

Managerial Economics

Unit-2 Supply & Forecasting

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Concept of Supply: Law of Supply, Factors affecting Supply, Elasticity of supply.

Demand Forecasting: Introduction, Meaning and Forecasting, Methods or Techniques of Demand Forecasting, Criteria for Good Demand Forecasting, Demand Forecasting for a New Product;

In This Unit We Cover the Following Topics

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Please welcome for any correction or misprint in the entire manuscript and your valuable suggestions kindly mail us brijrbedu@gmail.com.

2.1 CONCEPT OF SUPPLY

Supply of a commodity refers to the quantity of commodity offered for sale at a particular price & time. In other words, supply of a commodity means quantity of a commodity that a seller (Firm) is willing to sell in the market at a given price in a given period of time.

In the words of *Prof. Benham*, “Supply may mean the amount offered for sale per unit of time.”

In the words of *Thomas*, “The supply of goods is the quantity offered for sale in a given market at a given time at various prices.”

Just like demand, supply also has 3 elements which are:-

- a) Quantity of the commodity. b) Price of the commodity. c) The period of time.

2.2 FACTORS AFFECTING/DETERMINANTS OF SUPPLY

Price of the commodity→ There is a direct relationship between price of a commodity and its quantity supplied. Therefore, a producer usually offers more quantity of commodity for sale at a higher price and less quantity at a lower price. It is obvious that every businessman wants to increase his profits and is Ok if the prices are high.

Price of Other goods→ An increase in the prices of other goods makes them more profitable for the firms. They will increase their supply. While, if the prices of other goods decreases, the supply of the good become relatively less profitable. The supply of such a good may decrease.

Change in Technology→ Improvement in the technique of production reduces cost of production. Consequently, profits tend to increase inducing an increase in supply.

Objectives of the Firm→ If the objective of the firm is to maximize profits & sales, more quantity of a commodity will be offered at high price. Sometimes companies increase their supply not to get more profits. Rather they are aiming at capturing market share, adding new customers, prestige, to keep away competition, etc.

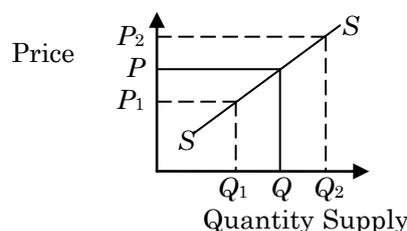
Expected Future Price→ If the producer expects price of the commodity to increase in the near future, current supply of the commodity should reduce. If on the other hand, fall in the price is expected, current supply should increase.

Government Policy→ Taxation and subsidy policy of the Government also effect market supply of the commodity. Increase in taxation tends to reduce the supply, while subsidies tend to induce greater supply of the commodity.

2.3 LAW OF SUPPLY

The law of supply explains the relationship between price and quantity supplied. It states that, “Other things being equal, if the price of a commodity falls, the quantity supplied of it will also fall and if the price of a commodity rises, its quantity supplied will also rises.” It means quantity supplied of a commodity is directly or positively related to the price of the commodity.

According to *Prof. Marshall*, “The law of supply states that other things being equal, the amount supplied increases with a rise in price and diminishes with a fall in price.” The law of supply holds good when “other things remain constant.” It means factors influencing supply, other than price, are assumed to be constant.



Assumptions of the Law of Supply

1. There should be no change in the price of related goods.
2. There should be no change in the technology of production.
3. There should be no change in objectives of the firm.
4. There should be no change in the Government Policy.
5. Producers do not expect change in the price of the commodity in the near future.

Why Does Supply Curve Slopes Upwards To the Right?

Change in Stock→ With price rise more quantity is supplied out of the old stock while lesser supply is made with the fall in price. There is release of inventories with price rise.

Profit & Loss→ Rising prices generally result in higher profits and increased production, so increased supply. While, lower prices resulting in losses, decrease the supply.

