Demand Planning Details:

Univariate Forecasting Errors

Overview

In SAP APO DP you have the possibility to meassure the accuracy of your forecast in six different forecast errors:

- Error Total (ET)
- Mean Percentage Error (MPE)
- Mean Absolute Percentage Error (MAPE)
- Mean Squared Error (MSE)
- Root Mean Squared Error (RMSE)
- Mean Absolute Deviation (MAD)

The system calculates the errors by comparing the differences between actual values and the ex-post forecast values.
Ex-post-forecasts are forecasts that are run in past periods for which actual demand history is also available.

Error Measures

Error: The difference between actual and predicted (one period earlier)

$$e_t = V_t - G_t(t-1)$$

e_t - error in period t

V_t - actual demand in period t

$G_t(t-1)$ - forecast for t made in period t-1, in SAP APO DP: ex-post-forecast for period t

Absolute error: $|e_t|$

Squared error: e_t^2

Percentage error:

$$PE_t = \frac{100e_t}{V_t}$$

Error Measures: Bias and Magnitude

Forecasts can be whether consistantly to high or to low **(bias)** or right on average, but with positive and negative deviations **(error magnitude)**.

ET and MPE measure bias.

MAPE, MSE, RMSE and MAD measure error magnitude.

You should monitor both for changes.

Error Total (ET)

Sum of all errors

$$ET = \sum_{t=1}^{n} e_t$$

- Uses raw errors (positve and negative)
- Can be positive or negative
- Measures bias in the forecast
- Should stay close to zero

Mean Percentage Error (MPE)

Average of percent errors

$$MPE = \frac{1}{n}\sum_{t=1}^{n} PE_t$$

- Can be positive or negative
- Measures bias in the forecast
- Should stay close to zero

Mean Absolut Percentage Error (MAPE)

Average of absoulute percentage errors

$$MAPE = \frac{1}{n}\sum_{t=1}^{n}|PE_t|$$

- Always positive
- Measures magnitude of errors
- Units are „percentage“

Mean Squared Error (MSE)

Average of squared errors

$$MSE = \frac{1}{n}\sum_{t=1}^{n} e_t^2$$

- Always positive
- Measures magnitude of errors
- Units are „demand units squared“

Root Mean Squared Error (RMSE)

Square root of MSE (standard deviation of forecast errors)

$$RMSE = \sqrt{\frac{1}{n}\sum_{t=1}^{n} e_t^2}$$

- Always positive
- Measures magnitude of errors
- Units are „demand units“, that is why the RMSE often is preferred to the MSE, as it is on the same scale like the data.

Mean Absolut Deviation (MAD)

Smoothed absolute errors

$$MAD = \frac{1}{n}\sum_{t=1}^{n}|e_t|$$

- Always positive
- Measures magnitude of errors
- Looks at the recent past