

# FORECASTING TRENDS

Chapter: 11

# WHAT IS FORECASTING?

- ✓ Forecasting is a decision-making tool
- ✓ Helps in budgeting, planning, and estimating future growth
- ✓ Forecasting is the attempt to predict future outcomes based on past events and management insight

# CHARACTERISTICS OF FORECASTING

Forecasts are always wrong

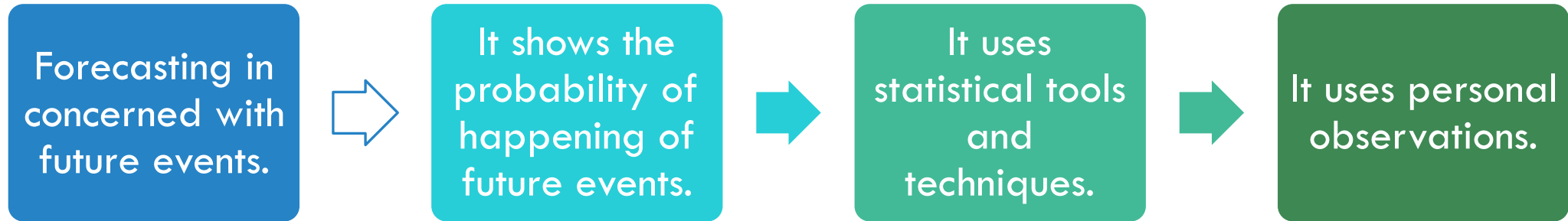
Forecasts are more accurate for groups or families of items

Forecasts are more accurate for shorter time periods

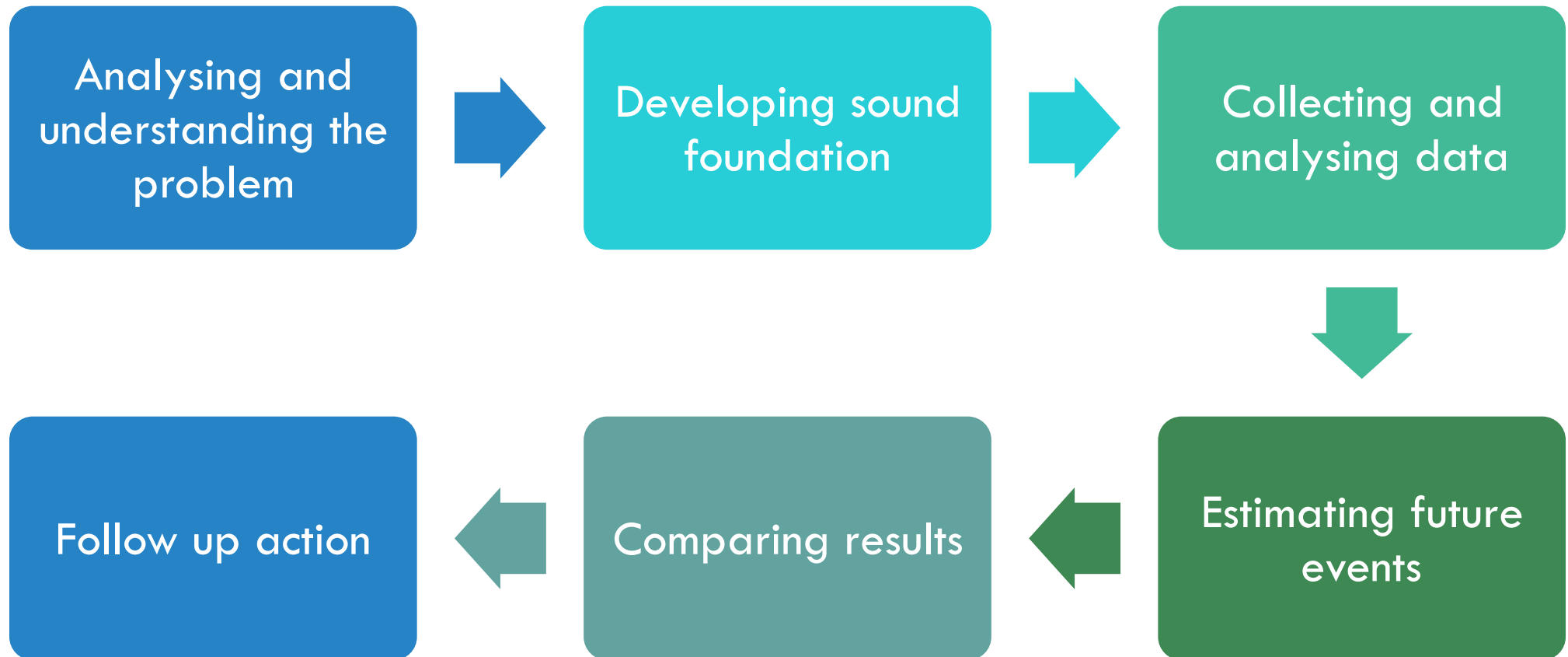
Forecasts are no substitute for calculated demand.

