**Forecasting**

**Knowledge Check**

**Weekly Learning Objectives**

* Understand and how and when to use various types of forecasting models
* Qualitative and quantitative forecasting techniques
* Measures of Forecast Accuracy
* Time-series Forecasting models
* Causal forecasting models

**Key Concepts:**

**1. Forecast:** A prediction of future events used for planning purposes. The art and science of predicting future events.

**2. Types of forecasts:** economic, technological, demand, capacity, staffing. etc.

**3. Three categories of models:** time series, causal, and qualitative.

**4. Quantitative forecasts:** forecasts that employ mathematical modeling to forecast demand.

**5. Qualitative forecasts:** Forecasts that incorporate such factors as the decision maker’s intuition, emotions, personal experience, and value systems.

**6. Jury of executive opinion:** A forecasting technique that uses the opinion of a small group of high-level managers to form a group estimate demand.

**7. Time series:** The repeated observations of demand for a service or product in their order of occurrence.

**8. Time-series analysis:** A statistical approach that relies heavily on historical demand data to project the future size of demand and recognize trends and seasonal patterns. A forecasting technique that uses a series of past data points to make a forecast.

**9. Four components of time-series:** trend, seasonality, cycles, and random variations.

**10. Aggregation:** The act of clustering several similar services or products so that companies can obtain more accurate forecasts.

**11. Judgement method:** A type of qualitative method that translates the opinions of managers, expert opinions, consumer surveys, and salesforce estimates into quantitative estimates.

**12. Salesforce estimates:** The forecasts that are compiled from estimates of future demands made periodically by members of company’s salesforce. A forecasting technique based on salesperson’s estimates of expected sales.

**13. Consumer market Survey:** A forecasting method that solicits input from consumers or potential consumers regarding future purchasing plans.

**14. Executive opinion:** A forecasting method in which the opinions, experience, and technical knowledge of one or more managers are summarized to arrive to at a single forecast.

**15. Technological forecast:** An application of executive opinion to keep abreast of the latest advances in technology

**16. Market research:** A systematic approach to determine external customer interests in a service or product by creating and testing hypotheses through data gathering surveys.

**17. Delphi method:** A process of gaining consensus from a group of experts while maintaining their anonymity. A forecasting technique using a group process that allows experts to make forecast.

**18. Causal Method:** A type of quantitative method that uses historical data on independent variables, such as promotional campaigns, economic conditions,

and competitors’ actions, to predict demand.

**19. Linear regression:** A causal method in which one variable (the dependent variable) is related to one or more independent variables by a linear equation. A straight-line mathematical model to describe the functional relationships between independent and dependent variables. A forecasting procedure that uses the least squares approach on one (simple regression) or more (multiple regression) independent variables to develop a forecasting model.

**20. Dependent variable:** The variable that one wants to forecast. This is what is being predicted.

**21. Independent variables:** Variables that are assumed to affect the dependent variable and thereby “cause” the results observed in the past.

**22. Naïve forecast:** A time-series method whereby the forecast for the next period equals the demand for the current period. A forecasting technique which assumes that demand in the next period is equal to demand in the most recent period.

**23. Simple moving average:** A time-series method used to estimate the average of a demand time series by averaging the demand for the “n” most recent time periods. Moving averages smooth out variations when forecasting demands are fairly steady.

**24. Forecast error:** the difference found by subtracting the forecast from actual demand for a given period.

**25. Standard error of estimate:** A measure of variability around the regression line. This computation is called the standard deviation of the regression.

**26. Weighted moving average:** A time-series method in which each historical demand in the average can have its own weight. The sum of all weights is always equal 1. Weights can be used to put more emphasis on recent periods.

**27. Exponential smoothing:** A weighted moving average that calculates the average of a time series by giving recent demands more weight than earlier demands. A forecasting technique in which data points are weighted by an exponential function.

**28. Smoothing constant:** The weighting factor used in an exponential smoothing forecast, a number between 0 and 1.

**29. Mean squared error (MSE):** A measurement of the dispersion of forecast error. The average of the squared differences between the forecasted and observed values.

**30. Mean absolute deviation (MAD):** A measurement of the dispersion of forecasted errors. A measure of the overall forecast error for a model.

**31. Mean absolute percent (MAPE):** A measurement that relates the forecast error to the level of demand and is useful for putting forecast performance in the proper perspective. The average of the absolute differences between the forecast and actual values, expressed as a percentage of actual values.

**32. Tracking signal:** A measure that indicates whether a method of forecasting is accurately predicting actual changes in demand.

**33. Trend projections:** A time-series forecasting method that fits a trend line to a series of historical data points and then projects the line into the future for forecast. A linear trend line is a regression line with time as independent variable.Uses the scatter diagramto plot one variable against another variable (s), such as time.

**34. Seasonal variations:** Regular upward or downward movements in a time series that tie to recurring events.

**35. Cycles:** Patterns of data that occur every several years.

**36. Coefficient of Correlation:** A measure of the strength of the relationship between two variables.

**37. Coefficient of Determination:** A measure of the amount of variation in the dependent variable about its mean that is explained by the regression equation. The percentage of the variability in the dependent variable that is explained by the regression equation.

**38. Bias:** A forecast that is consistently higher or consistently lower than actual values of a time series.

**39. Decomposition:** A forecasting model that decomposes a time series into its seasonal and trend components.

**40. Deviation:** A term use in forecasting error.