

-
- proportion of sales in a particular market.
- Measured as sales revenue, sales volume or number of customers.
- Estimates of total market size obtained from trade associations and industry groupings.
- Indicates whether strategy adopted is achieving expected results in the target markets.

Customer retention

- Ensuring existing customers are retained, this will maintain or increase market share.
- Measured in terms of average duration of customer relationship.
- Surveying defecting customers and their reasons can provide valuable feedback.
- Customer loyalty can be measured by number of new customers referred by existing customers.

Customer acquisition / satisfaction

- Measured by either number of new customers or total sales to new customers in the desired segment.
- Other measures include the number of new customers expressed as a percentage of prospective inquiries, or the ratio of new customers per sales call.
- Customer satisfaction
 - Involves use of questionnaire surveys and customer response cards.
 - Also measured by letters of complaint, and other means of feedback.

Customer profitability

- Profitability should be analysed by different customer segments.
- Unprofitable segments identified.
- Newly acquired customers may initially be unprofitable, life-cycle profitability analysis should be used.
- Actions to make customers profitable may include altering their buying behavior so they consume less resources, or price increases.

LECTURE # 35

The internal business perspective*

- Creating satisfied and loyal customers only translates into achieving financial objectives by ensuring that the key internal business processes are effective and efficient.
- The internal business process measures should focus on the internal processes that are required to achieve the organizations customer and financial objectives.
- Three principal internal processes are:
 - Innovation processes
 - Operation processes
 - Post-sales service processes

Innovation processes

- In innovation processes managers research the needs of customers and then create the products or services that will meet those needs.
- Objectives of innovation process include:
 - Increasing the number of new products
 - Decreasing the time to develop new products
 - Identifying new markets and customers

Innovation processes

- Companies are becoming increasingly aware that success in developing a continuous stream of innovative products services can provide a competitive advantage.
- Research and development has become a more important element in the value chain of most businesses.
- Measures observed in organizations include:
 - Percentage sales from new products
 - New product introduction vs competition / plan
 - Number of key items in which Co is 1st or 2nd.

Operation processes

- The operation process starts with the receipt of the customer order, and finishes with the delivery of the product to the customer.
- Objectives of operation process include:
 - Decreasing process time
 - Increasing process efficiency
 - Improving product quality
 - Decreasing processing cost
- Performance and control measures have traditionally relied on financial measures such as standard costs, budgets and variance analysis.
- This over-emphasis sometimes motivated dysfunctional actions. E.g.
 - Pursuit of efficiency encouraged maximum utilization of labor and machines, resulting in excessive inventories, not related to current customer orders.

Cos have added measures of quality, reliability, delivery, that provide value to customers as a result of global competitive environment.

Cycle time measures

- Many customers place a high value on short and reliable lead time.
- This is measured by the time taken from placing an order until the time the desired product is received.
- Traditionally companies met this requirement by holding large inventories of many different products. This is not consistent with being low cost producer.
- Companies are adopting JIT systems to achieve both low cost and short lead-time objectives.
- Reducing cycle time is hence critical for JIT companies.

Post sales service processes

- The final category relating to internal business process perspective includes warranty and repairs, treatment of defects and returns, and the process and administration of customer payments.
- Post sale service performance can be measured by applying some of the time, quality and cost measures that have been suggested for the operating processes.
- E.g cycle time to measure speed of response to failures; activity cost to measure cost of resources being used for the post sale service.

The learning and growth perspective

- Identifies the infrastructure that the business must build to create long-term growth and improvement.
- Investing in the future other than in assets and R&D (which is included in innovation in the internal processes perspective).
- People, systems and organization procedures to provide capabilities that enable accomplishment of other three perspectives.

- **Three principal categories:**

- Employee capabilities
- Information system capabilities
- motivation, empowerment and alignment

Virtually no effort has been devoted to measuring the outcomes relating to the above three categories.

Employee capabilities*

- Three common core measurement outcomes:
 - Employee satisfaction: measured using surveys, typically they are requested to specify on a scale from dissatisfied to highly satisfied, for a list of questions that measure employee satisfaction. Examples of questions relate to: involvement in decisions, encouragement to be creative and use initiative.
 - Employee retention: can be measured by annual percentage of key staff that leave.
 - Employee productivity: many methods can be used, a generic method is sales revenue per employee.

Information system capabilities*

- Excellent information is needed on customers, internal processes and financial consequences of decisions.
- Measures of strategic information availability include: percentage of processes with real time: quality, cycle-time and cost feedback. And percentage of on-line information about customers.

Motivation, empowerment and alignment

- Proposed measure for motivated and empowered employees is the number of suggested improvements per employee.

- Performance drivers focus on whether departments and individuals have their goals aligned with company objectives, and articulated in the balanced scorecard.

LECTURE # 36

Quantitative models for the planning and control of stocks*

- Investment in stocks represents a major asset in most organizations.
- To determine optimum level of investment in stocks, two conflicting requirements must be met.
- First, stocks must be sufficient to meet requirement.
- Second, it must avoid holding surplus stock that are unnecessary and increase the risk of obsolescence.

The optimal stock level

- The optimal stock level lies somewhere between these two extremes.
- We will examine the application of quantitative models for determining the optimum investment in stocks.
- We shall consider the economic order quantity and the level at which stocks should be replenished.