Entry & Exit of the Firms→ Rising prices accompanies by higher profits motivate new firms to join the industry, and thereby increasing the supply. In case of loss, existing firms try to quit the industry and supply is reduced.

Exceptions to the Laws of Supply

Future Expectation about change in prices→ If the producers expect fall in prices in future, the producers will supply more despite the falling prices. To avoid loss in future, supplier behaves against the law of supply.

Supply of Agricultural Goods→ The supply of agricultural goods is regulated by rainfall, fertility of the land and weather conditions in place of prices.

Perishable Goods→ Since these goods cannot be stored for a long period; the producers supply them irrespective of their prices in the market. These goods are such as milk, green vegetables, fruits, sweets, etc.

Disposal of Old Stock→ To clear the back log of old stocks, the sellers are interested in the sales without bothering about the prices.

2.4 ELASTICITY OF SUPPLY

Elasticity is a measure of the responsiveness of one variable to change in other. It means the responsiveness (or reaction) of the quantity supplied of a good to change in one of the variables on which supply depends.

It means degree of responsiveness of supply to change in its price. It means the ratio of the percentage change in quantity supplied to a percentage change in the price. In other words, it is measured as percentage change in quantity supplied divided by the percentage change in price.

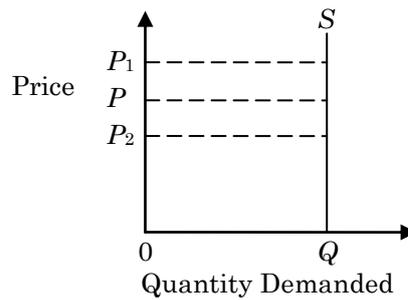
$$\text{Elasticity of Supply } (E_s) = \frac{\% \text{ change in supply}}{\% \text{ change in price}}$$

$$E_s = \frac{\frac{\text{Change in supply}}{\text{Original supply}} \times 100}{\frac{\text{Change in price}}{\text{Original price}} \times 100} = \frac{\text{Change in supply}}{\text{Change in price}} \times \frac{\text{Original price}}{\text{Original supply}}$$

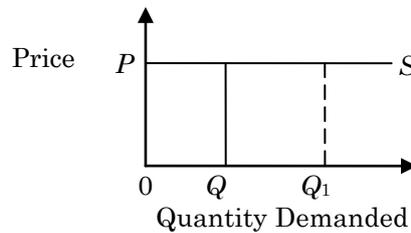
$$E_s = \frac{\Delta S}{\Delta P} \times \frac{P}{S}$$

2.5 TYPES/DEGREES OF ELASTICITY OF SUPPLY

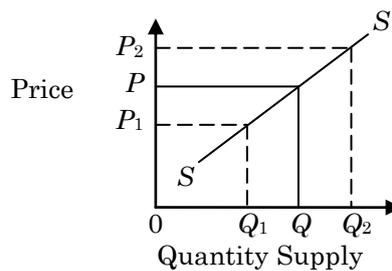
Perfectly Inelastic Supply ($E_s = 0$) → When quantity supplied does not change at all in response to change in price of a commodity.



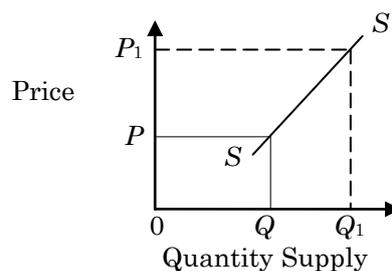
Perfectly Elastic Supply ($E_s = \infty$) → When the supply for a commodity expands to any extent without any change or with very little change in price.



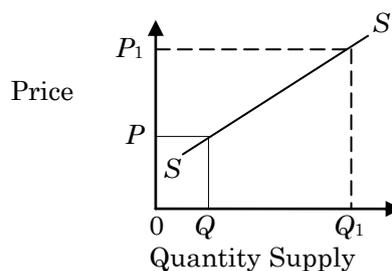
Unit Elastic Supply ($E_s = 1$) → When percentage change in supply is equal to percentage change in price.



