



SNS COLLEGE OF TECHNOLOGY , COIMBATORE - 35



23BAE743 LOGISTICS AND SUPPLY CHAIN MANAGEMENT

UNIT 5 SCM Performance Drivers and Forecasting

Dr. K. Mohan Kumar/ASP/MBA



Guess the Topic

Forecasting - Framework for a Forecast System





Recap

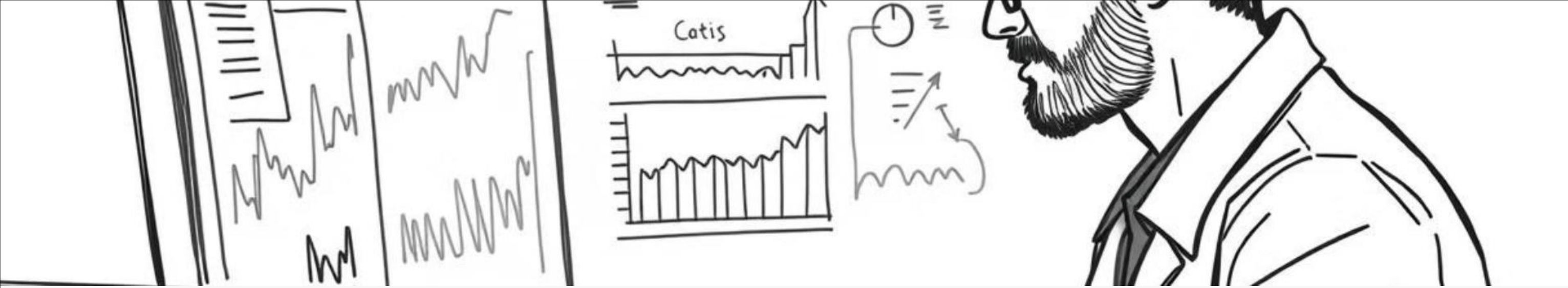
Green Supply Chain Management



Forecasting Framework for a Forecast System

A forecasting framework provides a structured and comprehensive approach to developing and implementing a forecasting system. It ensures accuracy, reliability, and efficiency in predicting future trends and outcomes. The framework outlines key steps, considerations, and best practices for effective forecasting.





Data Collection and Preparation

1

Identify Relevant Data Sources

Start by identifying all relevant data sources that can contribute to the forecasting model. This may include historical data, market research, customer behavior, competitor information, and economic indicators. Ensure data quality and consistency.

2

Data Cleaning and Transformation

Thoroughly clean and transform the collected data to address missing values, outliers, and inconsistencies. This ensures data accuracy and prepares it for analysis and modeling.

3

Feature Engineering

Create new features from existing data that can improve model performance. This could involve combining variables, creating lagged variables, or applying transformations based on domain expertise.

Model Selection and Training



Time Series Models

Consider using time series models like ARIMA, SARIMA, or exponential smoothing to forecast future values based on past patterns and trends.

Regression Models

Utilize regression models like linear regression or polynomial regression to predict future values based on relationships between predictor variables and the target variable.

Machine Learning Models

Explore machine learning models such as neural networks, support vector machines, or decision trees to capture complex relationships and patterns in the data. Evaluate model performance using appropriate metrics.

Model Validation and Evaluation

Cross-Validation Techniques

Use cross-validation techniques like k-fold cross-validation to assess the model's performance on unseen data and estimate its generalization ability.

Performance Metrics

Evaluate the model's accuracy, precision, recall, and other relevant metrics based on the specific forecasting objective. Choose metrics that are appropriate for the type of data and forecasting task.

Sensitivity Analysis

Assess the model's sensitivity to changes in input parameters and data assumptions to understand its robustness and potential biases.

Forecasting Implementation and Monitoring



1

Deploy the Model

Deploy the validated model in a production environment, making it accessible to users for generating forecasts.

2

Automate Forecasting Process

Automate the forecasting process to minimize manual effort and ensure timely updates. This could involve integrating the model with existing systems and automating data input and output.

3

Continuous Monitoring and Improvement

Monitor the model's performance over time, comparing actual outcomes with forecasts. Identify any discrepancies and adjust the model or data sources as needed to maintain accuracy and effectiveness.



Communication and Reporting

Type of Report	Key Information
Executive Summary	High-level overview of the forecast, key findings, and recommendations.
Detailed Forecast Report	In-depth analysis of the forecasting process, model details, performance metrics, and assumptions.
Visualization of Forecasts	Visual representations of forecasts using charts, graphs, and other interactive tools for easy understanding.

Scenario Planning and Sensitivity Analysis



Scenario Analysis

Develop multiple scenarios based on different assumptions about key variables, such as market conditions, economic trends, or competitor actions, to assess the potential range of outcomes.



