position that direct material cost of $1,600 \times 1,500 = \text{Rs } 24,00,000$ and all fixed operating costs in the Casting and Bonding operations would be incurred any way whether a defective or good unit is produced. The cost of producing a defective unit is the revenue lost Rs 54,00,000.

Skill Based – Q 26 – Make or Buy – July 21 ICAI Exam

RST Herbals (P) Limited, which manufactures and sells a highly successful line of herbal home care and herbal personal care products, has decided to diversify in order to stabilize sales throughout the year.

The company is considering venturing into manufacture of natural health care products. After considerable research, the natural health care products line has been developed. However, the CEO of the company has decided to introduce only one of the new products during the next month. If the product is success, further expansion in future years will be initiated.

The product selected is an immunity booster drink 'IM9' that will be sold in small glass bottles. The product will be sold to wholesalers in boxes of 24 glass bottles for Rs. 240 per box. Because of excess capacity, no additional fixed manufacturing overhead costs will be incurred to produce the product. However, a Rs. 27,00,000 charge for fixed manufacturing overhead will be absorbed by the product under the company's absorption costing system.

Using the estimated sales and production of 1,00,000 boxes of 'IM9', the Costing Department has developed the following cost per box:

Direct material	Rs. 108
Direct labour	Rs. 60
Manufacturing overhead	Rs. 42
Total cost	Rs. 210

The costs above include costs for producing both the immunity booster drink and the small bottle that contains it. As an alternative to making the small bottles, RST has approached a supplier to discuss the possibility of purchasing the bottles for 'IM9'. The purchase price of the empty bottles from the supplier would be Rs. 40.5 per box of 24 bottles. If RST accepts the purchase proposal, direct labour and variable manufacturing overhead costs per box of 'IM9' would be reduced by 10% and direct materials costs would be reduced by 25%.

Required

ANALYSE the following situations- (i) to (iv):

(i) Should RST Herbals make or buy the bottles?

(ii) What would be the maximum purchase price acceptable to RST Herbals?

(iii) Instead of sales of 1,00,000 boxes, revised estimates show a sales volume of 1,20,000 boxes. At this new volume, additional equipment must be acquired to manufacture the bottles at an annual rental of Rs. 12,00,000. Assuming that the outside supplier will not accept an order for less than 1,00,000 boxes, should RST Herbals make or buy the bottles ?

(iv) Refer to the data in (iii) above. Assume that the outside supplier will accept an order of any size for the bottles at Rs. 48 per box. How, if at all, would this change your answer?

(v) ADVISE qualitative factors should RST consider in determining whether they should make or buy the bottles?

Solution

(i) RST Herbals is not operating at capacity and will not be required to incur additional manufacturing overhead costs (fixed portion) to produce the bottles/ product. Therefore, make-or-buy decisions must be based on the relevant cost of each option which includes all incremental cash flows. Refer below calculations, the company would be able to save Rs. 6.00 per box from manufacturing at desired production level of 1,00,000 boxes or in total Rs. 6,00,000. Therefore, RST Herbals should manufacture the bottles.

	Relevant 'Make' Cost/ box	Relevant 'Buy' Cost/ box
Direct Material	27.00	---
Direct Labour	6.00	---
Manufacturing Overhead (variable*)	1.50	---
Empty Bottles	---	40.50
Total	34.50	40.50

*Manufacturing overhead of 'IM9' is Rs. 42 per box, this includes absorbed overhead of Rs 27(=27,00,000/1,00,000). Therefore, variable manufacturing overhead will be Rs. 15 per box.

(ii) The problem asks for the minimum purchase price. The context of the problem implies that the maximum purchase price is what was really required. RST Herbals would not pay more than Rs. 34.50 each because that is the cost to make the product internally. Obviously, the company would be willing to pay any amount which is less than Rs. 34.50.

