

DEMAND FORECASTING

COMPILED BY
RADHA IYER

What is demand forecasting?

- It is a tool which attempts to cope up with the uncertainty of the future.
- Starts with certain assumptions based on experience, knowledge and judgment.
- They are projected into the future using one of the following techniques: Box-Jenkins Models, Delphi Method, Exponential Smoothing, Moving averages, regression analysis and trend projection.

DEFINITION

Forecasting is a projection made on the basis of relevant logical assumptions, of the volume likely to be produced, transported and sold.

IMPORTANCE OF FORECASTING

1. Determining the product mix and process mix

Helps in designing product mix and process mix.

2. Enables to make sound plans

Gives past, present and future plans. Hence helps in designing sound plans for the future.

3. Helps to cope with change in environment

Keeps the manager alert and active to face challenges of future events and to adjust with the changes in the environment.

4. Helps to be proactive rather than reactive

A prediction for weekly and monthly shipments from a distribution center for a product or commodity.

5. Reduction in various costs

Accuracy in forecasts helps the managers to function smoothly and reduce various costs such as inventory cost, warehousing costs, transportation cost, production cost etc.

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6. Tracking overall performance

This helps to compare actual demand with firm's expectations and helps to keep a check and balance.

7. Effectively Supply chain scheduling

Helps to schedule various functions like production, warehousing and shipping.

8. Effective Labour Management

Helps to plan training programmes for the labour.

9. Cash flow management

Awareness about the peaks and valleys of demand to effectively manage the cash flow.

10. Accurate Budget

Helps in making proper budgets relating to sales budget, revenue budget, production budget, marketing and other overheads budgets etc.

FORECASTING METHODS

1. Qualitative methods

Are judgmental methods where expert opinion is used to make the forecast.

Useful when past data is unavailable.

Relies on special skills, knowledge and experience. There are several methods under this and they are:

a. Jury of executive method

Opinions of small groups of high level executives are taken in relation to the future demand.

b. Consumer survey method

Efforts are made to collect information from consumer about their purchasing plans for future.

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c. Assessment by sales personnel

A sales person gives his/her area sales.

d. Naïve approach

Assumes that demand in the next period is similar to the demand in most recent period without major changes in demand patterns.

e. Delphi method

Systematic and interactive forecasting method that relies on a panel of experts.

The experts answer questionnaire in two or more rounds.

After each round facilitator provides a small summary of each experts forecasts from the previous round as well as the reasons provided for their judgments. The experts are encouraged to revise their earlier answers. It is believed that during this process the range of answers will decrease and the group will converge towards the correct answer. Finally the process is stopped after a predefined stop criterion and the means score of the final rounds determine the results.

2. TIME SERIES METHOD

- Statistical methods using historical sales data which contain relatively clear and stable relationships. Helps to identify:
 - Systematic variations
 - Cyclic patterns
 - Trends and
 - The growth rate of these trends

Individual forecast components help in determining the future under the assumption it will be similar to the past.

When the rate of growth changes significantly, the demand pattern experiences a turning point. As it uses techniques like historical demand patterns and weighted averages of data points, they are not sensitive to turning points.

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a. Simple Average Method:

Uses an average of the most recent period's sales.

May contain any number of previous time periods.

One, three, four and twelve-period averages are common.

b. Weighted Average Method:

Recent data is given more weightage than older data.

Averaging over long period can give greater smoothing effects.

Months	Weights	Sales	Weighted Sales
January	2	4200	8400
February	3	4300	12,900
March	5	4350	21,750
Total	10		43050

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- Weighted forecast for April = 4305 i.e. $43050/10$

c. Exponential Smoothing

Concept implying estimation of future sales on a weighted average of previous demand and forecast levels.

$$F_t = d_{t-1} + (1-\alpha)f_{t-1}$$

F_t forecast time for t .

F_{t-1} forecast made for a part instance $t-1$

D_{t-1} Actual demand at that past instance.

α Smoothing constant

Advantage being that it permits rapid calculations of new forecasts.