Less than Unit Elastic Supply ($E_s < 1$) → When percentage change in quantity supplied is less than percentage change in price.



More than Unit Elastic Supply ($E_s > 1$) → When percentage change in quantity supplied is more than percentage change in price.



2.6 MEANING OF DEMAND FORECASTING

Business is full of uncertainties and so is the behavior of the consumer. We see changes in consumer tastes, preferences over time, new product enters the market and new techniques occur. In short, all calculations and speculations of a firm regarding its product, size of output, nature of commodity, quality and sales strategy, etc. depend on demand. The most successful firm is one whose estimates of demand are very near to the actual demand. Therefore, the knowledge of future demand is crucial for both new firms and those planning to expand the scale of production. Since output is to be sold, sale forecasts are required to decide the quantity of production.

Demand forecasting is the art of predicting demand for a product or service at some future date on the basis of certain present and past behavior patterns of some related events. In simple words, a demand forecast refers to the prediction or estimation of a future situation under given constraint.

Demand forecasting is no simple guessing but it refers to estimating scientifically and objectively on the bases of certain facts & events relevant to the art of forecasting.

Characteristics

Characteristics or features of forecasting are as follows:-

1. Forecasting is concerned with future events.
2. It shows the probability of happening of future events.
3. It analysis past and present data.
4. It uses statistical tools and techniques.
5. It uses personal observations.

Objectives/Need/Significance of Demand Forecasting

Formulation of Production Policy→ Demand forecasting enables to formulate the appropriate production policy to overcome the problems related to over-production and under-production.

Regular Availability of Labor→ Demand forecasting enables the business to properly arrange the availability and supply of skilled as well as unskilled workers to meet the production requirement scheduled during a given period of time.

Regular supply of Raw Material→ By determining the volume of production during a given period of time, the business can forecast the requirement of raw material for production in future.

Arrangement of Funds→ Demand forecasting enables to estimate the financial requirements of the enterprise to have the desired output.

Price Policy Formulation→ Demand forecasting enables the management to formulate the suitable price strategy or policy.

Decide about Expansion→ Demand forecasting also enables the business to plan for a new project, as well as expansion and modernization of the existing unit(s).

2.7 FORECASTING HORIZON

The forecast horizon is the length of time into the future for which forecasts are to be prepared. These generally vary from short-term forecasting horizons (less than three months) to long-term horizons (more than two years).

Types of Forecasting Horizon

For more information log on www.brijrbedu.org

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Short Term Forecasting: Short term demand or sales forecasting are made for a period of less than three months. Important objectives of short term demand forecasting are:

1. Determination of a suitable production policy.
2. Regular supply of raw materials.
3. Best utilization of machines.
4. Regular availability of labour and job assignments.
5. Determination of price policy.
6. Setting sales target, establishing control and providing incentives.
7. Forecasting of short term financial requirements.

Medium term forecasting: Medium term forecasting is made for a period of three months to two years. It is used for production planning, sales planning, increasing department capacities etc. Important objectives of medium term forecasts are-

1. Product mix
2. Department capacities
3. Sales planning
4. Production planning and budgeting

Long term forecasting: Long term demand or sales forecasting are made for a period of more than two years. Important objectives of long term demand forecasting are:

1. Planning of long term production
2. Planning of plant capacity
3. Provision of labour
4. Forecasting of long term financial requirements
5. Planning about expansion, modernization of existing plant and setting up of a new project.
6. Planning for new projects.

Management of the enterprise must be very careful and vigilant while preparing long term demand forecasting because if these forecasting are wrong, it can be very harmful for the enterprise.

2.8 STEPS TO FORECASTING

Procedure, stages or general steps involved in forecasting are given below:-

Analyzing and understanding the problem: The manager must first identify the real problem for which the forecast is to be made. This will help the manager to fix the scope of forecasting.

Developing sound foundation: The management can develop a sound foundation, for the future after considering available information, experience, type of business, and the rate of development.