Reasons for holding stocks

There are three general reasons for holding stocks:

- Transaction motive – to meet production and sales requirements.
- Precautionary motive – where supply of raw materials is unreliable.
- Speculative motive – where future input prices are expected to change.
- The quantitative models incorporate only the transactions motive for holding stock

Relevant costs for the quantitative model

- Relevant costs for determining optimum stock level are holding costs and ordering costs.
- Holding costs consist of:
 - Opportunity cost of investment in stocks
 - Variable insurance cost:
 - Variable warehouse and storage cost;
 - Variable material handling cost
 - Cost of obsolescence and deterioration in stocks
- Holding costs not affected by changes in stock levels are not relevant costs.

Relevant holding costs

- Warehousing and storage: salary of storekeeper, depreciation of equipment, fixed rental of buildings and equipment are irrelevant.
- If space can be rented out, it should be included as opportunity cost.
- Insurance cost should be included only when premiums are charged on fluctuating levels of stocks. Fixed annual insurance cost is not a relevant holding cost.
- The opportunity cost of holding stocks is reflected in the required return from investment.

Relevant ordering costs*

- Ordering costs consist of preparing a purchase order, receiving deliveries and paying invoices.
- To estimate variable cost of ordering, the number of orders placed is used.
- The cost of acquiring stock is not relevant as it remains unchanged irrespective of the order size or stock level. (except where quantity discounts are available – discussed later).

- Ordering and holding costs will change in relation to the order size, these will be relevant for decision making models.

Economic order quantity (EOQ)

- If more units are ordered at one time, fewer orders will be required per year. This will mean reduction in ordering cost.
- However, when fewer orders are placed, larger average stocks must be maintained, this leads to an increase in holding stocks.
- The optimum order size is one where the total amount of ordering and holding costs are minimized. This is known as the Economic Order Quantity (EOQ).

Example - EOQ

- A company purchases a raw material from an outside supplier at a cost of Rs 9 per unit. The total annual demand for this product is 40,000 units, and the following additional information is available.

- Required annual return on investment in stocks (10% x Rs9)
0.9
- Other holding cost per unit 0.1
- Holding cost per unit 1.00
- Cost per purchase order 2.00

Determine optimal order quantity.

Example - EOQ

Order quantity	200	400	600	800
Average units in stock	100	200	300	400
Number of Purchase orders	200	100	67	50

Annual holding cost (Rs)		100	200	300	400
Annual ordering cost (Rs)	400	200	134	100	
Total relevant cost(Rs)	500	400	434	500	

The Economic Order Quantity (EOQ) is 400 units. At this point the total annual relevant costs are at a minimum.

Note

No of Pos D/ order qty; Holding cost=avg stock* Rs1 per unit

EOQ Graph

- P 1079
- Fig 25.1
- Please insert from Colin Drury book, 6th edition.

EOQ – formula method

- Economic order quantity can be found by applying a formula.
- The formula incorporates basic relationship between holding and ordering costs, and order quantities.
- Number of orders for a period is the total demand for the period (D) divided by the quantity in each order (Q).
- The ordering cost is obtained by multiplying the number of orders for a period by the cost per order (O).

EOQ – formula method

- Hence ordering cost is given by:
- Demand for the period x cost per order = DO quantity in each order Q

- Holding costs will be the average stock ($Q/2$) multiplied by the holding cost per unit (H).
- quantity of order/2 x holding cost per unit = $\frac{QH}{2}$ 2

image slide

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2

EOQ – formula method

- Total cost for any order qty (TC) = $\frac{DO}{Q} + \frac{QH}{2}$
- We can determine the minimum with respect to Q as $Q = \frac{2 DO}{H}$
 - Q: quantity ordered; D: demand for the period
 - O: cost per order; H: holding cost per unit

Assumptions of EOQ formula

- Holding cost per unit will be constant – additional storekeepers might be hired as the stocks increase beyond a certain level.
- Average stock balance is equal to one half of the order quantity i.e. constant amount of stock is consumed per day.
- Despite the approximations in the data, the calculation of EOQ is still likely to be useful.

Example - EOQ

- In the example discussed earlier, if we apply the formula method, the result is:

$$\begin{aligned}\text{Total cost TC for EOQ of 400 units} &= \frac{DO}{Q} + \frac{QH}{2} \\ &= \frac{40000}{400} \times 2 + \frac{400 \times 1}{2} \\ &= \text{Rs } 400.\end{aligned}$$

LECTURE # 37

Relevant holding costs*

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- `<iframe width="425" height="349" src="http://www.youtube.com/embed/jHZTIEPpOCA" frameborder="0" allowfullscreen></iframe>`

Note: EOQ – vehicles at a petrol station filling petrol; people at ATM machines drawing cash; scene of warehouse operation.

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- Hence ordering cost is given by:
- $\frac{\text{Demand for the period}}{Q} \times \text{cost per order} = \frac{DO}{Q}$ quantity in each order
- Holding costs will be the average stock ($Q/2$) multiplied by the holding cost per unit (H).
- $\frac{\text{quantity of order}}{2} \times \text{holding cost per unit} = \frac{QH}{2}$
- Total cost for any order qty ($TC = \frac{DO}{Q} + \frac{QH}{2}$)
- We can determine the minimum with respect to Q as $Q = \text{square root of } \frac{2 DO}{H}$
 - Q: quantity ordered; D: demand for the period

O: cost per order; H: holding cost per unit

Assumptions of EOQ formula

- Holding cost per unit will be constant – additional storekeepers might be hired as the stocks increase beyond a certain level.
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Example of eoq

- In the example discussed earlier, if we apply the formula method, the result is:

Total cost TC for EOQ of 400 units = $\frac{DO}{Q} + \frac{QH}{2}$

$\frac{40000}{400} + \frac{400 \times 1}{2}$

= $40000 \times 2/400 + 400 \times 1 / 2$

= Rs 400.

LECTURE # 38

Optimum lot size for a production run