|  |  |
| --- | --- |
| **2** | **Modern Business Environment** |

**Total Quality Management**

Q2: Supreme Prakashan Ltd. is in the business of publishing a leading newspaper which has a wide customer base. It measures quality of service in terms of

(i) Print quality

(ii) On time delivery

(iii) Number of damaged and unsold paper

To improve its business prospects and performance, the company is considering installing a scheduling and tracking system which involve an annual additional cost of ` 3,00,000 beside equipments costing ` 4,00,000 needed for the installation of system.

To purchase the equipment, company is planning to utilise the proceeds of an investment fetching an annual income @ of 9%.

Details regarding the present and future performance are given as under—

|  |  |  |
| --- | --- | --- |
|  | **Present** | **Expected** |
| On-time delivery | 85% | 97% |
| Variable cost per lost of newspaper damaged and unsold | ` 40 | ` 40 |
| Fixed cost | 50,000 | 50,000 |
| No. of lots of newspaper damaged and unsold | 6,000 | 1,000 |

It is expected that each percentage increase in on time performance will result in revenue increase of ` 36,000 per annum. Required contribution margin is 40%.

Should Supreme Prakashan Ltd. install the new system?

**Solution:**

**Should Supreme Prakashan Ltd. Install the New System?**

|  |  |
| --- | --- |
| ` | |
| Additional Costs of the New Scheduling & Tracking System p.a. | 3,00,000 |
| Equipment - Opportunity Cost (`4,00,000 × 9%) | 36,000 |
| …(A) | 3,36,000 |
| Contribution from Additional Annual Revenue (40% × ` 4,32,000\*) | 1,72,800 |
| Cost Saving in respect of Lots of Newspapers [(6,000 - 1,000) × ` 40] | 2,00,000 |
| …(B) | 3,72,800 |
| Net Benefits …(B) (A) | 36,800 |

(\*) [` 36,000 × 12%/1%]

By installing the scheduling and tracking system, the company will be able to save ` 36,800 per annum. Hence, the company should install the new system.

❖ ❖ ❖

Q3: A company produces and sells a single product. The cost data per unit for the year 2017 is predicted as below:

|  |  |
| --- | --- |
| ` per unit | |
| Direct material | 35 |
| Direct labour | 25 |
| Variable overheads | 15 |
| Selling price | 90 |

The company has forecast that demand for the product during the year 2017 will be 28,000 units. However to satisfy this level of demand, production quantity will be increased?

There are no opening stock and closing stock of the product.

The stock level of material remains unchanged throughout the period.

The following additional information regarding costs and revenue are given: 12.5% of the items delivered to customers will be rejected due to specification failure and will require free replacement. The cost of delivering the replacement item is ` 5 per unit.

20% of the items produced will be discovered faulty at the inspection stage before they are delivered to customers.

10% of the direct material will be scrapped due to damage while in storage. Due to above, total quality costs for the year is expected to be ` 10,75,556.

The company is now considering the following proposal:

To introduce training programmes for the workers which, the management of the company believes, will reduce the level of faulty production to 10%. This training programme will cost   
` 4,50,000 per annum.

To avail the services of quality control consultant at an annual charges of ` 50,000 which would reduce the percentage of faulty items delivered to customers to 9.5%.

**You are required to:**

(i) Prepare a statement of expected quality costs the company would incur if it accepts the proposal. Costs are to be calculated using the four recognised quality costs heads.

(ii) Would you recommend the proposal? Give financial and non-financial reasons.

**Solution:**

**Statement Showing ‘Expected Quality Costs’**

|  |  |  |
| --- | --- | --- |
| **Particulars** | **Current Situation (`)** | **Proposed Situation (`)** |
| Prevention Costs | — | 4,50,000 |
| Appraisal Costs | — | 50,000 |
| External Failure Costs | 3,20,000 | 2,35,120 |
| Internal Failure Costs | 7,55,556 | 3,91,538 |
| Total Quality Costs | 10,75,556 | 11,26,658 |

**Workings**

**External Failure Cost**

| **Particulars** | **Current  Situation** | **Proposed Situation** |
| --- | --- | --- |
| Customer’s Demand …(A) | 28,000 units | 28,000 units |
| Number of units Dispatched to Customers …(B) | 32,000 units | 30,939 units |
| Number of units Replaced …(B) – (A) | 4,000 units | 2,939 units |
| External Failure Cost  {4,000 units × ` (35+25+15+5)};  {2,939 units × ` (35+25+15+5)} | ` 3,20,000 | ` 2,35,120 |

**Internal Failure Cost**

| **Particulars** | **Curren Situation** | **Propose Situation** |
| --- | --- | --- |
| Number of units Dispatched to Customers …(A) | 32,000 units | 30,939 units |
| Number of units Produced & Rejected …(B) | 40,000 units | 34,377 units |
| Number of units Discovered Faulty … (B) – (A) | 8,000 units | 3,438 units |
| Cost of Faulty Production …(D)  {8,000 units × ` (35+25+15)};  {3,438 units × ` (35+25+15)} | ` 6,00,000 | ` 2,57,850 |
| Material Scrapped | 4,444.44 units | 3,819.67 units |
| Cost of Material Scrapped …(E)  {4,444.44 units × ` 35}; {3,819.67 units × ` 35} | ` 1,55,556 | ` 1,33,688 |
| Internal Failure Cost …(D)+(E) | ` 7,55,556 | ` 3,91,538 |

❖ ❖ ❖

**Q4: In the context of quality costs, customer compensation costs and test equipment running costs would be classified as:**

|  |  |  |
| --- | --- | --- |
|  | **Customer compensation costs** | **Test equipment running costs** |
| A | Internal failure costs | Prevention costs |
| B | Internal failure costs | Appraisal costs |
| C | External failure costs | Appraisal costs |
| D | External failure costs | Prevention costs |

**Answer**: **C**

External failure costs are those incurred due to poor quality of goods delivered to customers; therefore this includes compensation costs.

Appraisal costs are those incurred in the measuring of quality of output; therefore this includes test equipment running costs.

❖ ❖ ❖

**Q8:** Hindustan Bikes Ltd (HBL) is an Indian Multinational Company with headquarters in Bengaluru. It has been founded in the year 1990 as a manufacturer of Locomotive.The Company is presently listed locally as well as in international Stock Market. HBL’s parent company is the Hindustan Group.The Management of HBL recognizes the need to establish a culture at the Company so that-“Do the right things, right the first time, every time”.

Management has provided you following actual information for the most recent month of the current year-

Cots Data

|  |  |
| --- | --- |
| Customer Support centre cost | `35 per hour |
| Equipment Testing Cost | `18 per hour |
| Warranty Repair cost | `1,560 per bike |
| Manufacturing rework cost | `228 per bike |

Volume and Activity Data

|  |  |
| --- | --- |
| Bikes Requring manfucturing Rework | 3,200 bikes |
| Bikes requiring warranty Repair | 2,600 bikes |
| Production Line Equipment Testing Time | 1,600 hrs |
| Customer Support Centre TIme | 2,000 hrs. |

HBL carried out a Quality Review of its existing Suppliers to enhance quality levels during the month at a cost of `1,25,000. Due to the quality issues in the month, the bike production line experienced unproductive down time which cost `7,70,000.