Collecting and analyzing data: Data collection is time consuming. Only relevant data must be kept. Many statistical tools can be used to analyse the data.

Estimating future events: The future events are estimated by using trend analysis. Trend analysis makes provision for some errors.

Comparing results: The actual results are compared with the estimated results. If the actual results tally with the estimated results, there is nothing to worry. In case of any major difference between the actual and the estimates, it is necessary to find out the reasons for poor performance.

Follow up action: The forecasting process can be continuously improved and refined on the basis of past experience. Areas of weaknesses can be improved for the future forecasting. There must be regular feedback on past forecasting.

2.9 METHODS OR TECHNIQUES OF DEMAND FORECASTING

Qualitative Methods

In qualitative methods, forecasting is done by obtaining information about the likes and dislikes of consumers. Hence, these methods are suited for short term forecasting. Forecasts for new products can be only made by qualitative methods because no past data is available that can be analyzed. Qualitative techniques provide the means to adjust the forecast using the experience and judgment of people knowledgeable about the product being forecast and the environment affecting the forecast.

Merits:

- a. Changes in sales pattern can be predicted.
- b. Decision makers can incorporate rich data sources consisting of their intuition, experience, and expert judgment.

Demerits:

- a. It is expensive and time consuming.
- b. It leads to inconsistencies in judgment due to moods and emotions of forecasters.
- c. The future ability to forecast accurately may be reduced when a forecaster tries to justify, rather than understand, a forecast that proves to be inaccurate information.

Expert Opinion Method→ This method is also known as defiling method of investigation. In this method, instead of depending upon the opinion of buyers and salesmen, firms can obtain views of the specialists or experts in their respective fields. Opinions of different experts are sought and their identity is kept secret. These opinions are then exchanged among the various experts and their reactions are sought and analyzed.

Merits:

- a. It is simple to conduct.
- b. It takes little time.
- c. It is inexpensive.
- d. Can be used where quantitative data is not possible.

Demerits:

- a. The expert may be biased.
- b. The results are based on opinion of one or more persons and not on scientific analysis. Hence, this method lacks reliability.
- c. The method is subjective and the forecast could be unfavorably influenced by persons with vested interests.

Survey Methods: – Survey methods are generally used where the purpose is to make short-run forecast of demand. Under this method, consumer surveys are conducted to collect information about their intentions and future purchase plans. This method includes:

- a) **Consumer Complete Enumeration Survey:** In this method, almost all potential users of the product are contacted and asked about their future plan of purchasing the product in question. The quantities indicated by the consumers are added together to obtain the probable demand for the product.

Limitations:

- a. Consumers themselves may not know their actual demand in future and hence may be unable or unwilling to answer the query.
- b. Even if, they answer, their answer to hypothetical questions may be only hypothetical and not real,
- c. Consumers response may be biased according to their own expectations about the market conditions
- d. Their plans may change with a change in the factors not included in the questionnaire.

- b) **Sample Survey:** Under this method, only a few potential consumers and users selected from the relevant market through a sampling method are surveyed. Method of survey may be direct interview or mailed questionnaire to the sample-consumers.

Merits:

1. This method is simpler
2. This method is less costly
3. This method is less time-consuming
4. This method is generally used to estimate short-term demand.

Limitations: The sample survey method is widely used to forecast demand. This method however has some limitations similar to those of complete enumerations method.

- c) **Sales force opinion survey:** It is also called as a Collective opinion method. In this method, sales persons are required to estimate expected sales in their respective territories. The rationale of this method is that sales persons being closest to the customers are likely to have the most intimate feel of the market. These estimates of salesman are consolidated to find out the total estimated sales. These estimates are reviewed to eliminate the bias of optimism on the part of some salesmen and pessimism on the part of others.

Merits:

1. It is less costly.
2. Collecting data from its own employees is easier for a firm than to do it from external parties.
3. It is based on firsthand knowledge of the salesmen.

