4 Forecasting

Part 2

By

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10
OM Strategy Decisions
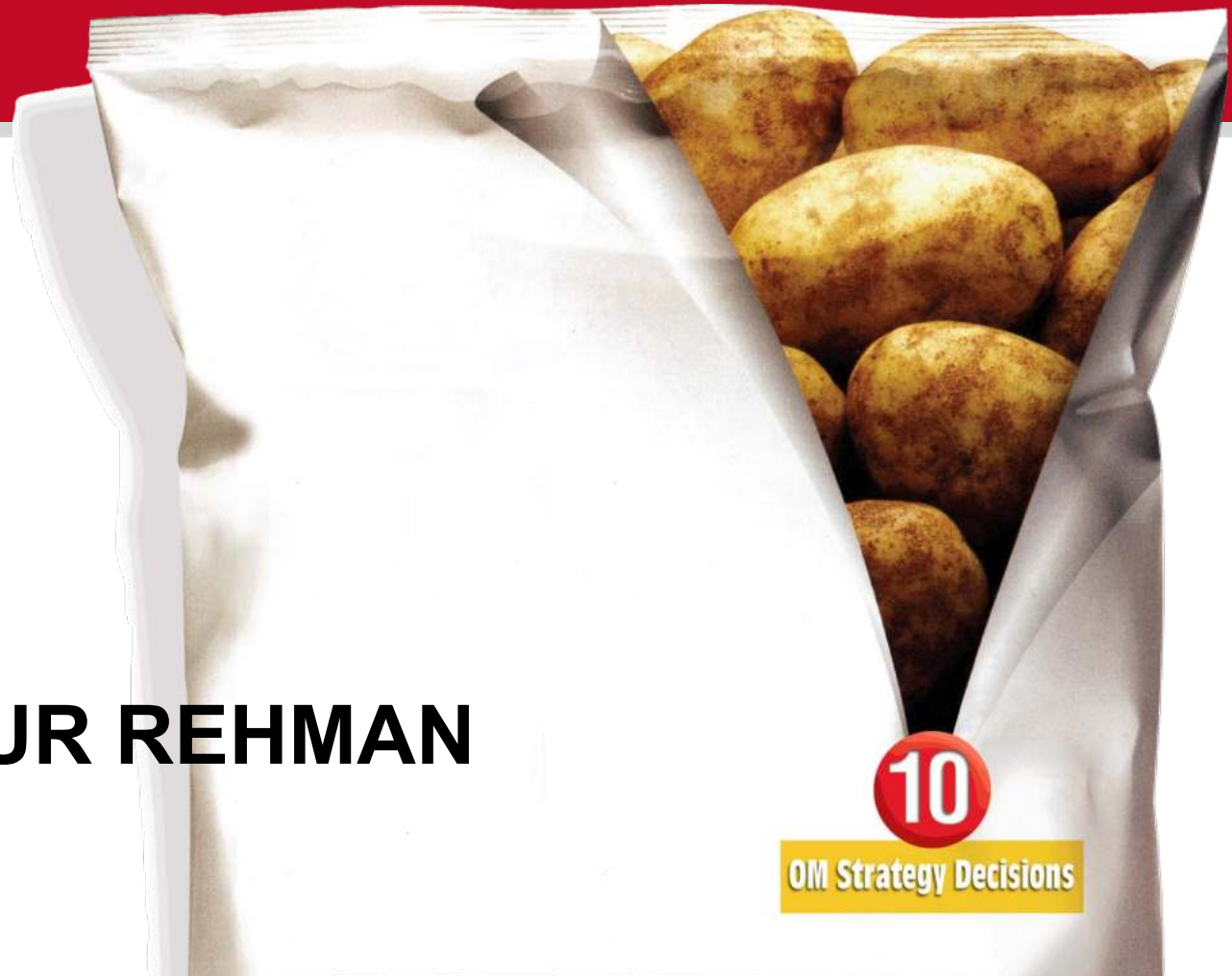
What is Forecasting?

◆ **Process of predicting a future event**

◆ **Underlying basis of all business decisions**

  ◆ **Production**

  ◆ **Inventory**

  ◆ **Personnel**

  ◆ **Facilities**

Forecasting Time Horizons

◆ **Short-range forecast**

  ◆ **Up to 1 year, generally less than 3 months**

  ◆ **Purchasing, job scheduling, workforce levels, job assignments, production levels**

◆ **Medium-range forecast**

  ◆ **3 months to 3 years**

  ◆ **Sales and production planning, budgeting**

◆ **Long-range forecast**

  ◆ **3⁺ years**

  ◆ **New product planning, facility location, research and development**

Distinguishing Differences

◆ **Medium/long range** forecasts deal with more comprehensive issues and support management decisions regarding planning and products, plants and processes