(iii) For revised volume of 1,20,000 boxes, the relevant manufacturing cost per box will be increased by Rs. 10 per box. In that case the company would be able to save Rs. 4.00 per box from buying outside (34.50+10.00-40.50). Therefore, it is better to purchase from outside rather entirely producing inhouse. Total benefits on account of buying from outside would be Rs. 4,80,000. However, if company decides for partial manufacturing in house, production will give the lowest cost since the company would be able to save the additional equipment cost of Rs. 12,00,000 but company have to pay Rs. 6 per box extra on 1,00,000 boxes (i.e., minimum order volume). Total benefits on account of partial manufacturing (vs. full manufacturing) would be Rs. 6,00,000. Refer below working-

In- house Production	1,20,000	---	20,000
Outside Purchase	---	120,000	1,00,000 (minimum)
Relevant Make Cost	41,40,000 (@34.50) 12,00,000 (additional)	---	6,90,000 (@34.50)
Relevant Buy Cost	---	48,60,000 (@40.50)	40,50,000 (@ 40.50)
Total	53,40,000	48,60,000	47,40,000

Therefore, RST Herbals should make 20,000 units and buy 1,00,000 units.

(iv) If outside supplier agrees to accept an order of any size for the bottles, the company may enhance its production to 1,00,000 boxes (i.e., the level, beyond this it has to incur additional equipment annual rental cost*) from the in-house production level as arrived in point (iii) i.e., 20,000 boxes. Thus, for balance requirement beyond 1,00,000 boxes, company have to buy at higher rate of Rs. 48 which is Rs. 7.5 over and above the current supply rate of Rs. 40.5. Accordingly, it will incur additional cost of Rs. 1,50,000 (7.5×20,000) and simultaneously it will be able to save Rs. 4,80,000 i.e., Rs. 6 per unit on

additional in- house production of 80,000 boxes. In total, it will save Rs. 3,30,000 from the optimal cost level as arrived in option (iii).

Now the total cost under this scenario would be Rs 44,10,000/- which is the lowest cost at 1,20,000 boxes level.

In- house Production	1,00,000 (maximum)*
Outside Purchase	20,000 (minimum)
Relevant Make Cost	34,50,000 (@34.50)
Relevant Buy Cost	9,60,000 (@ 48.00)
Total	44,10,000

**Assumed for any additional unit over and above 1,00,000 units, additional equipment investment will be required.*

Hence, RST Herbals should make 1,00,000 units and buy 20,000 units.

(v) Currently RST Herbals is manufacturing herbal home care and herbal personal care products. It seems that the existing product line is highly competitive. Usually, a company with highly competitive product line/ (s) may decide to make its own products as a way to reduce cost-price squeeze. However, companies looking for expansion may opt for outsourcing. The reason is that the company can use its money (or cash flows) more profitably to expand its product lines rather than investing in equipment, materials, and additional space for making products. RST Herbals has decided to diversify* by venturing into natural health care products. Consequently, the CEO has opted to introduce immunity booster drink "IM9" with plans for further expansions. In this scenario, RST Herbals may easily outsource non-core activities i.e., manufacturing of the bottles to create a scope of further expansion. In addition, buying of bottles to a certain extent is also justified by the economic factors also.

Overall, the decision of make (in-house) versus buy (outsource) should not be made without careful analysis, a variety of factors and risks are required to be taken into consideration.

**Diversification – new product and new market (Ansoff Matrix)*

Skill Based – Q31 – Relevant Costing – RTP Nov'21 (Q4)

Felicity Ltd. is a chemical manufacturing company. It has received a special project that needs to be completed executed 3 months from the time it is accepted. The management has to communicate its acceptance or rejection of the project within few days. They have approached you, the management accountant to work out the costing for this project. Following is the information available:

1. Financing:

The company would require a short-term overdraft of Rs. 5,00,000 immediately in order to execute the project. Bank charges an interest of 10% per annum on this overdraft. This overdraft facility would be needed for the duration of the project, that is 3 months and would be repaid in full at the end of the period.

2. Materials:

Felicity Ltd. has a stock of inventory of 5,000 kg on hand that is not of immediate use. It can be sold as scrap in the market at Rs. 250 per kg. The special project requires 3,000 kg of this inventory which can be replaced at the current market price of Rs. 300 per kg.