Demerits:

1. Consumer's tastes and preferences keep changing with time.
2. The sales person may give the lower estimates alone are used to set their sales quotas.
3. The sales persons are more concerned with making sales rather than with forecasting sales.

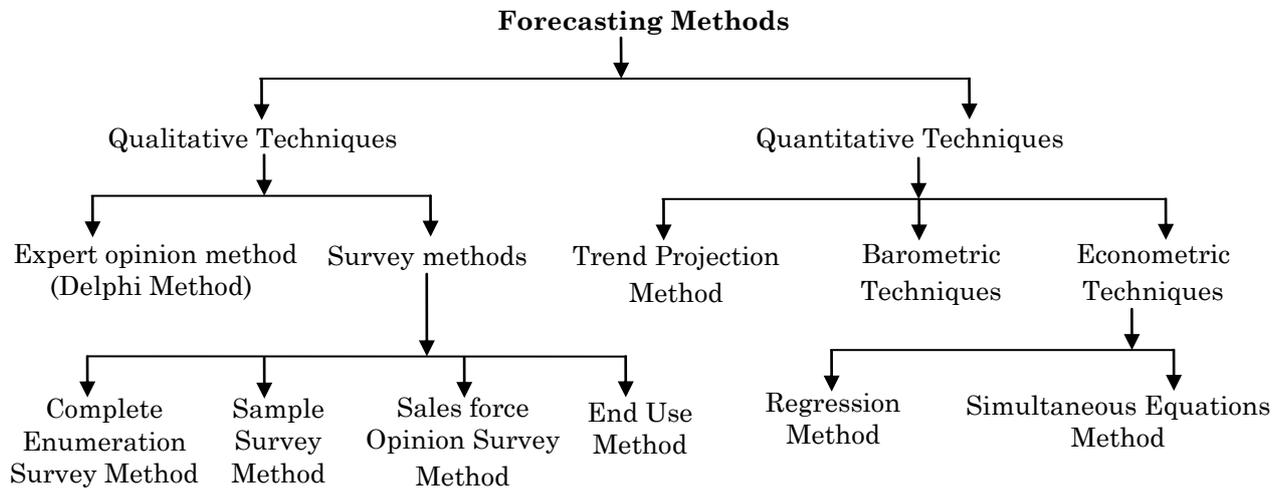
- d) **End Use Method:** The end-use method of demand forecasting has a considerable theoretical and practical value, especially in forecasting demand for inputs. Making forecasts by this method requires building up a schedule of probable aggregate future demand for inputs by consuming industries and various other sectors. In this method, technological, structural and other changes which might influence the demand are taken into account in the very process of estimation.

Merits:

1. The method yields accurate predictions
2. It provides sector wise demand forecast for different industries.
3. It is especially useful for producer's goods.

Demerits:

1. It requires complex and diverse calculations.
2. It is costlier as compared to the other survey methods and is more time consuming.
3. The method is subjective and the forecast could be unfavorably influenced by persons with vested interests.

2.10 FORECASTING METHODS**Quantitative Methods**

These are forecasting techniques that make use of historical quantitative data. It is also called as a statistical method.

Trend projection Method: Trend projection method is a classical method of business forecasting. This method is essentially concerned with the study of movement of variable through time. The use of this method requires a long and reliable time-series data. There are two techniques of trend projection based on time-series data:

Graphical Method: A trend line can be fitted through a series graphically. Old values of sales for different areas are plotted on a graph and a free hand curve is drawn passing through as many points as possible. The direction of this free hand curve shows the trend.

Fitting Trend Equation or Least Square Method: The least squares method is a form of mathematical regression analysis that finds the line of best fit for a dataset, providing a visual demonstration of the relationship between the data points. Each point of data is representative of the relationship between a known independent variable and an unknown dependent variable.