◆ **Short-term** forecasting usually employs different methodologies than longer-term forecasting

◆ **Short-term** forecasts tend to be more accurate than longer-term forecasts

Types of Forecasts

◆ **Economic forecasts**

    ◆ **Address business cycle – inflation rate, money supply, housing starts, etc.**

◆ **Technological forecasts**

    ◆ **Predict rate of technological progress**

    ◆ **Impacts development of new products**

◆ **Demand forecasts**

    ◆ **Predict sales of existing products and services**

Seven Steps in Forecasting

1. **Determine the use of the forecast**
2. **Select the items to be forecasted**
3. **Determine the time horizon of the forecast**
4. **Select the forecasting model(s)**
5. **Gather the data**
6. **Make the forecast**
7. **Validate and implement results**

The Realities!

◆ **Forecasts are seldom perfect**

◆ **Most techniques assume an underlying stability in the system**

◆ **Product family and aggregated forecasts are more accurate than individual product forecasts**

Forecasting Approaches

Qualitative Methods

- **Used when situation is vague and little data exist**
  - **New products**
  - **New technology**
- **Involves intuition, experience**
  - **e.g., forecasting sales on Internet**

Quantitative Methods

- **Used when situation is 'stable' and historical data exist**
  - **Existing products**
  - **Current technology**
- **Involves mathematical techniques**
  - **e.g., forecasting sales of color televisions**

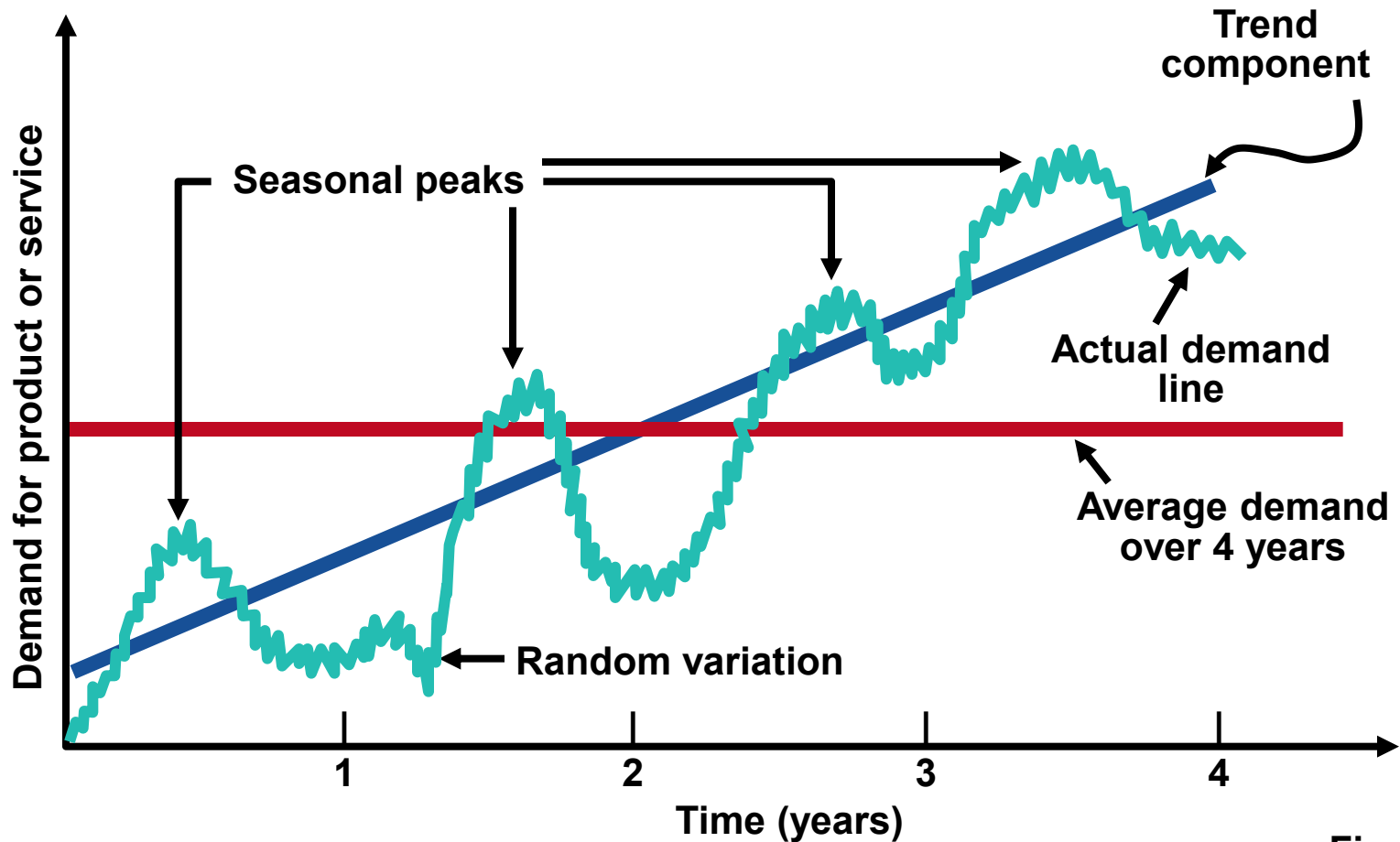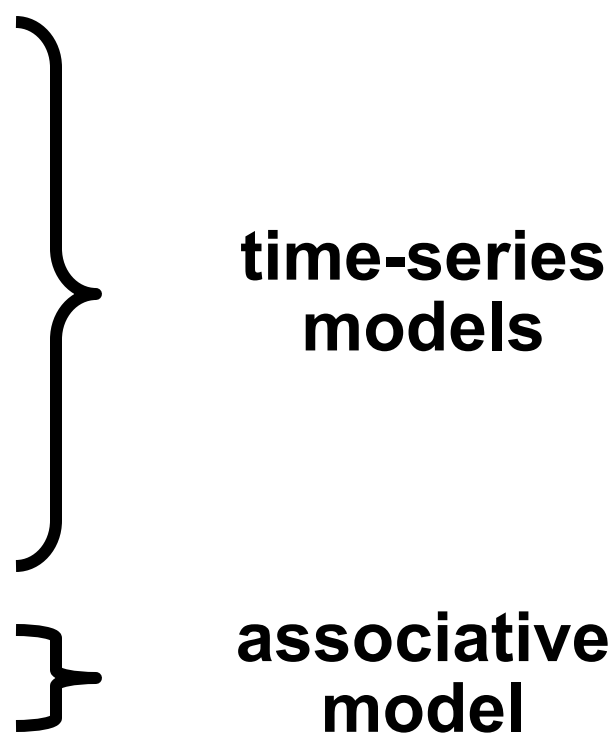# *Components of Demand*