3. Labour:

(a) All skilled workers currently work full time in their respective departments, there are no idle hours. For this special project, 5 workers would be needed from other departments. They would totally devote 2,000 hours of labour time to this project. The cost of labour per hour is Rs. 300. Since their working hours have been diverted to this project, the production in the other departments cannot be met. Hence, the company would incur a loss of contribution of Rs. 1,00,000 for these 2,000 hours. Alternatively, the company can outsource the labour for this special project at a total cost of Rs. 625,000. The management will opt for the more cost-effective option as the quality of both in-house manufacturing and outsourcing is the same.

(b) Overtime payment to inspection supervisor, who checks the final products would be Rs. 25,000. This would be incurred irrespective of whether the labour is in-house or outsourced.

4. Machine X-2.1"

This project would require the use of an existing machine X-2.1". Depreciation of X-2.1" is Rs. 40,000 per annum. The variable operating cost of X-2.1" for the three-month period would be Rs. 3,00,000. At present, X-2.1" is operating at full capacity. By diverting it exclusively for the special project would cost the company a loss of contribution of Rs. 1,00,000 for the three-month period.

5. Administration overheads include apportionment cost of Rs. 25,000 and an incremental cost (incurred specifically due to the acceptance of the project) of Rs. 10,000.

6. Total revenue that the company can earn from the project is Rs. 20,00,000.

Required

COMMENT whether the special project should be accepted or not. Also give a complete ANALYSIS of the special project cost based on the principles of relevant costing.

Solution**Special Project Cost**

Item of Cost	Comments / Working	Amount (Rs.)
Project financing: Interest of overdraft	Interest @10% on overdraft of Rs. 5,00,000 for 3 months [10% × Rs. 5,00,000 × (3months / 12 months)] (Refer note 1)	12,500
Materials	(Refer note 2)	7,50,000
Labour		
Outsourced labour cost	(Refer note 3)	6,25,000
Overtime paid to inspection supervisor	(Refer note 4)	25,000
Overheads	(Refer note 5)	
(a) Operating cost of machinery for special project	3 months	3,00,000
(b) Opportunity cost of diverting X-2.1" machine	Contribution lost Rs. 1,00,000 for 3 months	1,00,000
Administration overheads	Incremental cost (Refer note 6)	10,000
Total cost for accepting the project		18,22,500

Comment

Revenue to be earned from the project is Rs. 20,00,000 while the cost of accepting the project would be Rs. 18,22,500. The project can yield a surplus of Rs. 1,77,500. Therefore, the special project can be accepted.

Notes

Note 1: Project financing for 3 months through overdraft of Rs. 5,00,000 at interest of 10% per annum.

This is a relevant cost since it is an incremental cost to be incurred only if the project is accepted. The incremental cost is the interest to be paid on the overdraft of Rs. 5,00,000 for 3 months. At the end of three months, the overdraft will be repaid in full, therefore there will be no further incremental cost.

Note 2: Material cost

The company already has material worth 5,000 kg in its inventory. This is a sunk cost that has already been incurred. Materials requirement for this project is 3,000 kg which can be sourced from the current inventory of 5,000 kg. This material could have been sold as scrap at Rs. 250 per kg. However, since 3,000 kg of this material can be used for this project, the sale proceeds from the scrap sale of 3,000 kg would be the opportunity cost that has to be accounted for. This is the cash inflow forgone if the project is accepted.

Replacement cost of 3,000 kg at Rs. 300 per kg would be irrelevant since there is no need to buy this material, it is already in inventory. Also the material has no further immediate use, so there is no need to replace it.

Note 3: Labour cost – cost of in-house production vs cost of outsourcing the work for the project

Five skilled workers from other departments would need to devote 2,000 hours for this project. They are paid at Rs. 300 per hour. They are fully working in their respective departments and are not idle. The cost of labour of these 5 workers for 2,000 hours would be a relevant cost for the project.

Total hours by 5 skilled workers = 2,000 hours Rate per hour = Rs. 300 per hour

Labour cost for in house skilled workers= 2,000 hours × Rs. 300 per hour = Rs. 6,00,000

To this, the loss of contribution for diverting the skilled workers' hours for the project represents an opportunity cost that is a relevant cost. This is the revenue forgone if the project is undertaken.

