

## **Demand Forecasting**

All organizations operate in an atmosphere of uncertainty but decisions must be made today that affect the future of the organization. There are various ways of making forecasts that rely on logical methods of manipulating the data that have been generated by historical events. A forecast is a prediction or estimation of a future situation, under given conditions. Demand forecast will help the manager to take the following decisions effectively.

The major short run decisions are:	The major long run decisions are:
<ul style="list-style-type: none"><li>➤ Purchase of inputs</li><li>➤ Maintaining of economic level of inventory</li><li>➤ Setting up sales targets</li><li>➤ Distribution network</li><li>➤ Management of working capital</li><li>➤ Price policy</li><li>➤ Promotion policy</li></ul>	<ul style="list-style-type: none"><li>➤ Expansion of existing capacity</li><li>➤ Diversification of the product mix</li><li>➤ Growth of acquisition</li><li>➤ Change of location of plant</li><li>➤ Capital issues</li><li>➤ Long run borrowings</li><li>➤ Manpower planning</li></ul>

The steps to be followed:

- Identification of objectives
- Nature of product and market
- Determinants of demand
- Analysis of factors
- Choice of technology
- Testing the accuracy

Criteria to choose a method of forecasting are:

- Accuracy
- Plausibility
- Durability
- Flexibility
- Availability

The following are needed for demand forecasting:

- Appropriate production scheduling
- Suitable purchase policy
- Appropriate price policy
- Setting realistic sales targets for salesmen
- Forecasting financial requirements
- Business planning
- Financial planning
- Planning man-power requirements

To select the appropriate forecasting technique, the manager/forecaster must be able to accomplish the following:

1. Define the nature of the forecasting problem
2. Explain the nature of the data under investigation
3. Describe the capabilities and limitations of potentially useful forecasting techniques.
4. Develop some predetermined criteria on which the selection decision can be made.

## **Demand Forecasting Methods:**

1. Survey of buyers' intension
2. Delphi method
3. Expert opinion
4. Collective opinion
5. Naïve model
6. Smoothing techniques
7. Time series / trend projection
8. Controlled experiments
9. Judgmental approach

## Time Series / Trend Projection

linear trend             $Y = a + b X$

---

### **Linear Trend Equation:**

$$Y = a + b X$$

$Y =$  demand

$X =$  time period



$$\Sigma Y = na + b\Sigma X \quad \text{-----} \quad \text{(i)}$$

$$\Sigma XY = a\Sigma X + b\Sigma X^2 \quad \text{-----} \quad \text{(ii)}$$

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Sales	22734	24731	31489	44685	55319	91021	146234	107887	127483	97275

Estimate the sales for 2012, 2015 and fit a linear regression equation and draw a trend line.

Year	X	Sales (Y)	XY	X <sup>2</sup>
2002	1	22734	22734	1
2003	2	24731	49462	4
2004	3	31489	94467	9
2005	4	44685	178740	16
2006	5	55319	276595	25
2007	6	91021	546126	36
2008	7	146234	1023638	49
2009	8	107887	863096	64
2010	9	127483	1147347	81
2011	10	97275	972750	100
	$\Sigma X = 55$	$\Sigma Y = 748858$	$\Sigma XY = 5174955$	$\Sigma X^2 = 385$

$$\Sigma Y = na + b\Sigma X \quad \text{-----} \quad (i)$$

$$\Sigma XY = a\Sigma X + b\Sigma X^2 \quad \text{-----} \quad (ii)$$

$$748858 = 10a + 55b \quad \text{-----} \quad (i)$$

$$5174955 = 55a + 385b \quad \text{-----} \quad (ii)$$

$$\text{Equation (i) } \times \bar{X} \quad 5242006 = 70a + 385b \quad \text{-----} \quad (iii)$$

$$\text{Equation (iii) } - (ii) \quad 67051 = 15a$$

$$\underline{4470.07} = \underline{a}$$

Substitute value of 'a' in equation (i)

$$748858 = 44700 + 55b$$

$$55b = 748858 - 44700$$

$$\underline{b} = \underline{12802.8}$$

$$Y = a + b X$$

$$Y = 4470.07 + 12802.8 X$$

$$\text{Sales for 2012} = 4470.07 + 12802.8 (11) = 145300.87$$

$$\text{Sales for 2015} = 4470.07 + 12802.8 (14) = 183709.27$$

### Trend in Sales