Figure 4.1

Overview of Quantitative Approaches

1. **Naive approach**
2. **Moving averages**
3. **Exponential smoothing**
4. **Trend projection**

time-series models

5. **Linear regression**

associative model

Time Series Forecasting

◆ **Set of evenly spaced numerical data**

　　◆ **Obtained by observing response variable at regular time periods**

◆ **Forecast based only on past values, no other variables important**

　　◆ **Assumes that factors influencing past and present will continue influence in future**

Time Series Components
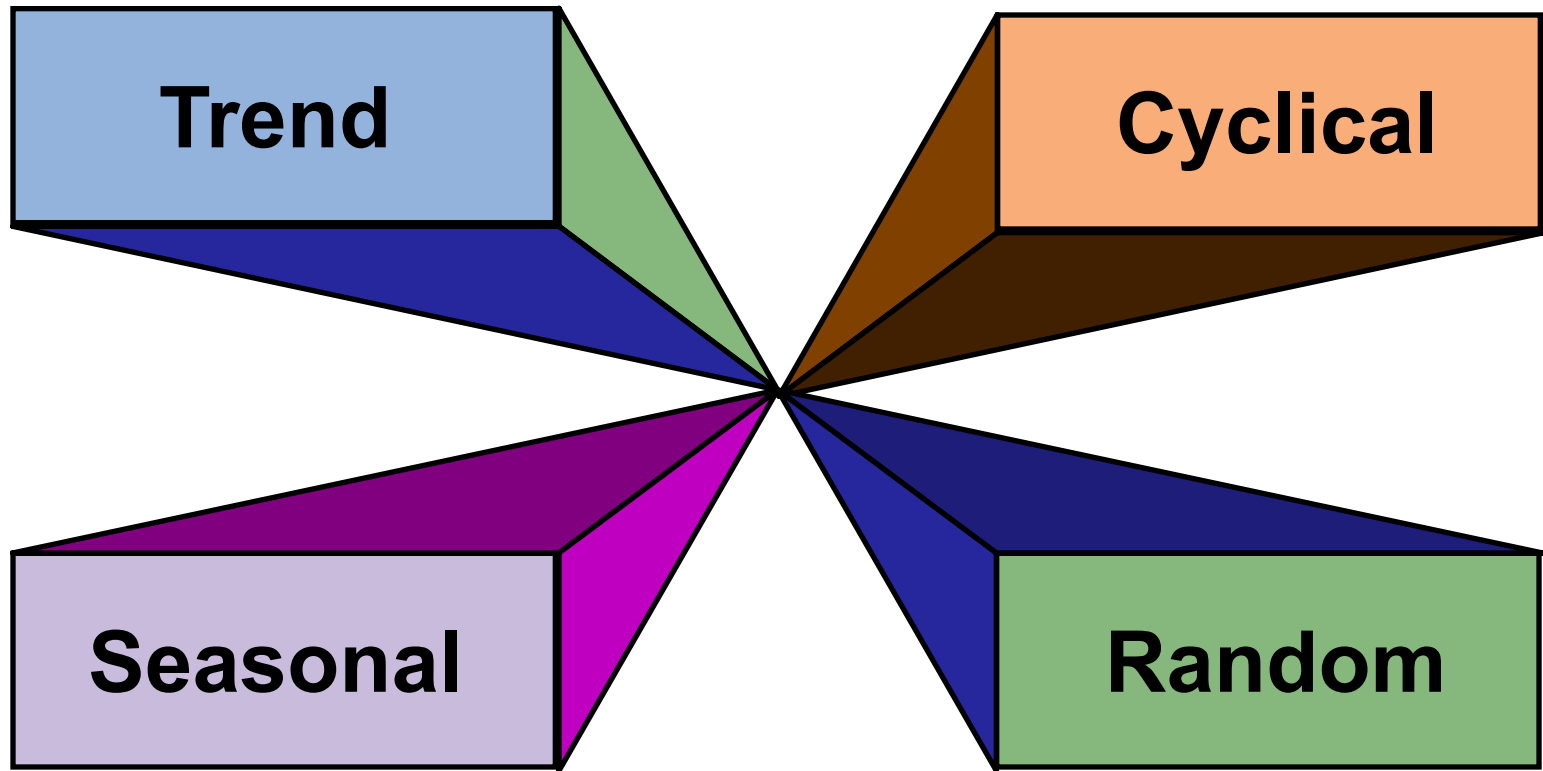
Cyclical Component

