ANALYSIS OF DEMAND FORECASTING METHODS IMPLEMENTATION IN ECONOMY

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Abstract:

Demand forecasting is a fundamental aspect of inventory management. Forecasts are crucial in determining inventory stock levels, and accurately estimating future demand for spare part's has been an ongoing challenge, especially in the aerospace industry. The papers presents the benefits in reducing the prediction error and improve the precision of requirement forecast, and a group of optimal solution will be selected in these several forecasting methods.

Introduction :

Demand forecasting refers to making estimations about future customer demand using historical data and other information. Proper demand forecasting gives businesses valuable information about their potential in their current market and other markets so that managers can make informed decisions about pricing, business growth strategies, and market potential. Without demand forecasting, businesses risk making poor decisions about their products and target markets.

There are a number of reasons why demand forecasting is an important process for businesses:

- It allows businesses to more effectively optimize inventory, increasing turnover rates and reducing holding costs.
- It provides an insight into upcoming cash flow, meaning businesses can more accurately budget to pay suppliers and other operational costs.
- Anticipating demand means knowing when to increase staff and other resources to keep operations running smoothly during peak periods.

The activity of estimating the quantity of a product or service that consumers will purchase. Demand forecasting involves techniques including both informal methods, such as educated guesses, and quantitative methods, such as the use of historical sales data or current data from test markets. Demand forecasting may be used in making pricing decisions, in assessing future capacity requirements, or in making decisions on whether to enter a new market.

— according to **Cundiff and Still,** *"Demand Forecasting is an estimate of Demand during a specified period. Which estimate is tied to a proposed marketing plan and which assumes a particular set of uncontrollable and competitive forces."*

— In the words of **Prof. Philip Kotler.** The *company (sales) forecast is the expected level of company sales based on a chosen marketing plan and assumed marketing environment*"

— According to **Evan J. Douglas,** *"Demand forecasting may be defined as the process of finding values for demand in future time periods.*"

Demand Forecasting Methods

1.Survey of Buyer's-Intentions:
This is a short-term method of knowing and estimating customer's demand. This is direct method of estimating demand of customers as to what they intend to buy for the forthcoming time—usually a year. By this the burden of forecasting goes to the buyer. This method is useful for the producers who produce goods in bulk.

Still their estimates should not entirely depend upon it. This method does not hold good for household consumers because of their inability to foresee their choice when they see the alternatives. Besides the household consumers there are many which make this method costly and impracticable. It does not expose and measure the variables under management control.

2. Collective Opinion or Sales Force Competitive Method:
Under this method, the salesman are nearest persons to the customers and are able to judge, their minds and market. They better understand the reactions of the customers to the firms products and their sales trends. The estimates of the different salesmen are collected and estimates sales are predicted.

These estimates are revised from time to time with changes in sales price, product, designs, publicity programmes, expected changes in competition, purchasing power, income distribution, employment and population. It makes use of collective wisdom of salesmen, departmental heads and top executives.

Advantages:
(1) It is simple, common sense method involving no mathematical calculations.

(2) It is based on the first-hand knowledge of salesman and the persons directly connected with sales.

(3) This method is particularly useful for sales of new product. It has the salesman's judgment.

Dis-advantages:
(1) It is a subjective approach.

(2) This method can be used only for short-term forecasting.

For long-term planning it is not useful.

3. Trend Projection or Time Trend of the Time Series:
This is the most popular method of analysing time series and is generally used to project the time trend of the time series. A trend line can be filled through the series in visual or statistical way by the method of least squares.

The analyst can make a plausible algebraic relation—may it be linear, a quadratic or logarithmic between sales on one hand and independent variable time on the other. The trend line is then projected into the future for purpose of extrapolation.

Advantages:
This method is most popular as it is simple and in-extensive and because of time series data often exhibits a persistent growth trend.

Assumptions:
The basic assumption of this method is that the past rate of change of the variable under study will be continuing in future. This assumption gives good safe results till the time series exhibits a persistent tendency to move in the same direction.

When the burning point comes, the trend projection breaks down. Even though a forecaster could hope normally to be correct in most forecasts when the turning points are few and spaced at long intervals from each other.

In fact, the actual challenge of forecasting is in the prediction of turning points rather than in the trend projection. At such turning points the management will have to change and revise its sales and projection strategies most drastically.

There are four factors responsible for the characterization of time series.
They are:
1. Fluctuations and turning points.

2. Trend seasonal variations.

3. Cyclical fluctuations, and

4. Irregular or random forces.

The problem in forecasting is to separate and measure each of these factors.

This time series is expressed by the following equation:
O = TSCI

where, O = observed data

T = a secular tend

S = a seasonal factor

C = cyclical element

I = an irregular movement.

The usual practice is to calculate the trend first from the basic data. The trend values are then taken out from the observed data (TSCI /T). The next step is to reckon the seasonal index that is utilised to remove the seasonal effect (SCI/S).

It is fitted through chain to the remainder that also gives the irregular effect. This approach to the breaking up of time series data is an analytical device of usefulness for the knowledge of the nature of business fluctuations.