Every forecast should include an error estimate

# CHARACTERISTICS OF FORECASTING



# STEPS IN FORECASTING



# IMPORTANCE OF FORECASTING

Forecasting provides relevant and reliable information about the past and present events and the likely future events. This is necessary for sound planning.

It gives confidence to the managers for making important decisions.

It is the basis for making planning premises.

It keeps managers active and alert to face the challenges of future events and the changes in the environment.

# IMPORTANCE OF FORECASTING

Helps in Production Planning

Helps in Financial Planning

Helps in Economic Planning

Helps in Workforce Scheduling

# LIMITATIONS OF FORECASTING

1. The collection and analysis of data about the past, present and future involves a lot of time and money. Therefore, managers have to balance the cost of forecasting with its benefits. Many small firms don't do forecasting because of the high cost.
2. Forecasting can only estimate the future events. It cannot guarantee that these events will take place in the future. Long-term forecasts will be less accurate as compared to short-term forecast.
3. Forecasting is based on certain assumptions. If these assumptions are wrong, the forecasting will be wrong. Forecasting is based on past events. However, history may not repeat itself at all times.
4. Forecasting requires proper judgement and skills on the part of managers. Forecasts may go wrong due to bad judgement and skills on the part of some of the managers. Therefore, forecasts are subject to human error.

# FORECASTING TIME HORIZONS

## Short range forecast

- Generally less than 3 month; up to 1 year
- Planning, purchasing, job assignments, work force levels, product levels

## Medium range forecast

- 3 month to 3 years
- Sales planning, production planning, cash budgeting

## Long range forecast

- 3 or more years
- New product planning, facility location, research and development

# APPLICATION OF SHORT RANGE FORECASTS

1. How much inventory of a particular product should be carried next month?
2. How much of each product should be scheduled for production next week
3. How much of each raw material should be ordered for delivery next week?
4. How much workers should be scheduled to work on regular time basis and on overtime basis next week?
5. How many maintenance workers should be scheduled to work next week?

# APPLICATION OF LONG RANGE FORECASTS

1. Selecting a product design.
2. Selecting a production processing scheme
3. Selecting a plan to supply scarce materials
4. Selecting a long range production capacity plan
5. Selecting a long range Financial Plan for acquiring funds for capital investment
6. To build new buildings and to purchase new materials
7. To develop new sources of materials and new source of capital funds

# WHEN TO USE THE FORECAST

## Business managers

- Plan operations

## Investors

- To predict trends in markets

## Economists

- to develop models that replicate economic trends for different sectors of the economy