From the above, prepare a statement showing “Total Quality Cost”.

Solution: Calculation “Cost of Quality”

|  | Particular | ` |
| --- | --- | --- |
| A:- Quality Compliance: | (1) Prevention costs: supplier Review | 1,25,000 |
|  | (2) Appraisal Costs: Equipment Testing (`18 × 1,600 hrs) | 28,000 |
| B: Qualtiy non-Compliance | (1) Internal Failure Costs |  |
|  | Down Time | 7,70,000 |
|  | Manufacturing Reworks(`228X3,200 bikes) | 7,29,000 |
|  | (2) External Failure costs |  |
|  | Customers support (`35 X 2,000 hrs) | 70,000 |
|  | Warranty Repair (`1,560 X 2,600 bikes) | 40,56,000 |
|  | Total cost of Quality Report | 57,79,400 |

❖ ❖ ❖

**Q13:** A company makes a single product which sells at `800 per unit and whose variable cost of production is ` 500 per unit. Production and sales are 1000 units per month. Production is running to full capacity and there is market enough to absorb an additional 20% of output each month.

The company has two options:

Option - I:

Inspect finished goods at ` 10,000 per month. 4% of production is detected as defectives and scrapped at no value. There will be no warranty replacement, since every defect is detected. A small spare part which wears out due to defective material is required to be replaced at ` 2,000 per spare for every 20 units of scrap generated. This repair cost is not included in the manufacturing cost mentioned above.

Option - II:

Shift Finished goods inspection at no extra cost to raw material inspection, (since defective raw materials are entitled to free replacement by the supplier), take up machine set-up tuning and machine inspection at an additional cost of ` 8,000 per month, sop that scrap of finished goods is completely eliminated. However, delivery of uninspected finished products may result in 1% of the quantity sold to be replaced under free warranty due to minor variation in dimensions, which does not result in the wearing out of the spare as stated in Option-I.

(i) Using monthly figures relevant for decision making, advise which option is more beneficial to the company from a financial perspective.

(ii) Identify the quality costs that can be classified as

(a) appraisal costs and (b) external failure costs

**Solution:** The Relevant Cost are analyses as under-

|  |  |  |  |
| --- | --- | --- | --- |
| **Particulars** | **COQ Classification** | **Option I** | **Option II** |
| Spare Costs costs for 40 units = 1 per 20 units = 2 spares × `2,000 | Appriasal costs | `4,000 | Nil |
| Finished Goods/Raw Material inspection | Appriasal Costs | `10,000 | `8,000 |
| Warranty Replacement =1,000 units × 1% × ` 500 variable Cost | External Failure Costs | Nil | `5,000 |
| Total Costs |  | `14,000 | `13,000 |

Conclusion: Option II is preferable due to lower costs.

*Note:*

Alternatively warranty Replacement can also be taken at `800 pu (being variable Cost ` `500 +Contribution foregone ` 500)

Alternative assumption relating to scrap costs of 40 units and Revenue from Additional Sale Quantity also Possible.

❖ ❖ ❖

**Q14: Asha** Carriers is a transporting Company that transport goods from one place to another. It measures quality of service in terms of –(i) Time requires to transport goods, (ii) On-time delivery, (iii) Number of lost or damaged cartons.

To improve its business prospects and performance, the Company is seriously considering to install a scheduling and tracking system , which involves an annual outlay of `1,50,000 besides equipments costing `2,00,000 needed for installation of the System. The Company proposes to utilize the proceeds of the Fixed Depost maturing next month to purchase the equipment .The rate fo interest at present at present on deposit is 10%.The Company furnishes the following about its present and anticipated future performance-

|  |  |  |
| --- | --- | --- |
| **Particulars and On-time delivery %** | **Current at 85%** | **Expected at 95%** |
| Variable costs per carton lost or damaged | `50 | `50 |
| Fixed Costs per carton lost | `30 | `30 |
| Number of cartons lost or damaged | 3,000 | 1,000 |

The company expects that each percent point increase in on-time performance will result in revenue increase of `18,000 per annum. Contribution Margin of 45% is required.Should Asha Road Carriers acquire and install the new system?

**Solution:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Relevant Costs** | **`** | **Relevant Benefits** | **`** |
| Annual Costs of new system (given) | 1,50,000 | Contribution Earned (18,000 × 10 × 45%) | 81,000 |
| Interest lost on Capital (`2,00,000 × 10%) | 20,000 | Savings in Varaible Costs:  (3,000 - 1,000) × `50z | 1,00,000 |
| Fixed Costs (Apportionment, and not relevant) | Nil |  |  |
| Net Benefit (balancing Figure) | 11,000 |  |  |
| Total | 1,181,000 | Total | 1,81,000 |

Decision: The new system may be implemented.

❖ ❖ ❖

# Cost of Quality Reporting (TQM)

**Q17:** CAL manufactures and sells solar panels for garden lights. Components are bought in and assembled into metal frames that are machine manufactured by CAL. There are a number of alternative suppliers of these solar panels. Some of CAL’s competitors charge a lower price, but supply lower quality panels; whereas others supply higher quality panels than CAL but for a much higher price.

CAL is preparing its budgets for the coming year and has estimated that the market demand for its type of solar panels will be 100,000 units and that its share will be 20,000 units (i.e. 20% of the available market). The standard cost details of each solar panel are as follows:

|  |  |  |
| --- | --- | --- |
|  |  | **$ per unit** |
| Selling price |  | 60 |
| Bought – in components (1 set) | 15 |  |
| Assembly & machining cost | 25 |  |
| Delivery cost | 5 | 45 |
|  |  | 15 |

**Contribution**

An analysis of CAL’s recent performance revealed that 2% of the solar panels supplied to customers were returned for free replacement, because the customer found that they were faulty. Investigation of these returned items shows that the components had been damaged when they had been assembled into the metal frame. These returned panels cannot be repaired and have no scrap value. If the supply of faulty solar panels to customer could be eliminated then, due to improved customer perception, CAL’s market share would increase to 25%.

**Required:**

1. Explain, with reference to CAL, quality conformance costs and quality non conformance costs and the relationship between them.
2. Assuming that CAL continues with its present systems and that the percentage of quality failing is as stated above:
3. Calculate, based on the budgeted figures and sales return rate, the total relevant costs of quality for the coming year.
4. Calculate the maximum saving that could be made by implementing an inspection process for the solar panels, immediately before the goods are delivered.