Total labour cost for in house production

= cost of skilled workers + contribution lost (opportunity cost)

= Rs. 6,00,000 + Rs. 1,00,000 = Rs. 7,00,000

The cost of outsourcing the work for this project is Rs. 6,25,000. Since the quality of work is the same under both options it is cost effective to outsource the labour for this special project. Therefore, the relevant cost for the special project is Rs. 625,000.

Note 4: Overtime paid to inspection supervisor

Overtime paid to inspection supervisor specially for this project is an incremental cost, a relevant cost.

Note 5: Machine X-2.1"

The operating cost of X-2.1” Rs. 3,00,000 is an incremental cost, therefore a relevant cost. The depreciation of Rs. 40,000 per annum on it is a sunk cost and hence not relevant.

This machine X-2.1” works at full capacity, no idle time. Hence the contribution loss of

Rs. 1,00,000 for the three-month period due to this diversion will be an opportunity cost that has to be accounted for. This is revenue forgone if the project is accepted.

Note 6: Administrative overhead

Allocation of administrative overhead of Rs. 25,000 is not a relevant cost since this is a sunk cost already incurred. Incremental administrative cost of Rs. 10,000 incurred specifically for the project is a relevant cost and hence has to be accounted for.

Skill Based Q.36 – Continue or Shut Down

Micro-Guard Industries Limited (MGIL) is a renowned company for a unique range of thoughtfully-engineered products, designed to provide simplified solutions and upscale your home interiors. MGIL engaged in the manufacturing of Power Systems, Batteries, Wires & Cables, Switch Gears & Modular Switches etc. But MGIL is largely famous for its wide range of Voltage Stabilizers. Each product is manufactured in a separate division.

While planning regarding voltage stabilizers division (VSD) for the first half of the fiscal year 20-21 amid the outbreak of COVID-19, the board get through a report from internal expert committee pertaining to crystal series of voltage stabilizers which says– ‘due to restricted availability of the input factors (on account of lock-down by the government), only 40,000 crystal voltage stabilizers (CVS) is expected to manufactured and sold during the first half of fiscal, against the normal capacity of 75,000 per quarter; that too at Rs 1,600/- per CVS’. At normal capacity level it incurs the following cost to manufacture and sell single unit of CVS–

Particulars	Amount (Rs.)
Direct material	575
Direct labour	215
Variable overhead	310
Fixed overhead	300
Cost per unit	1,400

One of the directors suggested– ‘since migrant workers moved to their home states and expected to come back in 3-5 months’ time hence it is better to temporary discontinue (lock- out) the production for the first half of fiscal’. Another director support him by stating– ‘it will give the opportunity to our suppliers (or retailers) to clear the old stock available with them’. On the reference by the board, you (chief management accountant at MGIL) provide an estimate to management that 1/3rd fixed overhead at a normal capacity level is unavoidable and additional cost due to discontinue (lock-out) of plant for 6 months and resumption thereafter is Rs. 35 lacs.

Required

You are required to ADVISE the management–

(i) Shall they continue the production of CVS or temporary discontinue (lock-out) for the first half of the fiscal year? (consider monetary aspects)

(ii) The qualitative factors which need to consider, while deciding either discontinue (lock-out) or continue.

(iii) What are the minimum number of CVS that VSD needs to manufacture and sell; in order to economically justify the continuation of the production?

Note– In a legal sense, Lock-out means the temporary closing of a place of employment or the suspension of work, or the refusal by an employer to continue to employ any number of persons employed by him; which is way different from shut-down. But in management accounting lock-out and shutdown both carry the same meaning.

Solution

(i) The loss in case of temporary discontinue is Rs. 185 lakhs which is less than the loss in case of continuing the production of CVS (i.e., 250 lakhs), hence considering monetary aspects it is advised to discontinue (lock-out) the production of CSV for the first half of the fiscal year 2020-21.