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d. Extended Smoothing

Basic model can be extended to include trend and seasonality consideration.

They are known as exponential smoothing with trend and seasonality respectively.

3. Casual Technique

- i. Based on the hypothesis that future demand of a product depends on the past or current values of some variables.
- ii. They try to develop correlations between the future demand of some products and past value of some causal variables
e.g. beverages sales at cricket match is dependent on temperature.

APPROACHES TO FORECASTING

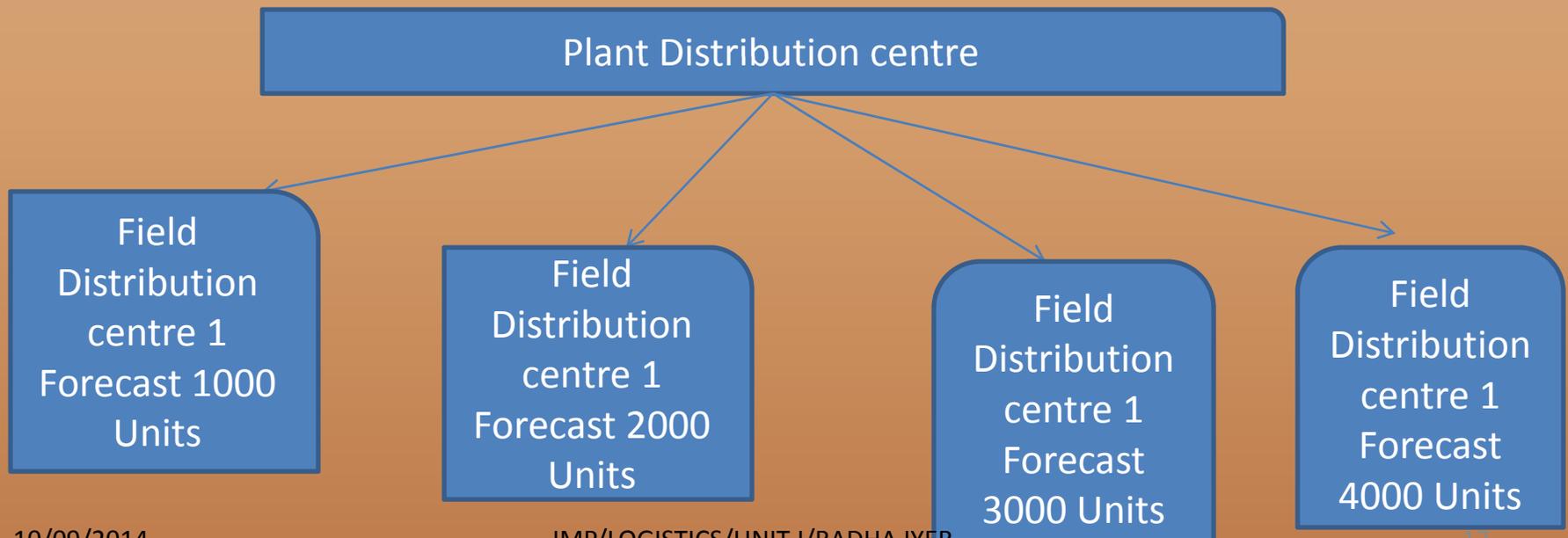
1. Top-Down Approach

Also known as decomposition approach develops nation level SKU (Stock keeping units) forecast and then spreads the volume across locations on the basis of historical sales patterns.

This is centralized and appropriate for stable demand situations or when the demand levels are changing uniformly throughout the market.

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- For example, when demand levels are increasing 10% uniformly across all markets, the use of top-down approach facilitates development of new detailed forecasts since all changes are relative.
 - Field Distribution centre 1



2. BOTTOM UP APPROACH

- This is decentralized since each distribution center forecast is developed independently.
- As a result, each forecast can more accurately track and consider demand fluctuations within specific markets.
- It requires more detailed record keeping and makes it more difficult to incorporate systematic demand factors such as the impact of a major promotion.