**Solution:**

1. Quality conformance costs are costs that are deliberately incurred by an organization in order to minimize quality failures. Quality non- conformance costs are costs that are incurred by an organization as a consequence of quality failures that have occurred. There is a relationship between these categories of costs to the extent that the more that is spent on conformance costs the lower should be the level of quality failures and therefore the lower the non-conformation costs. Organizations must decide on their position in this quality/cost trade off. The scenario indicates that CAL has positioned itself in the middle of the range of possible positions because some of its competitors supply lower quality products whereas others supply higher quality products.
2. (i) customer demand is 20,000 good items, but 2% of the items supplied are faulty therefore the total number of items to be supplied is:

20,000 × 100/98 = 20,408 so that 2% (i.e. 408) are returned for free replacement.

The cost of these 408 units that are replaced free of charge is $45 per unit = $18,360

However, there is a further cost of this failure because it could be eliminated the market share would increase to 25%. This would result in an additional 5,000 units of sales which each earn a contribution of $15 = $75,000.

As a result the non-conformance cost of these faulty items is $93,360.

(ii) if these failures had been discovered before delivery some of these costs could have been avoided. Although the item might still have been faulty and needed replacement, the lost sales would be avoided as would the delivery cost of the faulty items. Thus the cost of this failure could potentially have been reduced toa n internal failure cost of 408 units × $40 = $16,320 a saving of $77,040.

❖ ❖ ❖

**Q24:** Z Plus Security (ZPS) manufactures surveillance camera equipment that are sold to various office establishments. The firm also installs the equipment at the client’s place to ensure that it works properly. Each camera is sold for `2,500. Direct material cost of `1,000 for each camera is the only variable cost. All other costs are fixed. Below is the information for manufacturing and installation of this equipment:

|  |  |  |
| --- | --- | --- |
| **Particulars** | **Manufacture** | **Installation** |
| Annual Capacity (camera units) | 750 | 500 |
| Actual Yearly Production and Installation (camera units) | 500 | 500 |

**Required**

The questions below are separate scenarios and are not related to each other

(i) IDENTIFY the bottleneck in the operation cycle that ZPS should focus on improving Give reasoning for your answer.

(ii) An improvement in the installation technique could increase the number of installations to 550 camera units. This would involve total additional expenditure of `40,000. ADVISE ZPS whether they should implement this technique?

(iii) Engineers have identified ways to improve manufacturing technique that would increase production by 150 camera units. This would involve a cost `100 per camera unit due to necessary changes to made in direct materials. ADVISE ZPS whether they should implement this new technique.

**Answer: (i)** **Identification of Bottleneck:** Installation of cameras is the bottleneck in the operation cycle. The annual capacity for manufacturing and installation are given to be 750 camera units and 500 camera units respectively. Actual capacity utilization is 500 camera units, which is the maximum capacity for the installation process. Although, ZPS can additionally manufacture 250 camera units, it is constrained by the maximum units that can be installed. Therefore, the number of units manufactured is limited to 500 camera units, subordinating to the bottleneck installation operation. Therefore, ZPS should focus on improving the installation process.

**(ii) Improving Capacity of Installation Technique:** Every camera sold increases the through put contribution by `1,500 per camera unit (sale price `2,500 per camera unit less direct material cost `1,000 per camera unit). By improving the current installation technique an additional 50 camera units can be sold and installed. This would involve total additional expenditure of `40,000. Hence, the incremental benefit would be:

|  |  |
| --- | --- |
| **Particulars** | **Amount (**`**)** |
| Increase in throughput contribution (additional 50 camera units `1,500 per camera unit) | 75,000 |
| *Less:* Increase in total expenditure | 40,000 |
| Incremental benefit | 35,000 |

Since the annual incremental benefit is `35,000 per annum, ZPS should implement this improvement to installation technique, the current bottleneck operation.

**(iii) Improving Manufacturing Capacity:** Every camera sold increases the throughput contribution by `1,500 per camera unit (sale price `2,500 per camera unit less direct material cost `1,000 per camera unit). By improving the current manufacturing technique an additional 150 camera units can produced. This would involve a cost `100 per camera unit due to necessary changes to made in direct materials. Therefore, number of units manufactured can increase to 650 camera units. However, production of 150 camera units will not translate into additional sales, because each sale also requires installation by ZPS. In a year only 500 camera installations can be made, leading to an inventory pile up of 150 camera units. This is detrimental to ZPS, since it does not earn any contribution by holding inventory. Therefore, ZPS should not go ahead with the proposal to improve the manufacturing technique.

**Throughput accounting and decision-making**

When a company can make more than one product, throughput per unit of constraint factor can be used to rank products in order of priority for production.

❖ ❖ ❖

**Q25:** JJ Ltd manufactures three products: W, X and Y. the products use a series of different machines but there is a common machine that is a bottleneck.

The standard selling price and standard cost per unit for each product for the forthcoming period are as follows:

|  | **W** | **x** | **Y** |
| --- | --- | --- | --- |
|  | **£** | **£** | **£** |
| Selling price cost | 200 | 150 | 150 |
| Direct materials | 41 | 20 | 30 |
| Labour | 30 | 20 | 36 |
| Overheads | 60 | 40 | 50 |
| Profit | 69 | 70 | 34 |
| Bottleneck machine – minutes per unit | 9 | 10 | 7 |

40% of overhead cost is classified as variable.

Using a throughput accounting approach, what would be the ranking of the products for the best use of the bottleneck?

**Solution:** the ranking of the products for best use of the bottleneck is W, Y, X.

**Throughput accounting approach**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **W** | **X** | **Y** |
|  | **£** | **£** | **£** |
| Selling price | 200 | 150 | 150 |
| Direct material | (41) | (20) | (30) |
| Throughput | 159 | (130) | (120) |
| Throughput per minute on bottleneck | 159/9  = 17.67  1 | 130/10  = 13  3 | 120/7  = 17.14  2 |

❖ ❖ ❖

**Q26:** Flopro makes and sells two products A and B each of which passes through the same automated production operations. The following estimated information is available for period1:

(i)

|  |  |  |
| --- | --- | --- |
| **Product Unit data:** | **A** | **B** |
| Selling price per unit($) | 60 | 70 |
| Direct material cost ($) | 2 | 40 |
| Variable production overhead cost ($) | 28 | 4 |
| Overall hours per product unit (hours) | 0.25 | 0.15 |

(ii) Budgeted production/sales of products A and B are 1,20,000 units and 45,000 units respectively. The selling prices per unit for A and B are 560 and 570 respectively.

(iii) Maximum demand for each product is 20% above the budgeted sales levels.

(iv) Total Fixed production overhead cost is $1,470,000. This is absorbed by products A and B at an average rate per hour based on the estimated production levels.

One of the production operations has a maximum capacity of 3,075 hours that has been identified as a bottleneck that limits the overall production/sales of products A and B. The bottleneck hours required per product unit for products A and B are 0.02 and 0.015 respectively.

**Required:** Calculate the mix (units) of products A and B that will maximize net profit and the value (s) of the maximum net profit.

(b) The bottleneck situation detailed in (a) still applies. Flopro has decided to determine the profit maximizing mix of products A and B based on the throughput accounting principle of maximizing the throughput return per production hour of the bottleneck resource. This may be measured as: Throughput return per production hour= (Selling price-material cost/bottleneck hours per unit).