◆ **Repeating up and down movements**

◆ **Affected by business cycle, political, and economic factors**

◆ **Multiple years duration**

◆ **Often causal or associative relationships**

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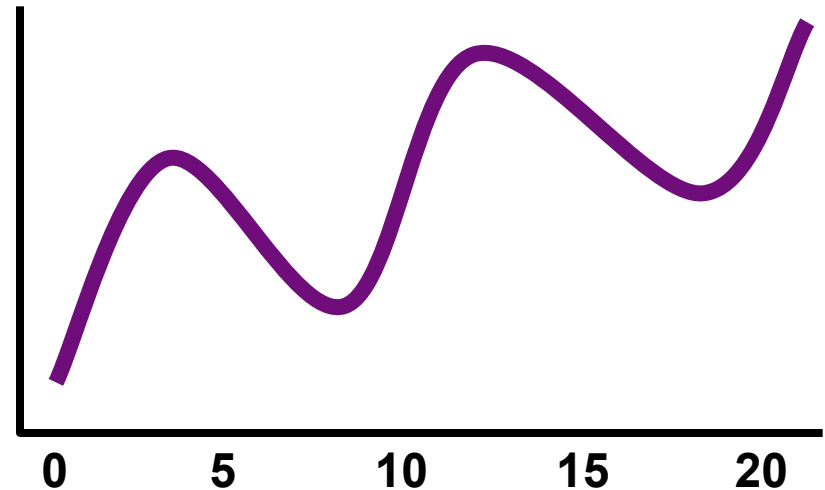
Trend Component

◆ **Persistent, overall upward or downward pattern**

◆ **Changes due to population, technology, age, culture, etc.**

◆ **Typically several years duration**
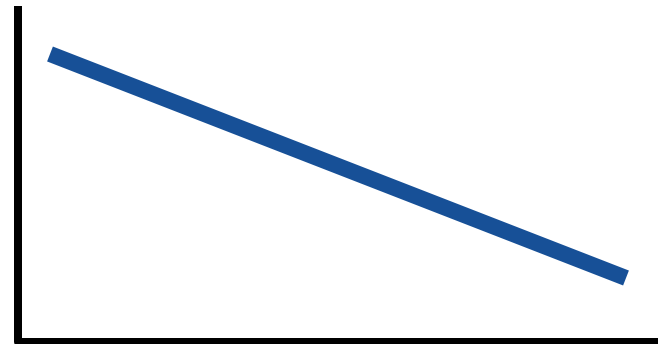
Seasonal Component

◆ **Regular pattern of up and down fluctuations**

◆ **Due to weather, customs, etc.**

◆ **Occurs within a single year**

Period	Length	Number of Seasons
Week	Day	7
Month	Week	4-4.5
Month	Day	28-31
Year	Quarter	4
Year	Month	12
Year	Week	52

Random Component

◆ **Erratic, unsystematic, 'residual' fluctuations**

◆ **Due to random variation or unforeseen events**

◆ **Short duration and nonrepeating**

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