Comparative Cost and Benefit for the first half of the fiscal year 2020-21

Continue – 40,000 units		Dis-continue (Lock-out)	
Particulars	Amount in Rs.	Particulars	Amount in Rs.
Contribution (500×40,000units)	200 Lakhs	Additional Cost (resumption)	35 Lakhs
Fixed Cost	450 Lakhs	Fixed Cost (unavoidable)	150 Lakhs
Loss	250 Lakhs	Cost	185 lakhs

Working note 1 – Contribution per unit

Particulars	Amount in Rs.
Sale Price	1,600
Variable Cost (575+215+310)	1,100
Contribution	500

Working note 2 – Fixed Cost & Avoidable Component

Particulars	Amount in Rs.
Total Fixed Cost for the first half [(75,000×2) units ×300]	450 Lakhs
Unavoidable (1/3rd)	150 Lakhs
Balance - Avoidable (2/3rd)	300 Lakhs

(ii) **Qualitative factors**, while deciding either discontinue (lock-out) or continue.

(a) Government advisory regarding lock-down and lock-in – MGIL is legally bound to observe and comply with government advisories regarding lock-down and lock-in.

(b) Customer relations – Discontinuing the production, even temporary may cause adverse reactions from customers, they may move to another product or brand which capable to substitute CVS. Further as per the director's opinion old stock will be cleared during such period, this may cause a loss of reputation.

(c) Supplier relations – The trade relation with suppliers of VSD/MGIL may turn bitter if supply halted. May also cause a loss of goodwill. Although the director argued that supplier can sell the old stock available with them, but it is nowhere mentioned that whether all the supplier or retailer have a requisite amount of stock in order to cater the need of their customers.

(d) Employee/Worker relations – One of the directors mentioned that migrant workers moved to their home states and expected to come back in 3-5 months. It is important to identify– how much of the workforce at VSD is migrant and what is the duration of lock-down announced by the government, is there any relaxation in the same (for example working with 1/3 or 1/2 capacity)? VSD also need to consider guideline and term of the agreement with workers, in regard to the compensation they will get, if it is decided to lock-out (temporarily discontinue the production). Apart from this, staff (or workers) morale is also an important factor to consider.

(e) Timing of shutdown – Timing (when to lock and unlock) and duration of lock-out, both are important form preview of VSD, because the kind of product in which MGIL deals either in demand during the relevant season or near festival season (during sales and bonanzas).

(f) Whether discontinuing a segment have adverse effects on the sale of other products – CVS is a complementary product to other models sold by VDS and product sold by MGIL. Hence, impact of discontinuing the production of CVS on sale of these relate products need to be considered.

(iii) In order to economically justify the decision of continuing the production, VSD need to manufacture and sell such number of CVS; so that loss (if continued) shall be less than or equal to the loss/ cost of 185 lakhs (which is due to discontinue (lock-out) of plant for the first half of fiscal 2020-21).

So, let presume 'x' is such number of CSV 450 Lakhs – $(500 \times 'x') \leq 185 \text{ Lakhs}$

$\Rightarrow 500x \geq 265 \text{ Lakhs}$ $x \geq 53,000 \text{ Units}$

Hence, VSD need to manufacture and sell at least 53,000 units of CVS; in order to economically justify the continuation of the production.

Skill Based – Q42 – Make or Buy – CA Student Journal

Mr. Venkatesh, who recently joined the Tirupati Casting and Forge Limited (TCFL) as assistant manager in the management accounting division is collecting, estimating, and arranging the information required for make vs. buy decision and pricing decision; using which chief management accountant can consider the best way to go while taking uncertainties into account and advise the management accordingly.

X-104

Balaji Enterprises (BE) ready to deliver product X-104 (in a semi-furnished state) for ₹40 under a continuous supply agreement. TCFL insists on inserting a stable price clause in the supply agreement, to which BE responds that variation will be pass on to TCFL. Finally, it was decided if the agreement

entered then the price (which is currently ₹ 40/-) shall be subject to periodical (after each quarter) review.

Y-29

TCFL is producing the product Y-29 (at full capacity) and able to sell the entire production through a network of distributors (and through retailers, in those areas where there is no distributor appointed). TCFL contacted by an e-retail platform, with a proposal; wherein the platform shows interest in offering the product Y-29 to its customers (members/ subscribers). The E-retail platform has two types of customers, "the plus" category and others. The E-retail platform will charge ₹1,300/- from "plus" category and ₹1,350/- from others, E-retail platform

has the policy to keep margin (to meet its cost and earn a profit) of 8.33% and 12.50% on the procurement cost for the sale made to "plus" category and other customers respectively. In the proposal, the E-retail platform also states the price which it can pay to TCFL; according to the requirements stated above.