All other information detailed in (a) still applies, except that the variable overhead cost as per (a) is now considered to be fixed for the short/intermediate term, based on the value ($) which applied to budgeted production/sales.

**Required:**

1. Calculate the mix (units) of products A and B that will maximize net profit and the value of that net profit.
2. Calculate the thoughput accounting ratio for product B which is calculated as throughput return per hour of bottleneck resource for product B/overall total overhead cost per hour of bottleneck resource.
3. Comment on the interpretation of throughput accounting ratios and their use as a control device. You should refer to the ratio for product B in your answer.

**Answer: (a) Optimum Product mix**

The contribution per product unit (Selling price- variable cost) may be calculated as:

A =$60 – (2 + 28) - $30

B - $70 – (40 + 4) - $26

|  |  |  |
| --- | --- | --- |
|  | **A** | **B** |
| Contribution per unit | $30 | $26 |
| Bottleneck hours per unit | 0.02 | 0.015 |
| Contribution per bottleneck hour | $1,500 | $1,733 |
| Ranking | 2 | 1 |

Therefore produce and sell product B up to its maximum demand and then product A with the remaining capacity:

|  |  |
| --- | --- |
| Maximum demand of product B (45,000 × 120%) | 54,000 units |
| Bottleneck hours required for B (54,000 × 0.015) | 810 hours |
| Bottleneck hours available for A (3,075 -810) | 2,265 hours |
| Output of product A which is possible (2,265 ÷0.02) | 113,250 units |

**Maximum net profit:**

|  |  |  |
| --- | --- | --- |
|  |  | **$** |
| **Contribution product A** | 113,250 × $ 30 | 3,397,500 |
| **Contribution product B** | 54,000 × $26 | 1,404,000 |
| **Total Contribution** |  | 4,801,500 |
| **Less: Fixed overhead cost:** |  | 1,470,000 |
| **Net profit** |  | **3,331,500** |

**(b) Throughput accounting**

**(i) Product mix to maximize net profit**

Throughput per unit is calculated as selling price-direct material cost:

A =$60 – 2 = $58

B = $ 70 – 40 = $30

|  |  |  |
| --- | --- | --- |
|  | A | B |
| Throughput per unit | $58 | $30 |
| Bottleneck hours per unit | 0.02 | 0.015 |
| Throughput return per bottleneck hour | $2,900 | $2,000 |

Flopro should sell product A up to its maximum demand and then product B using the remaining capacity.

|  |  |
| --- | --- |
| Maximum demand of product A (120,000 × 120%) | 144,000 units |
| Bottleneck hours required for A (144,000 × 0.02) | 2,880 hours |
| Bottleneck hours available for B (3,075 – 2,880) | 195 hours |
| Output of Product B which is possible (195 ÷0.015) | 13,000 units |
| Maximum net Profit: |  |
|  | $000 |
| Throughput return product A 144,000 × ($60-2) | 8,352 |
| Throughput return product B 13,000 × ($70 – 40) | **390** |
| Total throughput return | 8,742 |
| Less: Overhead cost: |  |
| Variable based on budget (120,000 × $28 + 45,000 × $4) | (3,540) |
|  | (1,470) |
| Net Profit | **3,732** |

**(ii) Throughput accounting ratio for product B**

Throughput accounting ratio =

Throughput return per hour of bottleneck for product B was calculated in part (i) as $2,000.

Total overhead cost per hour of bottleneck:

Total overhead costs: (3,540,000 + 1,470,000) $5,010,000

Total hours of bottleneck: 3,075

= Total overhead cost per hour of bottleneck (5,010,000 ÷ 3075) $1629.27

Throughput accounting ratio = = 1,2275

**(iii) Interpretation**

Where throughput accounting principles are applied, a product is worth producing and selling if tis throughput return per bottleneck hour is greater than the production cost per throughput hour. This may be measured by the thoughput accounting ratio. Where the ratio is less than 1.00 return exceeds cost and the focus should be on improving the size of the ratio.

Efforts may be made to improve the position for each product and in total by focusing on areas such as

Improved throughput ($) per unit by increasing selling price or reducing material cost per unit. Product B has a very high material element ($40 per unit).

Improving the throughput ($) per unit by reducing the time required on the bottleneck resource. Reducing the time for product B from 0.015 hours to 0.01 hours through hours thourgh methods change would improve its ratio.

Improving the overall position by reducing the cost of spare capacity .This may be achieved by operational re-design aimed at reducing or eliminating the impact of any bottlenecks.

The throughput ratio for product B is 1.2275 which is greater than 1.00 and therefore acceptable. Its ratio is considerably less than that of product A, which is 1.780 ($2,900 ÷ $1,629.27). Tshe product ratio may be used as a basis for the monitoring of trend, by product and in total.

❖ ❖ ❖

Q27: Classify the following items under the three measures used in the theory of constraints:

(i) Research and Development cost

(ii) Rent/Utilities

(iii) Raw materials used for production

(iv) Depreciation

(v) Labour Cost

(vi) Stock of raw materials

(vii) Sales

(viii) Cost of equipments and buildings.

Solution: The 3 key measures are:

|  |  |
| --- | --- |
| Throughput Contribution | Raw Material for Production |
| Sales |
| Operating Cost | Rent/Utilities |
| Depreciation |
| Labour |
| Investments | Research and Development Cost  Raw Material stock  Building and Equipment Cost |

❖ ❖ ❖

**Identification of Bottleneck Activities through TA Ratio**

**Q29:** A Company produces three products using three different machines. Machine Capacity is limited to 1,600 hours for each machine. The following information is available for a period.

|  |  |  |  |
| --- | --- | --- | --- |
| Product | P | Q | R |
| Contribution (sales-Direct Materials)  Machine hours required per unit:  Machine 1  Machine 2  Machine 3  Estimated Sales Demand | ` 1,200  6  9  3  200 | `1,000  2  3  1  200 | ` 600  1  1.5  0.5  200 |

From the above-(a) identify the bottleneck activity and allocate the machine time (b) Compute Throughput accounting (TA) Ratio, If total factory Costs are ` 3,20,000 for the period.

Solution: The 3 key measures are:

|  |  |
| --- | --- |
| Throughput Contribution | Raw Material for Production |
| Sales |
| Operating Cost | Rent/Utilities |
| Depreciation |
| Labour |
| Investments | Research and Development Cost  Raw Material stock  Building and Equipment Cost |

❖ ❖ ❖

**Q31:** Demand for a product made by P Ltd is 500 units per week. The product is made in three consecutive processes – A, B, and C. Process capacities are:

|  |  |  |  |
| --- | --- | --- | --- |
| **Process** | **A** | **B** | **C** |
| Capacity per week | 400 | 300 | 250 |

The long-run benefit to P Ltd of increasing sales of its product is a present value of $25,000 per additional unit sold per week.

