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Demand Forecasting By Time series Analysis

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ABSTRACT

Forecasting Demand denotes an estimation of the level of demand of the product at a future period under given circumstances. This paper helps the firm or the entrepreneur who have estimate for the longer period, i.e., long term demand forecasting. For the long term demand forecasting , some statistical and mathematical techniques needed to predict the future demand . So the researcher adopt the time series model, Auto Regressive (AR process) for the future demand. This paper helps a firm or the Entrepreneur to assess the probable demand for its products and plan its production accordingly. To predict the future demand based on the past demand and price of the firm or the entrepreneur, and present demand and price of the firm or the entrepreneur, researcher used the AR time series model. It will conclude or take a major decision part in the firm or the entrepreneur for their development.

1. Introduction

Nowadays Entrepreneurs or the firm have to plan for the future business by estimating the future situation in current circumstances. Forecasting Demand helps the Entrepreneurs or the firm by estimating the level of demand of the product at a future period under the current and past situation. It is very essential for every firm to produce the products at the right time in the Globalised Market. Forecasting helps a firm or the Entrepreneurs to cope up the demand for its products and plan its production accordingly. Most of the countries, demand is the limiting factor. But In India supply is the limiting factor, because marketing suffer by a higher price of the product and black markets. Whenever the supply is more important, the demand forecasting occupies a major role to compensate the supply in the capital markets. This is the right time to identify the forecasting demand in the globalise markets.

2. Types of forecasting

Forecasting may be classified in to two

1. Short-term demand forecasting
2. Long-term demand forecasting

Short-Term Demand Forecasting

Short-term demand forecasting is the period of one year. It refers all the local markets, like milk vendor, vegetable vendor, fast foods, hotels etc., Because they predict the future demand by short-term demand forecasting and act accordingly. By the day-to-daylife short –term demand forecasting is very useful to the publics or the small scale industries or the entrepreneurs in small level for engage their production and also for short-term planning. Now a days major issue in forecasting is the share market. By the fast going and rushing up the hours, investors can't wait for a long time. Hence they use the short-term demand forecasting for the share market and capital market in a short term investings and short term productions.

Long-Term Demand Forecasting

Long-term demand forecasting involves the study of technological developments, economic trends and consumer preferences, man-power planning, climatic change. Long- term demand forecasting enables to take major strategic business decisions. When forecasting for the longer period means, it may be occur a probability of error. It is very essential to identify the quality and quantity and reduce the probable of error in the long-term demand forecasting. Long-term demand forecasting require some statistical techniques and mathematical model to avoid or reduce the probability error. Then only it is able to predict easily.

3. Methodology

A firm or the entrepreneur, can assess the future course of demand, Demand forecasting is the important tool to predict the future demand with the current demand and prices and the past demand and prices and they have to plan for the future business and future demand by estimating the present and the past circumstances. Short-term demand forecasting methods predict the demand easily, need not adopt the statistical techniques, because the period is less, But the long-term demand forecasting requires some statistical techniques and models for identifying the future demands of the firm or the entrepreneur. For that the researcher adopt the statistical methods in long-term demand forecasting. This method is useful for long-run forecasting and for the products already in the market. This method heavily depends on past data for analysis. For these, researcher adopt the time series analysis. This technique is highly complex, so it requiring considerable mathematical competence. So researcher have to adopt Auto Regressive process (AR) modeling of time series data to find out the long term forecasting demands.

A firm which has been in existence for a long time would have accumulated considerable data relating to sales during past years. These data will be analysed inorder to establish the nature of demand in sales over a period, so that the

possible demand in the future can also be inferred. The past demand is projected in order to interpret the future demand.

4. Objectives

1. To predict the long term demand forecasting, based on the past demand and price of the firm or the entrepreneur, with the current circumstances, forecasting is reliance on statistical techniques

5. Time Series Data

A time series is a set of observations on the values that a variable takes at different times. Such data may be collected at regular intervals, such as daily(stock prices, weather reports), weekly (eg. Money supply), monthly (CPI), quarterly (GDP), annually (Government budgets), quinquennially, that is every 5 years or decennially (every 10 years)

Economic Statement

Long-term demand forecasting is reliance on statistical techniques.

Mathematical model of Time series data

An Auto regressive (AR)Proces

$((Dt - \partial) = \alpha 1(Dt - 1 - \partial)$

Econometric Model of Time series data

$(Dt - \partial) = \alpha 1(Dt - 1 - \partial)$+Ut

Where ∂ is the mean of Dt and Ut is an uncorrelated random error term with zero mean and constant variance σ2. Dt follows a first order autoregressive, or AR(1), D values are expressed as deviations from their mean value. In otherwords models says that the forecast value of D demand at time t is simply some proportion (= $\alpha 1$) of its value at time (t-1) plus a random shock or disturbance at time t, again the D values are expressed around their mean value .

$(Dt - \partial) = \alpha 1(Dt - 1 - \partial)$+ $\alpha 3(Dt - 2 - \partial) +$ Ut

Then we say that Dt follows a second order auto regressive, or AR(2), process. That is the value of D demand at time t on its value in the previous two time periods, the Demand D values being expressed arounf their mean value ∂.

Then we have

($Dt - \partial) = \alpha 1(Dt - 1 - \partial)$ + $\alpha 3(Dt - 2 - \partial) + \cdots +$ $\alpha p(Dt - p) +$ Ut

Where Dt is a pth order autoregressive or AR(P) process. So we found the current and previous D values, from that we can predict the future D values.

6. Results

In the first order auto regressive or AR(1) where D is the future demand of the firm at the period of time and the $\partial$is the change in the demand. $\alpha 1$ is the co-efficient of the factors that is price , demand , climatic change, consumer preferences, from the past of the years, and the present years can predict the future demand. Ut is an uncorrelated random error term with zero mean and constant variance sigma square. Then we call as first order Auto Regressive(AR1) stochastic process.(t-1) is the lagging of the time period for the past one period. Demand values are expressed around their mean values.

Then the second order Auto Regressive, the values of the future demand D at the time period t depends on its value of a past demand of the two period, past price of the two period , past climatic change of the two period, past consumer preferences of the two period and the future demand values expressed around their mean value ∂. Then the Dt is a Pth order auto regressive or AR(p) process, this means we can found a past demand, past price, past climate, past consumer preferences with the current circumstances of more than two periods and predict the future demand. Stochastic variables are climatic change, Consumer preferences, demand and price.

7. Conclusion

For the long term demand forecasting , Auto Regressive of Time Series model is an appropriate model to find the forecasting demand. It is very essential for the firm or the entrepreneur, to predict the future demand with the past data of time series and the present data of the time series models. They enable to sustain their products and take major decisions for the future demand and increased their production and profits.

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