# BUSINESSES AND FORECASTS

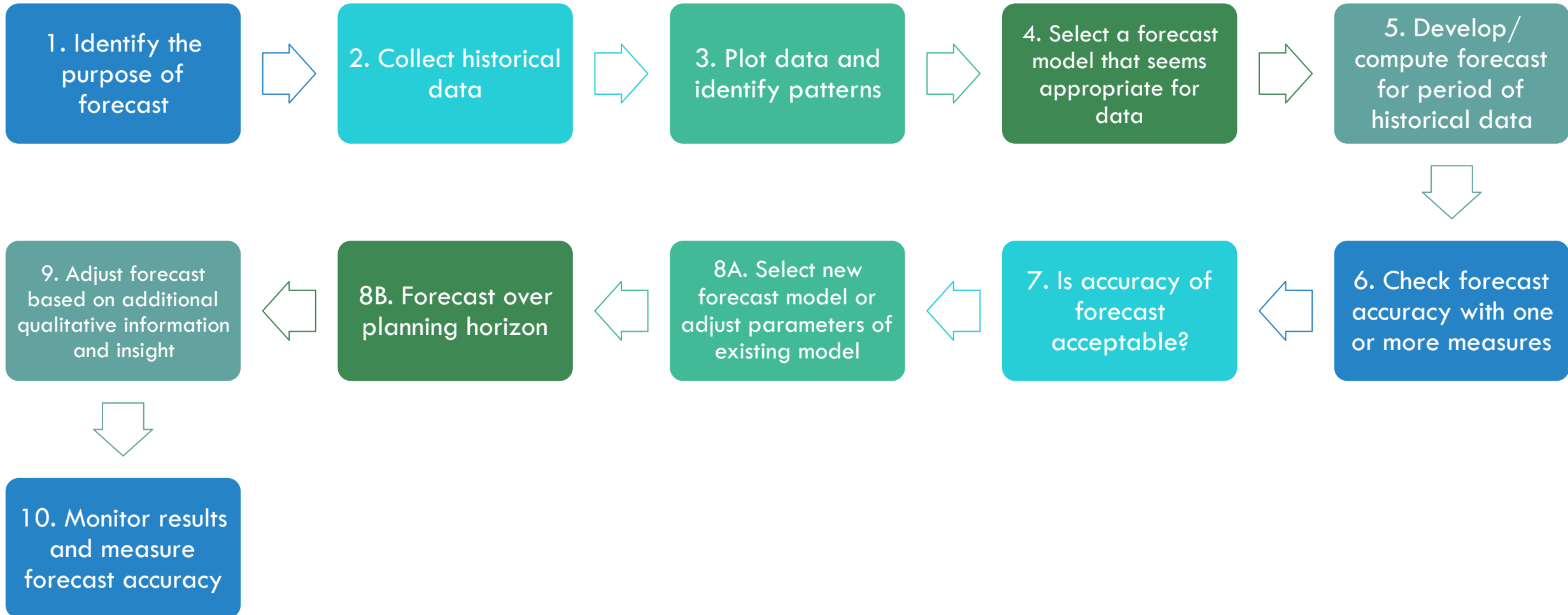


Happy medium

likely not to be making wise use of its capabilities and may fall short of meeting its forecasting goals

doesn't forecast at all doesn't really have any true guidance

# FORECASTING PROCESS



# FORECASTING APPROACHES

## Quantitative methods (Objective)

Used when situation is 'stable' & historical data exist

- Existing products
- Current technology

Heavy use of mathematical techniques

ex., Forecasting sales of a mature products

## Qualitative methods (subjective)

Used when situation is vague & little data exist

- New products
- New technology

Involves intuition, experience

ex., Forecasting sales to a new market

# QUANTITATIVE FORECASTING METHODS

## Time series forecasts:

- Naive methods
- Moving average
- Exponential smoothing
- Trend analysis
- Decomposition of time series

## Associative (causal) forecasts:

- Simple regression
- Multiple regression
- Econometric modeling

# QUALITATIVE FORECASTING METHODS

## Executive opinions

- Approach in which a group of managers meet and collectively develop a forecast

## Delphi technique

- Approach that uses interviews and surveys to judge preferences of customer and to assess demand

## Sales force polling

- Approach in which each salesperson estimates sales in his or her region

## Consumer surveys

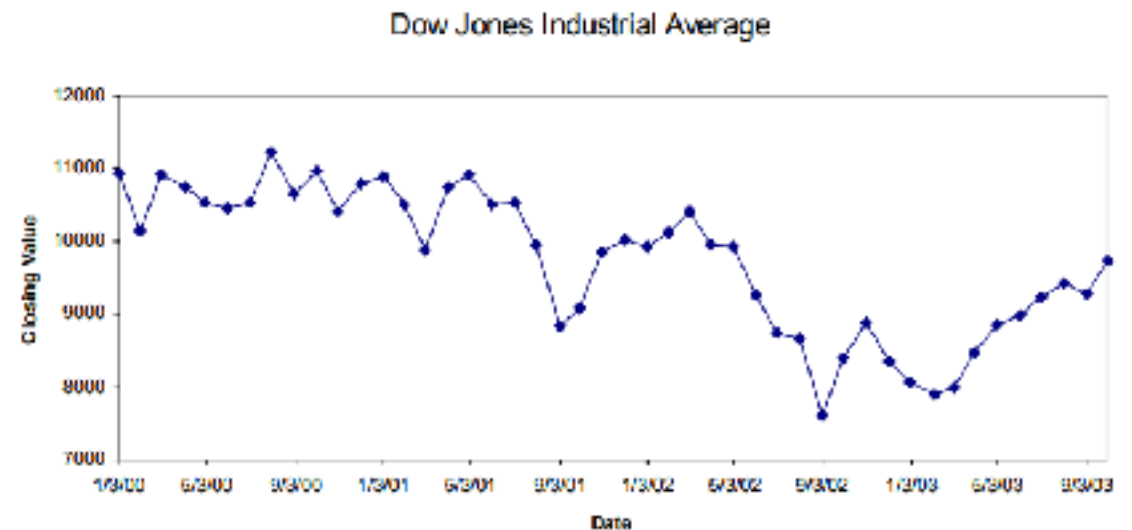
- Approach in which consensus agreement is reached among a group of experts