Investigations have revealed the following possibilities:

1. Invest in a new machine for process A, which will increase its capacity to 550 units per week. This will cost $1m.
2. Replace the machine in process B with an upgraded machine, costing $1.5m. this will double the capacity of process B.
3. Buy an additional machine for process C, costing $2m. this will increase capacity in C by #300 units per week.

**Required:** What is P Ltd’as best course of action?

**Note:** The above options are not mutually exclusive, so your answer should consider combinations as well as looking at them individually.

**Solution:**

Sales Demand:

C

250 units

B

300 units

A

400 units

500 units per week

We can see from the above diagram that the bottleneck is at ‘c’, the slowest operation. The best course of action would be to maximise sales by releasing the bottleneck in Process C.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **A** | **B** | **C** | **Demand** |
| Current capcity per week | 400 | 300 | 250\* | 500 |
| Buy C – Capacity per week | 400 | 300\* | 550 | 500 |
| Buy c & B – capacity per week | 400\* | 600 | 550 | 500 |
| Buy C, B & A – capacity per week | 550 | 600 | 550 | 500\* |

= Bottleneck

Financial viability

First, buy additional machine for ‘C’, and increase capacity by 300

Additional sales = 50

|  |  |
| --- | --- |
|  | **$000** |
| Benefit = 50 additional sales units × $25,000 | 1,250 |
| Increase in costs | 2,000 |
| Net cost | 750 |

Secondly, buy additional machine for ‘B’ and increase capacity by 300 units. This removes a second bottleneck at ‘B’.

Additional sales from current position = 150

|  |  |
| --- | --- |
|  | **$000** |
| Benefit = 150 × $25,000 | 3,750 |
| Cumulative costs ($2m + $1.5m) | 3,500 |
| Net benefit | 250 |

❖ ❖ ❖

**Q35**: H Ltd. manufactures three products. The material cost, selling price and bottleneck resource details per unit are as follow:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Product X | Product Y | Product Z |
| Selling price (`)  Material and other variable cost (`)  Bottleneck resources time (minutes) | 66  24  15 | 75  30  15 | 90  40  20 |

Budgeted factory costs for the period are ` 2,21,600. The bottleneck resources time available is 75120 minutes per period.

Required:

(i) Company adopted throughput accounting and products are ranked according to ‘product return per minute’. Select the highest rank product.

(ii) Calculate throughput accounting ratio and comment on it.

**Solution:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Particulars** | **X** | **Y** | **Z** |
| Sale Price p.u. | `66 | `75 | `90 |
| Material & other variable Cost p.u. | `24 | `30 | `40 |
| Contribution p.u.(1-2) | `42 | `45 | `50 |
| Bottleneck Resource Time (minutes) | 15 | 15 | 20 |
| Product Return per minure = Contribution = [(3)/(4)] | `2.80 | `3.00 | `2.5 |
| Rank based on (5) above | II | I | III |
| Factory cost per minute = `2,21,600 ÷75,120 (See Note) |  |  |  |

Comment: Product Y has the highest Throughput contribution per minute and the highest TA Ratio.

❖ ❖ ❖

**Q38:** X limited manufactures a product that requires 1.5 hours of machining. Machine time is a bottleneck resource, due to the limited number of machines available. There are 10 machines available, and each machine can be used for up to 40 hours per week.

The product is sold for $85 per unit and the direct material cost per unit is $42.50. Total factory costs are $8,000 each week.

**Calculate**

1. The return per factory hour
2. The TPAR.

**Solution:** Return per factory hour = ($85 - $42.50)/1.5 hours = $28.33

Cost per factory hour = $8,000/(10 × 40 hours) = $20

TPAR = $28.33/$20 = 1.4165

❖ ❖ ❖

# Supply Chain Management

**Q40: Memorable** Travels is a Tour operator offering holiday packages to a veriety of Customers.They advertise and promote their packages using print advertising in newspaper and colourful brouchers.A basic holiday package would include transport from the city to the destination, stay, food, attractions, or activities. Memorable Travels has been in business for the past 15 years, It has standard agreements with its suppliers based on which it has been offering standard holiday packages to its customers. Profitable business over these years has resulted in surplus cash that the company intends to reinvest in tis business.Recently the management has noticed increase in the number of complaints regarding these packages.This has resulted in lesser number of customers opting for these tours.

A study of these complaints has indicated that customer expectations from a holiday trip vary depending on their age group.Accordingly, Memorable Travels wants to offer customized holiday package trips that would suit the travelers expectations. IT wants to increase the number of packages offered to customers in addition to adding variety to them.This would provide customers the choices from which they can customize their holidays with the help of Memorable Travels.

The management wants to understand the need and importance of supplier chain management in a service organization such as itself.

**Required:**

1. Define the objective of Memorable Travels should have when considers incorporating the supply chain management framework into its business model.
2. Identify possible components of Memorable Travels upstream supply chain.
3. Suggest the key processes in the business model of Memorable Travels.

**Solution:**

1. Memorable Travels is providing a service wherein it uses its assets, staff and resources to provide customized travel packages to its customers. It should consider how to utilize its assets and staff to design and manage its supply chain such that it meets the customers demand in a cost-effective manner. Customers demand is uncertain due to (a) customization of holiday packages to suit their individual expectations and (b) sensitivity of travel to factors like economic prosperity, law and order etc.

Business processes must be effectively across organizations and functions to meet the customer’s expectation in the best possible manner.The ability of Memorable Travels to respond to its customers demand defines its operational capacity. Having more capacity (capacity) to meet customers demand helps it be more responsive and flexible. However, this has to be balanced with its ability to maintain an effective supply chain management. A supply chain is effective only when Memorable Travels and consequently the ultimate customer is bale to get the required level of service from its suppliers.

1. As mentioned in the problem, a basic holiday package would include transport from the city to the destination, stay , food, attractions, or activities. Accordingly, possible components of Memorable Travels upstream supply chain would include partnerships with:
2. Transport providers-road, rail, and air travel providers.This includes travel to the holiday destination as well as the local transport within that location.
3. Lodging and accommodation providers-hotels, bed and breakfast providers etc.
4. Providers fo tourist attractions and activities.
5. Key processes in the business model of Memorable Travels would be:

Information Flow

**Information flow is critical at various stages:**

* To understand expectations of customers
* To share this information with the suppliers of service with whom Memorable Travels has partnership.
* To establish clear service level agreement with these suppliers and to clearly define the scope of work.
* To be able to monitor the performance of these suppliers. Performacne has to be monitored because it will impact payment settlements with these suppliers.
* To collect constructive feedback from customers about the performance of these suppliers.

**Capacity and skills Management**

Memorable Travels has to develop the ability to cater to various expectations of its customers. It has to develop assets and skilled staff who can attract customers and help them customize their holiday packages.To enable this, the company has to invest in this organization, processes, assets and staff.As mentioned above in point(a), information flow is a key process in this business model. The company has to invest in its processes to ensure that information flow is smooth and accurate.Similarly it has to invest in assets like IT infrastructure offices and also develop a skilled staff who can provide quality service. Memorable Travels should also have the ability to develop pool of suppliers who provide good quality service.Better capacity to cater to customers demand bettere will ensure that Memorable Travel can develop and maintain its business efficiently. However, since building capacity and developing skills comes with a cost, that has to be balanced out with the revenue it generates.

