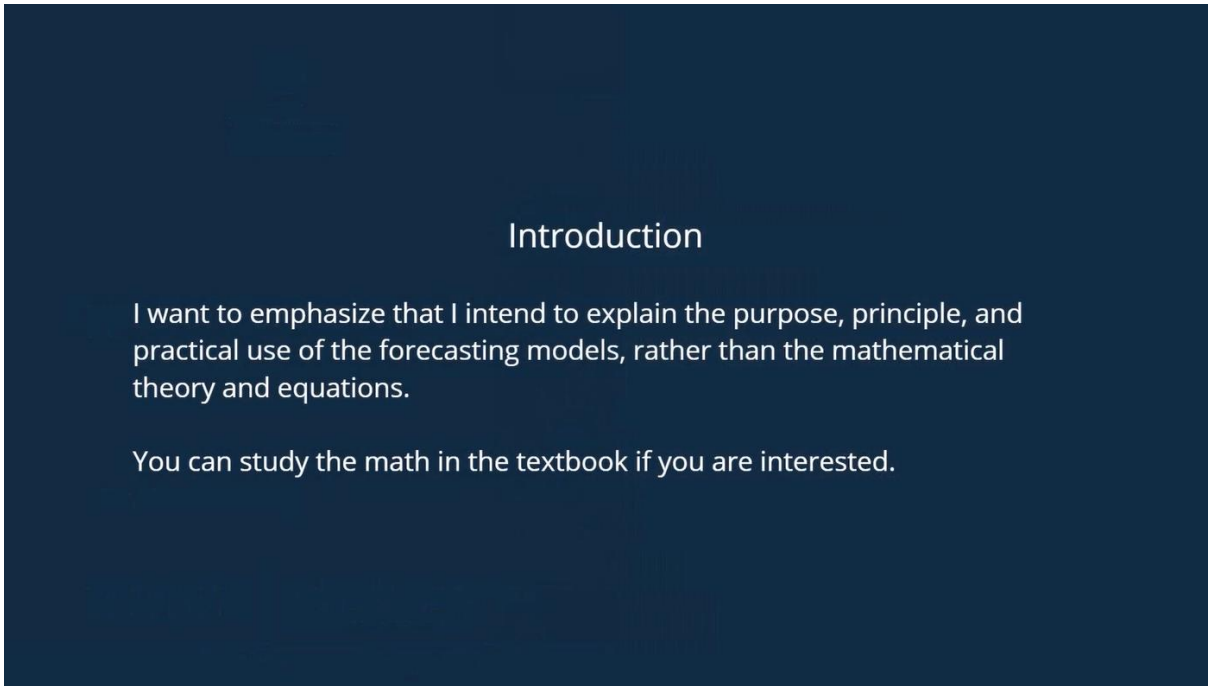
M6L3. Types of Forecasting

Slide #1

In this topic, we will discuss the various types of forecasting methods.

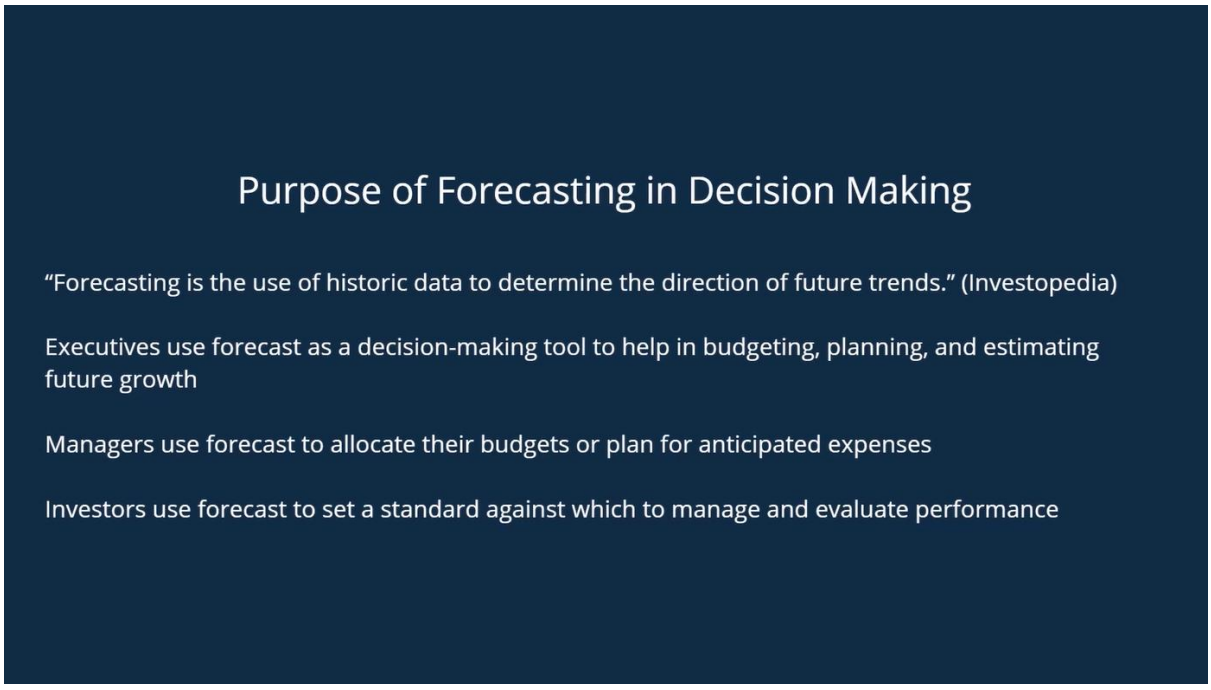
Slide #2



I want to emphasize that I intend to explain the purpose, principle, and practical use of the forecasting models rather than the mathematical theory and equations.