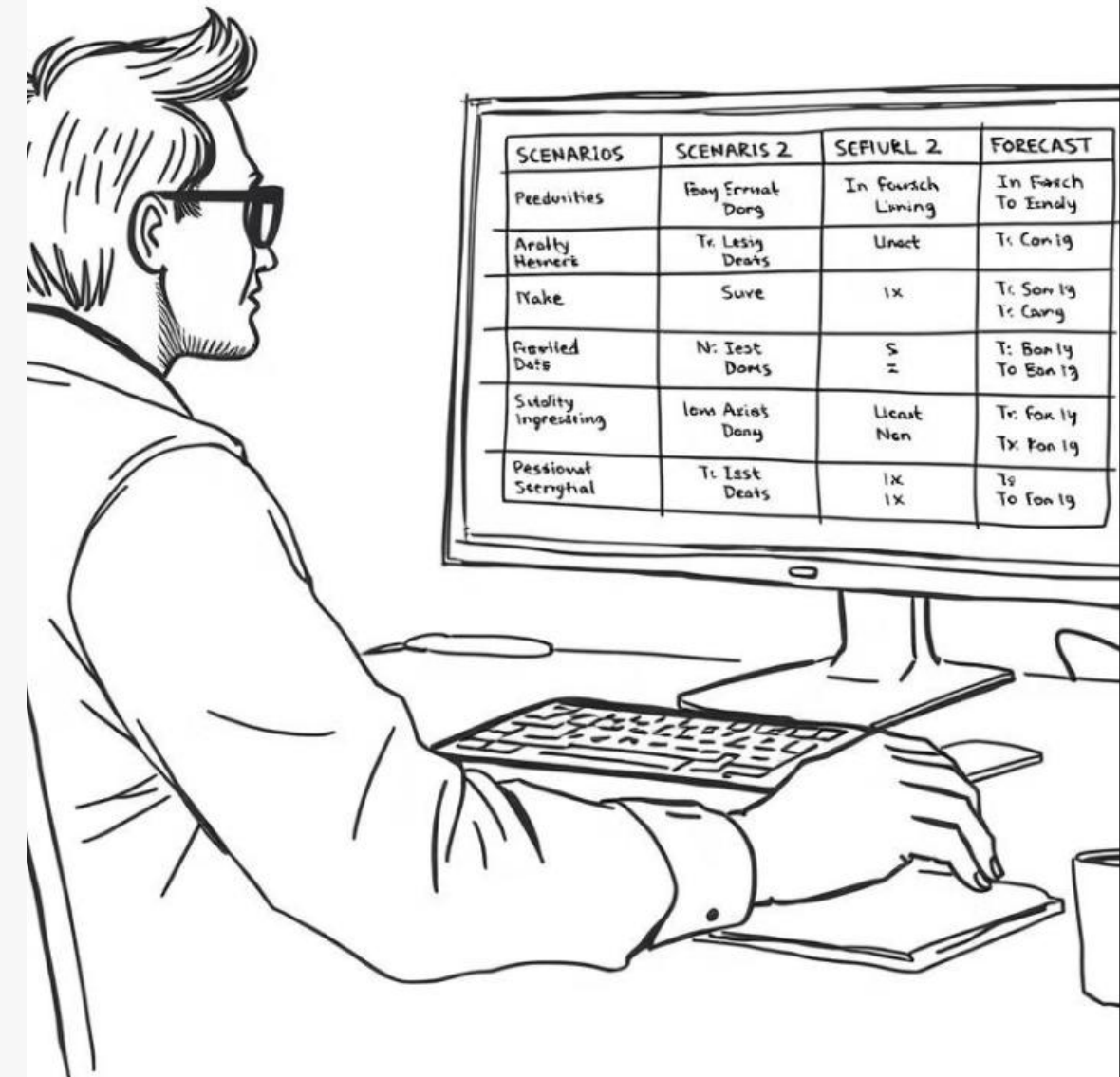
Sensitivity Analysis

Evaluate the model's sensitivity to changes in input parameters to understand its robustness and potential biases. Identify key variables that have the most significant impact on the forecast.



Risk Management

Identify potential risks and uncertainties that could affect the forecast. Develop contingency plans to mitigate the impact of these risks and improve the resilience of the forecasting system.





Best Practices for Forecasting

- 1** — Establish Clear Objectives
Define the specific forecasting objectives, target variables, and desired accuracy levels to guide the development and implementation of the forecasting framework.
- 2** — Involve Domain Expertise
Engage domain experts from relevant departments to provide insights, validate assumptions, and ensure the model aligns with business needs.
- 3** — Regularly Review and Update
Periodically review the forecasting process, model performance, and underlying assumptions to ensure accuracy and relevance. Make necessary adjustments to improve the forecasting system over time.
- 4** — Promote Collaboration and Communication
Foster collaboration and communication among data scientists, domain experts, and stakeholders to ensure alignment, transparency, and effective utilization of forecasts.



Future Trends in Forecasting

The field of forecasting is continuously evolving with advancements in technology and data science. Emerging trends include the use of artificial intelligence (AI), machine learning (ML), and deep learning (DL) for automated forecasting. These technologies enable more accurate, complex, and real-time forecasting models. Additionally, there is a growing focus on incorporating external data sources, such as social media sentiment, news articles, and economic indicators, to enhance forecasting accuracy. These advancements are transforming the way we predict future trends and make informed decisions.



Thank You

Dr. K. Mohan Kumar/ASP/MBA