**Demand Management**

Memorable Travels will have to focus on how to generate demand for its products. In tune with changing times, Memorable Travels will have to change its marketing from print based advertising to online advertising in order to have a larger outreach to attract Customers.The Company should be able to manage variation in customer’s expectations in a cost-effective way. As explained in point (b) above, this will be determined by the capacity of its operations and skills of its employees. Higher the capacity more the flexibility in its operations.

**Customers Relationship Management**

Customer segmentation and monitoring help in understanding customer’s needs in a better way and to focus on efforts to meet those needs through proper and timely communication of information with its service suppliers. However , the cost of maintaining this framework should not exceed the revenue that each customer segment generates.Accordingly, customers account profitability analysis should be prepared for each customer segment.

**Supplier Relationship Management**

As part of the customer relationship management, specific needs of customers would be identified.Based on these needs, potential suppliers who provide services of the requisite quality need to be identified.Service level agreement need to be drawn up after comprehensive rounds of negotiations. It is imperative to have a clear understanding with these suppliers regarding the quality servce expected.

**Service Delivery Management**

Agreement with suppliers will help to ensure that expectations of customers of Memorable Travels are being met. Service performance must be monitored, checked continuously for compliance.Any deviation from scope may have an impact on the payment settlement to be made with the supplier.

**Cash Flow**

As mentioned above, service delivery should be monitored to ensure that payment is made only to the extent the agreed quality of service is delivered. Periodic payments to suppliers should be made based on sevice level agreements. Similarly cash inflows from customers should be monitored to avoid any bad debts. Pricing for packages should be based on the level of service offered.Again, clear understanding of the terms of contract is essential to avoid uncertainties.

All processes within the company are linked to each other. Understanding the customer’s expectation have a direct impact on the supply chain. Therefore proper co-ordination is required for smooth functioning of the organization and its supply chain.

❖ ❖ ❖

# Business Excellence Model

**Q41:** As a guest lecturer at a symposium for Business Excellence where you are giving a lecture on “Sustaining Business Excellence”. A manufacturer of a fashion clothing line is one of the participants at the symposium. He has the following query:

“We are an apparel company that manufacture and sell our fashion clothing and accessories directly through 30 stores spread across India. Shortly we are planning to establish similar outlets overseas. Our business is under constant change due to changing customer terns, At the same time, we are the largest company in our industry segment in India, both in terms of market share and profits. We have a satisfied base of customers who are loyal to our brand. Shareholders are also satisfied stakeholders due to good returns provided on their investments. What would be the relevance of Business Excellence model to our company?

Thank you”.

You are required to frame an appropriate response to this query.

Required:—

1. Explain the importance of business excellence to an organization.
2. List the tool available to achieve and sustain excellence.
3. Apply the fundamentals of EFQM model on the appeal company.
4. Explain the relationship between various criteria of the model in general terms.

**Solution: (i)** Business Excellence is a philosophy for developing and strengthening the management systems and processes of an organization to improve performance and create value for stakeholders. Stakeholders in an organization are not limited to shareholders (business) alone. They include also customers, employees (people) and society. What an organization does impact all the stakeholders in different ways, yet they are all interlinked to each other. Customers’ needs are of paramount importance to companies. Yet given uncertain conditions, shareholders demand challenging return on their investments. Employees need more from their company than just their pay-check. They want the company to enable to grow their knowledge and experience that can improve their career growth. Society expects companies to operate ethically and for the overall betterment of the society and environment.

For several years businesses have been operating under challenging circumstances. For example, landline phones have been entirely replaced by mobile phones. Television programs can be watched seamlessly on internet enabled mobile phones. Not just this, today’s smartphones have computing capability much more than the computers that were used in Apollo Mission to send the first man to moon! The proliferation of mobile phones has changed not just the telecom industry but also others like communication, banking, e-commerce etc. The pace of change is both exhilarating and challenging.

To manage this complex scenario, a company cannot focus on only one aspect of their operations. Optimize processes, delivery quality to customers, manage employee talents, earn required return on investment while managing to be a socially responsible organization. In short, the company should achieve excellence in all aspects of its operations. This is business excellence. Business excellence principles emerged because of development of quality drive into traditional business management. It is imperative not just to achieve excellence but also to sustain it.

Business excellence models are holistic tools that help companies develop stakeholder focused strategy. Each operation within a company enables a corresponding result. Business models present a formal, standardized cause effect relationship between different operations (enablers) and their resultant consequences. If the company want to achieve a different result, it has to do things differently. This can be better analysed through these models. Continuous improvement on various operations will ultimately lead to excellence. More importantly, these models need to be used to sustain and maintain excellence to retain their competitive advantage. They are not to be taken as one time exercise by the company. Assessments using this model have to be made periodically so that timely action can be taken to achieve the desired result.

**(ii)** Some of the popular business excellence models are (i) the European Foundation Quality Management (EFQM) model (ii) Baldrige Criteria for Performance Excellence (iii) Singapore BE Framework (iv) Japan Quality Award Model and (iv) Australian Business Excellence Framework.

**(iii)** The apparel company is a well-established player in the industry. It is a growing company that is looking to expand its operations overseas. To achieve business excellence in this environment, the company could adopt the EFQM model, which is a popular model.

The EFQM model was developed by the European Foundation for Quality Management. The model provides an all-round view of the organization and it can be used to determine how different methods fit together and complement each other. It can help the company understand the cause and effect relationships between what their organization does and the results it achieves. Creating an EFQM Management Document gives the organization a holistic overview of its strategic goals, the key approaches it has adopted and the key results it has achieved.

The fundamental concepts for excellence are the basic principles that describe the essential foundation for any organization to achieve sustainable excellence. With respect to the company they can be detailed as below:

(a) Adding value to customers: Companies need to understand their customers, their needs, anticipate their needs and make use of opportunities to fulfil their expectations.

In the current case, fashion apparel business is ever changing and dynamic due to the changing trends in customer’s tastes. This could differ across locations within India and abroad. In the era of e-commerce, competition would be cut-throat. Before going to “how” it can meet customer’s needs, the company should be clear on “what” need of the customer it can satisfy. For example, should the company cater to Indian apparel market, western apparel market, men or women or children apparel market etc. Once the “what” is clear, the company should have mechanisms in place to find out and anticipate customer tastes. Accordingly, it should structure its operations to add value to the customers in terms of quality, availability, support, and experience.

(b) Creating a sustainable future: Society and environment (People and Planet of Triple Bottomline concept) play a major role in ensuring the sustainability of business. A company should have as much positive impact on its surroundings and try to minimize any negative impact on the same. Here, the company should assess the environmental impact of its operations, measures to minimize adverse impacts, business impact on the society etc.