Barometric methods of forecasting: The barometric method of forecasting follow the method meteorologists use in weather forecasting. Meteorologists use the barometer to forecast weather conditions on the basis of movements of mercury in the barometers. Following the logic of this method, many economists use economic indicators as a barometer to forecast trends in business activities. This method was first developed and used in the 1920s by the Harvard Economic Service. The basic approach of barometric technique is to construct an index of relevant economic indicators and to forecast future trends on the basis of movements in the index of economic indicators. The indicators used in this method are classified as:

- Leading Indicators
- Coincidental Indicators
- Lagging Indicators

Econometric methods: The econometric methods combine statistical tools with economic theories to estimate economic variables and to forecast the intended economic variables. The forecasts made through econometric methods are much more reliable than those made through any other method. The econometric methods are therefore most widely used to forecast demand for a product for a group of products and for the economy as a whole. The econometric methods are briefly described under two basic methods:

- a) **Regression analysis:** Regression analysis is the most popular method of demand estimation. This method combines economic theory and statistical techniques of estimation in regression technique of demand forecasting, the analysts estimate the demand function for a product. In the demand function, the quantity to be forecast is a dependent variable and the variables that affect or determine the demands are called independent variables.
 - *Simple regression technique:* In simple regression technique a single independent variable is used to estimate a statistical value of the dependent variable.
 - *Multi-variate regression:* The multi-variate regression equation is used where demand for a commodity is deemed to be the function of many variables or in cases in which the number of explanatory variables is greater than one.
- b) **Simultaneous Equation Model:** In explaining this model, it will be helpful to begin with a comparison of simultaneous equation method with regression method. Regression technique of demand forecasting consists of a single equation. In contrast, the simultaneous equations model of forecasting involves estimating several simultaneous equations. These equations are, generally:
 - Behavioural Equations
 - Mathematical Identities

2.11 CRITERIA FOR EFFICIENT DEMAND FORECASTING

The criteria that need to be considered before forecasting the demand for a product are as follows:

Accuracy: Implies that an organization should make forecasts close to real figures, so that the real picture of demand can be determined. For example, there would be an increase in sales in the coming years is an inaccurate forecast. On the other hand, there would be an increase in sales by 30% in the next year is an accurate forecast.

Durability: Implies that forecasts should be done in such a way that they can be used for long periods as forecasts involves a lot of time, money, and efforts.

Flexibility: Implies that the forecasts should be adjustable and adaptable to changes. In today's uncertain business environment, there is a rapid change in the tastes and preferences of consumers, which affect the demand for products. Therefore, the demand forecasts made by an organization should reflect those changes.

Apart from this, an organization, while making forecasts, should consider various business risks that may take place in the future.