# TIME SERIES FORECASTING

A time series is a sequence of measurements over time, usually obtained at equally spaced intervals:

- – Daily
- – Monthly
- – Quarterly
- – Yearly

## Time Series Example



# COMPONENTS OF A TIME SERIES

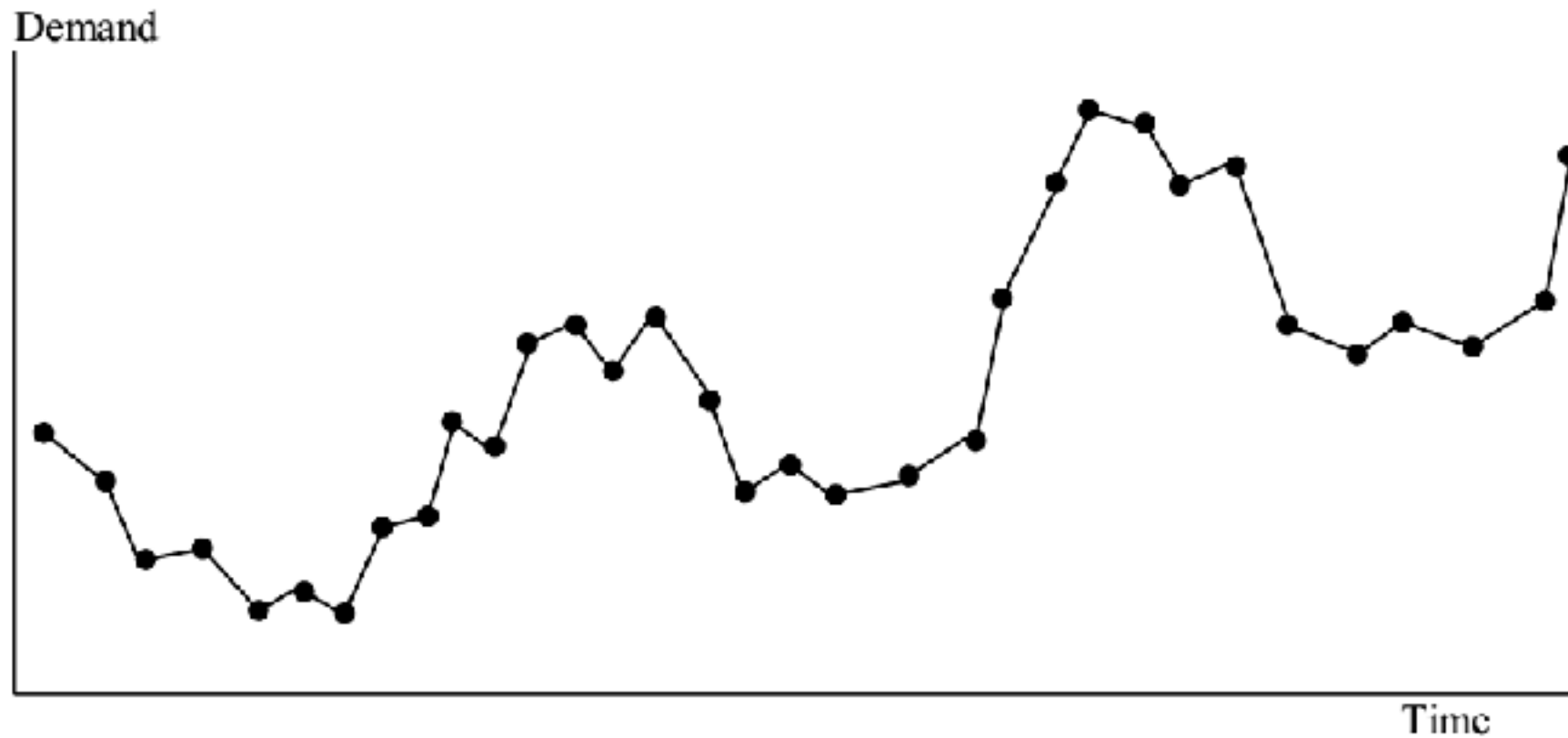
**Trend:** Data exhibit a steady growth or decline over time