For example, leather is contended to be harmful to the environment since it requires the skin of animals specially cattle hide, needs huge amount of energy and chemicals to process it. This has a negative environmental impact. As regards societal impact, suppliers of cloth to the apparel company should not indulge in labor malpractice like child labor and should adhere to safety standards within its factories. The company should procure cloth only from suppliers who adhere to such standards.

(c) Developing Organizational Capability: Companies need to manage change within the organization and beyond. The company should identify “what it is capable of being great at?” in order to differentiate it from its competitors. For example, the apparel company may have the capability of tracking its inventory at the stores on real time basis. As soon as the inventory falls below a certain level, the stores issues fresh products to stock up. This ensures that there are no stock outs at the retail outlet. This ability to track inventory real time and ability to stock up quickly may be unique to the company that gives it a competitive edge. Another can be the ability to quickly change the apparel production to meet changing trends. Likewise, the company should identify and develop unique capabilities to have a competitive edge in the market.

(d) Harnessing creativity and innovation: Continuous improvement and innovation brings value to the company. The company should promote a working environment that enables and appreciates creativity and innovation. For example, new apparel designs can be promoted to test the market. If found feasible, the company can go for mass production of the same.

(e) Leading with vision, inspiration, and integrity: The tone at the top defines the rest of the company. The leaders and management of the company should have a clear vision of what the company wants to achieve, develop strategy to achieve it, work with integrity and ethics. Leaders shape the future of the organization.

(f) Managing with agility: Agility would be the capability to identify and effectively respond to opportunities and threats. For example, although the apparel company is in an expansionary phase, it should consider the threat, yet opportunity of using e-commerce as a platform to reach out to customers directly. Brick and mortar stores are becoming largely redundant due to online platforms, a threat the company should recognize and act upon.

(g) Succeeding through the talent of people: An organization is only as good as the people who work in it. There should be an atmosphere of teamwork that enable achievement of organizational and personal goals. Performance evaluation, reward and recognition programs, training and talent network are ways to cultivate talent within the organization.

(h) Sustaining outstanding results: Use of EFQM model is not a onetime exercise. Constant and periodic evaluation is required to keep up and sustain excellence.

**(iv)** The criteria of the model are comprised of 5 enablers and 4 results. Enablers covers what an organization does (its objective) and how it does it (strategy, use of resources to achieve it).

(a) Leadership: A leader defines the organization’s culture. They enable the organization to achieve its goals by taking the correct decisions at the correct time. To do this they should have sufficient skill, work as per the company’s code of conduct and should be ethical in their dealings.

(b) Strategy: Operations should be planned and directed as per a clearly defined strategy. The company’s vision and mission statement with respect to its various stakeholders are the goals that the organization wishes to achieve. Strategy (plan) enables the company to achieve these goals.

(c) People: Excellence is possible only if the people working in the company wish to achieve it. They must be motivated, recognized, and managed to enable them to work towards the company’s vision and mission. The work culture should be that this opens up opportunities for personal development as well. This would cultivate a bond with the organization, which enables people working within to strive for excellence.

(d) Partnerships and resources: Effective management of partnerships that the company has with other organizations is critical to success. Partners could be external vendors, suppliers, and service providers. The services of partners enable business to operate smoothly. Resources, both tangible and intangible should be managed optimally. Tangible resources can be financial (cash, bank accounts) and physical assets (machinery, building, land etc.). Intangible resources would be intellectual property rights, information technology, licenses etc. Proper management of resources enables optimal results.

(e) Processes, Products, and Services: A company exists because of its processes, products, and services. They should be managed and continuously improved to create value to the stakeholders.

Results are what the organization achieves following its operations and decisions. As explained before, the stakeholders of the company are investors (business), people (employees), customers and society. In order to track performance, the company has to develop Key Performance Indicators (KPI)s for each of the stakeholder groups. Results should be tracked periodically. Changes to targets and benchmarks should be continuously made to reflect the current objectives that the company wants to achieve. Some of the results that the company can look at are:

(a) Customer results: Are the customers of the company satisfied with the products and service? How does the company fare in terms of brand loyalty? Is the customer base growing to indicate increasing market share?

(b) People results: Does the company have skilled and motivated employees? What is the employee turnover with reasons for the same? Does the company have proper access to hire required talent? Are the employees motivated, trained, recognized, and rewarded for their performance? What is performance measurement system, is it robust and accurate to measure performance?

(c) Society results: Is the company a good corporate citizen. Are the objectives of corporate social responsibility being met? If the organization is a not for profit organization, is it meeting its objectives and goals?

(d) Business results: Is a for profit organization achieving the required return on investment, profitability that the shareholders and other investor demand? Has the company been able to manage financial and other risks properly?

Enablers enable achievement of results. EFQM model documents this flow and symbiosis in a structured way. It highlights the strength and weakness of the enablers. With this information, the company can alter its operations and strategy to achieve desired results. On assessment, there is a flow from results to enablers. If the results have been achieved, enablers continue to operate status quo. If the results fall short of targets, changes have to be made to enablers to improve performance.

Therefore, it can be concluded the EFQM model encourages constant self- assessment to achieve excellence.

When a company wins an excellence award based on a business excellence model, it gains in stature within the industry. This recognition could work to its advantage financially and otherwise.

❖ ❖ ❖

Case Study: (Supply Chain Management)

Sun Electronics manufactures and sells various electronic goods like mobile phones, laptops, televisions, refrigerator etc. the company sells these goods through the 30 stores situated in different parts of the country. The store managers place a request to the centralized team situated in Mumbai on a monthly basis. One store can send only one requisition per month.

The requirements of the stores are forwarded to the production planning team which is responsible for scheduling the manufacturing of these products. Once the goods are manufactured, the goods are sent to a central warehouse in Mumbai and are dispatched to different stores according to the store requirements. The time taken from placing a request from store to the delivery of product to the store takes about 30-40 days on an average. In the process the company procures parts from more than 100 vendors. The company has faced quality related issues with many vendors leading to delay in production.

The average holding period of inventory in Sun Electronics is very high at 45 days as against an industry average of 15 days. Since the order to delivery time at store is very high, the company has traditionally allowed high inventory holding to reduce the stock outs at store level. The company is under severe pressure to improve its working capital cycle.

A high amount of inventory held at each store also means that the products become obsolete quickly. In case of products like mobile phones, new and upgraded versions are available in the market as early as six months from the date of initial launch of a particular model. A significant portion of inventory of mobile phones becomes obsolete every year. The company generally resorts to a discounted sale to liquidate such obsolete models.

The management at Sun Electronics has identified e-commerce as an opportunity for faster growth, both in terms of revenues and profitability. The company is considering launch of its own e-commerce website to sell all products which are currently being sold in physical stores. Depending upon the success of online sales, the company might choose to optimize and close certain physical stores in the next couple of years.

The management of the company is cognizant of the fact that existing inventory procurement and management system will not fit in the new e-commerce business. E-Commerce works on a inventory light model and quick as well as on time delivery of products of the customers. The fact that customers could be from a location other than those where Sun Electronics has physical presence makes the matter complex.