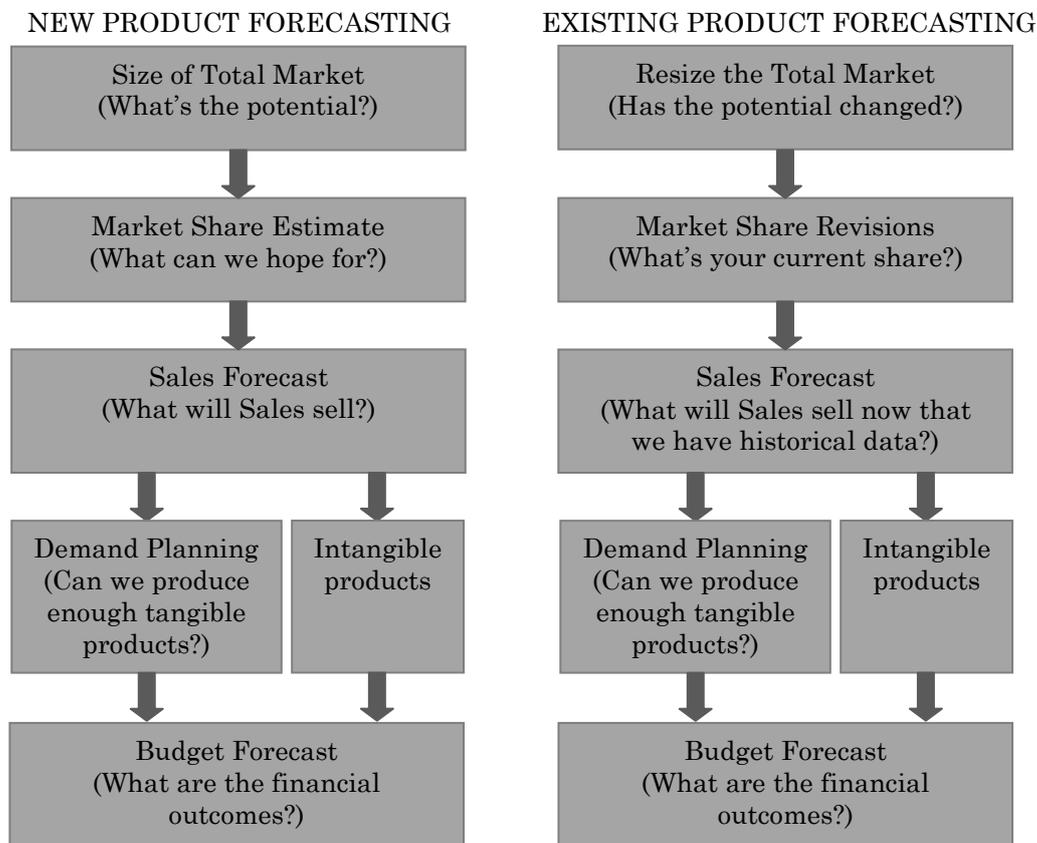
Acceptability: Refers to one of the most important criterion of demand forecasting. An organization should forecast its demand by using simple and easy methods. In addition, the methods should be such that organizations do not face any complexities. However, organizations generally prefer advanced statistical methods, which may prove difficult and complex.

Availability: Implies that adequate and up-to-date data should be available for forecasts. The forecasts should be done in timely manner so that necessary arrangements should be made related to the market demand.

Plausibility: Implies that the demand forecasts should be reasonable, so that they are easily understood by individuals who are using it.

Economy: Implies demand forecasting should be economically effective. The forecasting should be done in such a manner that the costs should be minimized and benefits should be maximized.

Forecasting for a New Product



2.12 METHODS OR TECHNIQUES OF DEMAND FORECASTING

Survey of Buyer's Intentions

The most direct method of estimating demand is to ask customers what they are planning to buy for the forthcoming time period usually a year. Thus in this method the burden of forecasting is put on the customers. However, it would not be wise to depend wholly on the buyer's estimates and they should be used cautiously in the light of the seller's own judgment.

Collective Opinion Method

In this method, sales persons are required to estimate expected sales in their respective territories. The rationale of this method is that sales persons being closest to the customers are likely to have the most intimate feel of the market. These estimates of salesman are consolidated to find out the total estimated sales. These estimates are reviewed to eliminate the bias of optimism on the part of some salesmen and pessimism on the part of others.

Expert Opinion Method

This method is also known as defile method of investigation. In this method, instead of depending upon the opinion of buyers and salesmen, firms can obtain views of the specialists or experts in their respective fields. Opinions of different experts are sought and their identity is

kept secret. These opinions are then exchanged among the various experts and their reactions are sought and analyzed.

Business Barometers

A very economical method of demand forecasting is the use of business barometers or indicators of various economic phenomena. Some of the important indicators which help businessmen in demand forecasting are: Gross National Product, Employment, Wholesale prices, industrial production, consumer credit, stock prices, etc.

Trend Projection Method

A firm which has been in existence for some time, will have accumulated considerable data on sales pertaining to different time periods. Such data when arranged chronologically yield 'time series'. The time series relating to sales represent the past pattern of effective demand for a particular product. Such data can be used to project the trend of the time series.

Graphical Method

A trend line can be fitted through a series graphically. Old values of sales for different areas are plotted on a graph and a free hand curve is drawn passing through as many points as possible. The direction of this free hand curve shows the trend.