You can study the math in the textbook if you are interested.

Slide #3



Forecasting is the use of historical data to determine the direction of future trends according to Investopedia.

Business forecast is widely used across different industries and at different levels for a number of different purposes.

For example, by making business level decisions, a successful executive today considers some kind of forecast to help him or her to predict the demands, chance, and the potential outcomes of different options.

Executives use forecasts as a decision-making tool to help in budgeting, planning, and estimating future growth.

Managers also use forecasts to allocate their budget for anticipated expenses.

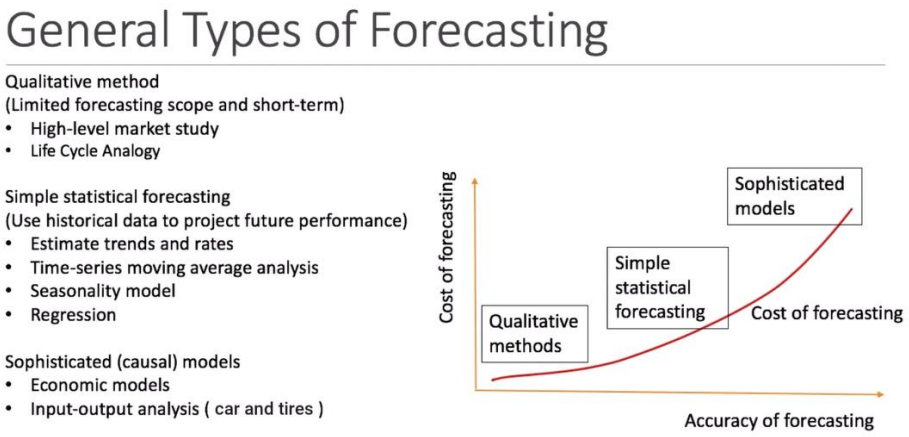
If you are a product manager and are coping with sales fluctuation, seasonal events, sudden changes in demand levels, price cutting maneuvers of competition, and large swings of economy, forecast can help you deal with those uncertainties.

It will help you more the more you understand the general principles of forecasting, what it can do and cannot do for you, which techniques can suit your needs of the moment, and how to balance the cost of forecasting and expected accuracy.

Investors use the forecasts that companies provide as a baseline to measure the company's performance.

When companies issue their financial report, investors look at the company's actual performance against the expected performance, and then make their judgment on how a company executed its plan, and then make their investment decisions accordingly.

Slide #4



From the cost and accuracy perspectives, there are three general types of forecasting methods.

The first type is the qualitative methods, which are at the left most side of the cost and accuracy curve. Qualitative methods rely on managerial judgment and experience. Different individuals can obtain different results from the same information. Qualitative methods are useful only when data is unreliable or in limited quantity or when time is limited. One popular qualitative forecasting method is high level market survey, which uses statistically designed surveys of consumers, potential customers, or expert observers to gather information on market conditions of future products.

Another method is life cycle analogy, which forecasts based on the position of the product in its life cycle and the performance of similar products in the past. Each phase of a product's life, from introduction through growth, maturation, and decline, has a different demand outlook, market, and manufacturing characteristics. The life

cycle analogy method uses the general trend of similar products in the same phase to project the performance of the new product. The qualitative methods are inexpensive, but their accuracy is also poor. They are appropriate for short term, which means monthly to quarterly forecast only.

Quantitative methods rely on mathematical models and assume that past data and other relevant factors can be combined into reliable predictions of the future.

Two types of methods are in use.

Simple statistics model or sophisticated model. Each type is suited for different conditions. A simple statistics model is less expensive to build and also is a little less accurate than sophisticated models. Simple statistics model uses historical data to project future performance to estimate the trends and rates such as time series moving average analysis method, which is the simplest of the projection methods. It uses historical data to project the future performance, but the moving average method cannot estimate the seasonal effect.

Seasonality models can be used to handle the seasonal patterns, while regression method can project the long-term trend. To achieve a higher level of accuracy, we have to use sophisticated forecasting models.

In general, there are two types of sophisticated forecasting models.

One is called economic model and the other is called input output analysis model. Economic models use the relationship between the supply and demand of a type of product in a general market. These methods are not common in companies. They are mostly used as predictors of macroeconomic climate and they can be purchased from an economic bureau when required. Input output models are a type of economic model based on the relationship between the outputs and inputs of various industries. For example, the number of car sales could be used as an input to predict the sales demand for car tires. This kind of method was developed in the late

70s and is still used in economic planning throughout the world. The cost of the sophisticated model is relatively high and they are good for long term forecasts.

For the purpose of this course, we will only cover the three statistics forecasting models time series moving average analysis, seasonal evaluation, and regression for a long-term trend.