Mr. Venkatesh compiled the following tables, for product X-104 and Y-29 respectively on a per unit basis–

X-104

Particulars	In-house production	Purchased from BE, there-after furnishing and re-labelling at TCFL
Selling price of product	115	112
Variable costs	73	25
Fixed costs	18	18
External purchase cost	NA	40

Y-29

Particulars	Amount in ₹
List Price	1,400
Price charge from distributors	1,225
Variable cost incurred by TCFL	870

Required

(i) COMMENT how TCFL should respond to the proposal of the e-retail platform regarding product Y-29 and ASSESS the sensitivity of such decision.

(ii) COMMENT on the make vs. buy decision regarding product X-104 and ASSESS the sensitivity of such decision to the external purchase price.

(iii) Sensitivity analysis considers partial uncertainty, ELUCIDATE.

Solution

(i) Pricing (Decision on the proposal by E-retail platform) & Sensitivity

Decision on the proposal by E-retail platform – Since the TCFL is producing the product Y-29 at full capacity and able to sell entire production through a network of distributors at ₹1,225 (results in a contribution of ₹355), hence shall not accept the proposal of the E-retail platform at the stated price of ₹1,200 (results in a contribution of ₹330) (see the statements below for the calculations).

Price stated by E-retail platform

Particulars	Plus Customer	Others
Sale price	1,300	1,350
Less- margin kept on the procurement cost	100 (i.e.8.33%)	150 (12.5%)
Procurement cost (price stated by E-retail platform)	1,200	

Comparable contribution

Particulars	If sold through distributors	If sold through E-retail platform
Selling price for TCFL	1,225	1,200
Less- Variable costs	870	870
Contribution	355	330

Sensitivity of the decision on the proposal by E-retail platform

If the contribution from each unit of Y-29 sold to the E-retail platform increased to 355 and beyond then TCFL will be indifferent, among the distributors and E-retail platform. Thus, the price stated by the E-retail platform needs to increase by ₹25 per unit (from ₹1,200 to ₹1,225) i.e., $25/1,200$ which come out to be 0.02083 or 2.083% ($25/1,200 \times 100$)

Hence, if the price stated by the E-retail platform in the proposal increase by more than 2.083% then the original decision would be reversed (because beyond that point selling through the E-retail platform will become more profitable for TCFL).

(ii) Make vs. Buy Decision & Sensitivity Analysis

Make vs. Buy Decision – Since the contribution is ₹47 when the product X-104 is purchased from BE and then furnishing and re-labelling done at TCFL, in comparison to ₹42 when it is produced in-house (see the calculation below); hence it is beneficial to buy the product X-104.

Comparable contribution

Particulars	In-house production	Purchased from BE, there-after furnishing and re-labelling at TCFL
Selling price of product	115	112
Less- Variable costs	73	25
Less- External purchase cost	-	40
Contribution	42	47

Sensitivity to the external purchase price

To be indifferent, among the in-house production and buying from BE, the contribution from the product X-104 when it is purchased from BE needs to fall to ₹42 per unit. Thus, the external purchase cost needs to increase by ₹5 per unit (from ₹40 to ₹45) i.e., $5/40$ which come out to be 0.125 or 12.5% ($5/40 \times 100$). Hence, if the external purchase price increased by more than 12.5% the original decision would be reversed (because beyond that point buying from BE will not remain beneficial).

(iii) Sensitivity analysis is capable to incorporate uncertainty into decision making (by taking each uncertain factor in turn), and also calculates the change (percentage change – relative measure hence comparison of importance among factors become easy) that is minimally required in factor(s) before the original decision is reversed.

Since sensitivity analysis considers uncertainly related to each factor in turn, hence where multiple factors changing simultaneously; it has no utility. Apart from this, sensitivity analysis only calculates the change that is minimally required in factor before the decision is reversed; but it does not consider or calculates the probability of such a change. Hence statement 'sensitivity analysis considers partial uncertainty' seems correct.