Assumptions:
(a) Analysis of movements would be in the order of trend, seasonal variations and cyclical changes.

(b) The effects of every component are not dependent on any other components.

4. Executive Judgment Method:
Under this method opinions are sought from the executives of different discipline i.e., marketing, finance, production etc. and estimates for future demands are made. Thus, this is a process of combining, averaging or evaluating in some other way the opinions and views of the top executives.

Advantages:
The main advantages of this method are:
1. The forecasts can be made speedily by analysing the opinions and views of top executives. The techniques is quite easy and simple.
2. No need of elaborate statistics:
There is no need of collecting elaborate. Statistics for the forecasts hence it is not much expensive.

3. Only feasible method to follow:
In the absence of adequate data is it the only feasible method to be followed.

Dis-advantages:
The chief dis-advantages of the of this method are:

(1) No factual basis of such forecast:
There is no factual basis of such forecasts, so the method is inferior to others.

(2) No accuracy:
Accuracy cannot be claimed under this method.

(3) Responsibility for the accuracy of data cannot be fixed on any one

5. Economic Indicators:
This method has its base for demand forecasting on few economic indicators.

(a) Construction contracts:
For demand towards building materials sanctioned for Cement.

(b) Personal Income:
Towards demand of consumer goods.

(c) Agricultural Income:
Towards demand of agricultural imports instruments, fertilisers, manner etc.

(d) Automobiles Registration:
Towards demand of car parts and petrol. These and other economic indicators are given by specialised organisation. The analyst should establish relationship between the sale of the product and the economic indicators to project the correct sales and to measure as to what extent these indicators affect the sales. To establish relationship is not an easy task especially in case of New Product where there is no past records.

Steps:
Following steps may be remembered:
(a) If there is any relationship between the demand for a product and certain economic indicator.

(b) Make the relationship by the method of least squares and derive the regression equation. Supposing the relationship is Linear the equation will be of the form $y = \alpha + bx$. There can be curvilinear relationship also.

(c) Once the regression equation is obtained any value of X (economic indicator) can be applied to forecast the value of Y (demand).

(d) Past relationship may not recur. Therefore, need for value judgments are felt. Other new factors may also have to be taken into consideration.

Limitations:
The limitations of economic indicators are as follows:

(1) It is difficult to find out an appropriate economic indicator.

(2) For few products it is not good, as no past data are available.

(3) This method of forecasting is best suited where relationship of demand with a particular indicator is characterised by a Time Lag, such as construction contracts will give consequence to demand for building materials with some amount of Time Lag.

But where the demand does not Lag behind the particular economic index, the utility is restricted because forecast may have to be based on projected economic index itself that may not result true.

6. Controlled Experiments:
Under this method, an effort is made to ascertain separately certain determinants of demand which can be maintained, e.g., price, advertising etc. and conducting the experiment, assuming etc., and conducting the experiment, assuming that the other factors remain constant.

Thus, the effect of demand determinants like price, advertisement packing etc., on sales can be assessed by either varying them over different markets or by varying them over different time periods in the same market.

For example:
Different prices would be associated with different sales on that basis the price, quantity relationship is estimated in the form of regression equation and used for forecasting purposes. It must be noted that the market divisions here must be homogeneous with regard to income, tastes etc.

Such experiments have been conducted widely in the USA and were successful. This is a new experiment. This is quite new and less applied.

The main reasons for non-application of this method so far as follows:
1. The method is expensive and time consuming.

2. It is risky because it may lead to un-favourable reactions on dealers, consumers and competitors.

3. It is not always easy to determine what conditions should be taken to be constant and what factors should be regarded as variable, so as to separated and measures their influence on demand.

4. It is hard to satisfy the homogeneity of market conditions. In-spite of these drawbacks, controlled experiments have sufficient potentialities to become a useful method for business research and analysis in future.

7. Expert's Opinions:

Under this method expert's opinions are sought from specialists in the field, outside the organisations or the organisation collects opinions from such specialists; views of expert's published in the newspaper and journals for the trade, wholesalers and distributors for the company's products, agencies and professional experts.

These opinions and views are analysed and deductions are made therefrom to arrive at the figure of demand forecasts.

Advantages:

The advantages of this method are:

(1) Forecasts can be done easily and speedily.

(2) It is based on expert's views and opinions hence estimates are nearly accurate.

(3) The method is suitable where past records of sales are not available.

(4) The method is economical because survey is done to collect the data. The expenses of seeking the opinions and views of experts are much less than the expenses of actual survey.

Dis-advantages:

The important dis-advantages of this method are:

(1) Estimates for a market segment cannot be possible.

(2) The reliability of forecasting is always subjective because forecasting is not based on facts.

Conclusion:

Proper demand forecasting enables better planning and utilization of resources for business to be competitive. Forecasting is an integral part of demand management since it provides an estimate of the future demand and the basis for planning and making sound business decisions. A mismatch in supply and demand could result in excessive inventory and stock outs and loss of profit and goodwill. Both qualitative and quantitative methods are available to help companies forecast demand better. Since forecasts are seldom completely accurate, management must monitor forecast errors and make the necessary improvement to the forecasting process.

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