**Required**

The company is considering implementation of a supply chain management system. Will a supply chain management system be of use to Sun Electronics in light of the e-commerce venture? You are required to EXPLAIN the concept of Supply Chain Management and EVALUATE the applicability of in the current case.

**Issue**

Sun electronics manufactures and sells various electronic products through its physical stores. The existing manufacturing system does not take into consider the demand of product in the market. Store managers are allowed to submit only one order per month. A high level of inventory can be seen at Sun Electronics as compared to the industry average. The store managers tend to keep high level of inventories as a safe guard against stock-outs. Whereas, keeping inventory to meet customer requirement is good, high level of inventories due to inefficient processes is not advisable.

The company also has a longer working cycle because of a long order to deliver time and excess holding of inventory. A significant amount of working capital is blocked due to this practice. Technology changes rapidly and the company is expected to roll out latest products in the market. A product like mobile gets outdated very soon and the company has to resort to discounted sales. This results in financial losses to the company.

The company has identified an opportunity in e-commerce. E-commerce businesses require leaner models and faster response time. The production must be based on the demand from the customer and not on an ad-hoc basis. In the following paragraphs, the importance of supply chain management (SCM) and its applicability in the current case is discussed.

**Supply chain management (SCM)**

Supply chain management can be defined as the management of flow of products, services and information, which begins from the origin of products and ends at the product’s consumption at consumer’s end. SCM also involves movement and storage of raw material, work in progress and finished goods. In other words, supply chain management involves management of all activities associated with moving goods from the raw materials stage to the end user. An important objective of SCM is to correlate the production and distribution of goods and services with demand of the product.

The following are the various activities which an organization carries out to meet the customer requirements (primary activities under value chain model) –

* Inbound logistics covering procurement and related activities.
* Operations covering conversion of raw materials into finished products
* Outbound logistics covering movement of products from plants to end users
* Marketing and sales
* Service

Supply chain management looks each o the above activities as integrated and interrelated to each other. None of the activities can be looked in silos. In the case of Sun Electronics, there is a restriction on number of orders which a store manager can place. This would lead to excess ordering because of the fear of stock-outs.

The customer demand is completely ignored and hence the production is not in sync with the market demand. This could lead to excess production, higher inventory holding and longer working capital cycles.

The facts presented in the case indicate the following problems at Sun Electronics:

* Production planning is not based on customer demand & is done on an ad-hoc basis.
* Inventory holding period is very high (45 days against an industry average of 15 days).
* The working capital cycle is longer.
* The time take to fulfil an order from the store is very high.
* The production is dispatched to a central warehouse for further deliveries to the stores. This could be an inefficient process.
* Liquidation of products at discount for products with low shelf life.

**SCM process and applicability to Sun Electronics**

**The SCM process is explained below:**

* **Plan** – the first step in SCM process is to develop a plan to address the requirements of the customer. Sun Electronics must shift its focus from ad hoc and predetermined production planning to understanding the requirements of customers. Production must be planned based on the demand of products. The focus must be on producing what the customer wants.
* **Develop (procure)** – in this step, the materials required for production is sourced from various suppliers. A good relationship with supplier is required to ensure that the parts/materials are received as and when required by the production team. It is also important that the vendors supply quality material which is not the case in Sun Electronics. The company must select suppliers which are dependable and can deliver quality products in the stipulated time. The company must focus in reducing the lead time required for sourcing materials which will reduce the inventory holding period.
* **Make** – the third step is making or manufacturing the products required by the customer. This is quite different from the existing practice in Sun Electronics where store managers are allowed to place only one order. This would mean that the company is not considering the ever changing demands and tastes of the customers.
* **Deliver** – the fourth stage is to deliver the products manufactured for the customers. This stage is concerned with logistics. The time required to deliver to the store in case of Sun Electronics is very high. The company must evaluate if the centralized warehouse is causing delay in delivery of products to the stores.

Logistics is one of the important components of the entire supply chain process. Right from procurement of material, movement of raw material in the plants and final delivery of products of customers, logistics plays a critical role. An excellent system must be in place to ensure that the movement of materials and final product are uninterrupted.

Warehousing also plays an important role in today’s business environment. The company has a centralized warehouse to meet the needs of all its stores. This would not be the most efficient way. The company must evaluate creation of additional storage facility which would ensure timely delivery goods to the stores. Newer products can reach the market faster.

**Benefits of SCM to Sun Electronics**

SCM looks at the entire value chain process as an integrated process. There is a seamless flow of information and products between suppliers and customers. The customer’s requirements would be captured to plan the production. The supplier would be intimated to supply the materials according the the production plan. An effective logistics system ensures that movement of materials is seamless. Sun Electronics can also consider implementing an integrated ERP which would also interact with vendors on real time basis.

The following benefits of SCM can be envisaged for Sun Electronics-

* Better Customer Service as customer is supplied with what he/she wants in the minimum time.
* Better delivery mechanism for goods.
* Improves productivity across various functions and departments.
* Minimises cost (both direct and indirect).
* Reduces the inventory holding time and improves the working capital cycle.
* Enhances inventory management and assists in implementation of JIT systems.
* Assists companies in minimising wastes and reduce costs.
* Improves supplier relationship.

**E-Commerce and SCM**

The SCM is the backbone of E-commerce industry. Customers buying products online want deliveries to be faster. Another distinct feature of e-commerce is that buyers could be located in any corner of the country and not just restricted to the cities where Sun Limited has physical presence. This definitely means that the company must have an effective Supply Chain Management in place which could meet the customer’s requirement.

The existing practice of one order per month from each store would not work in the e-commerce space. Orders can come at anytime and from anywhere. Supply Chain Management would be required for success of e-commerce business.

**Customer Orders**

The company must have an effective mechanism to capture customer orders and feed it into the production planning on a real time basis. An integrated ERP system would be required for this purpose. Any delay in intimating the production team would mean delay in production and delivery which would not be taken positively by the customers. The existing system of one order per month from a store would not fit the purpose. A real time flow of information would mean lower inventory holding.

**Procurement**

The material requirements must be communicated to suppliers seamlessly. The company must identify those vendors who can delivery quality materials in the required time frame. A delay in supplies would delay the production process. A company cannot afford this in e-commerce business. Automatic exchange of information using EDI (Electronic Data Interchange) or Integrated ERP systems would ensure that the vendors receive material requirements in a timely manner.

**Production**

As discussed earlier, the production must be in accordance with the customer order. This requires a shift in approach of the production team. Business environments have shifted from “Customer will buy what we produce” to “We have to produce what the customers require”. The company would ideally not produce products to store them and sell later.

**Logistics**

Logistics would be the backbone of entire e-commerce set up. Right from sourcing of materials to delivery of products at the customer’s door step, logistics would play an important role. If the company has an in-house logistics facility, the logistics team must be trained with the requirement of the new business. If the company has outsourced the logistics, vendors must be briefed about the requirements of the e-commerce. The company might have to tie up with new logistic vendors to avoid any delay in deliveries.

❖ ❖ ❖