**Seasonality:** Data exhibit upward and downward swings in a short to intermediate time frame (most notably during a year)

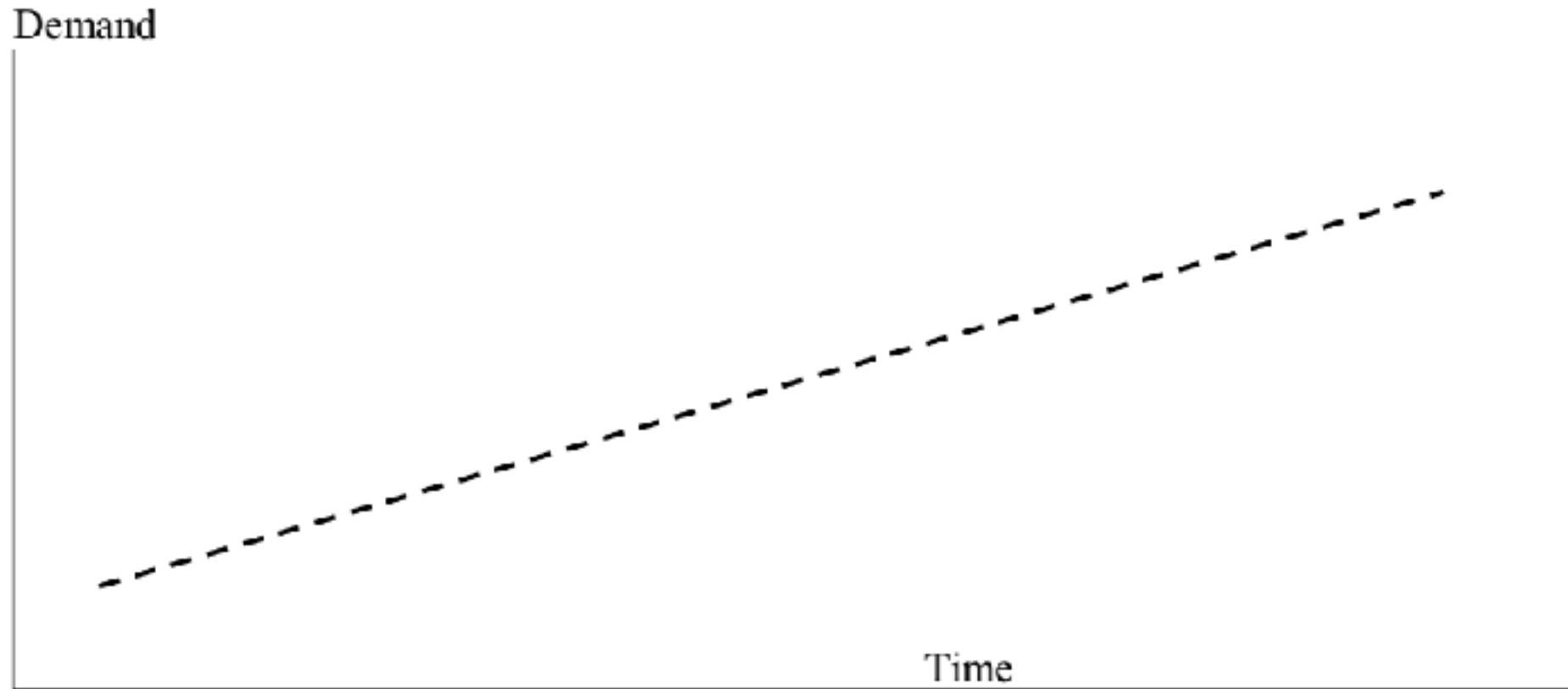
**Cycles:** Data exhibit upward and downward swings in over a very long time frame

**Random variations:** Erratic and unpredictable variation in the data over time with no discernable pattern

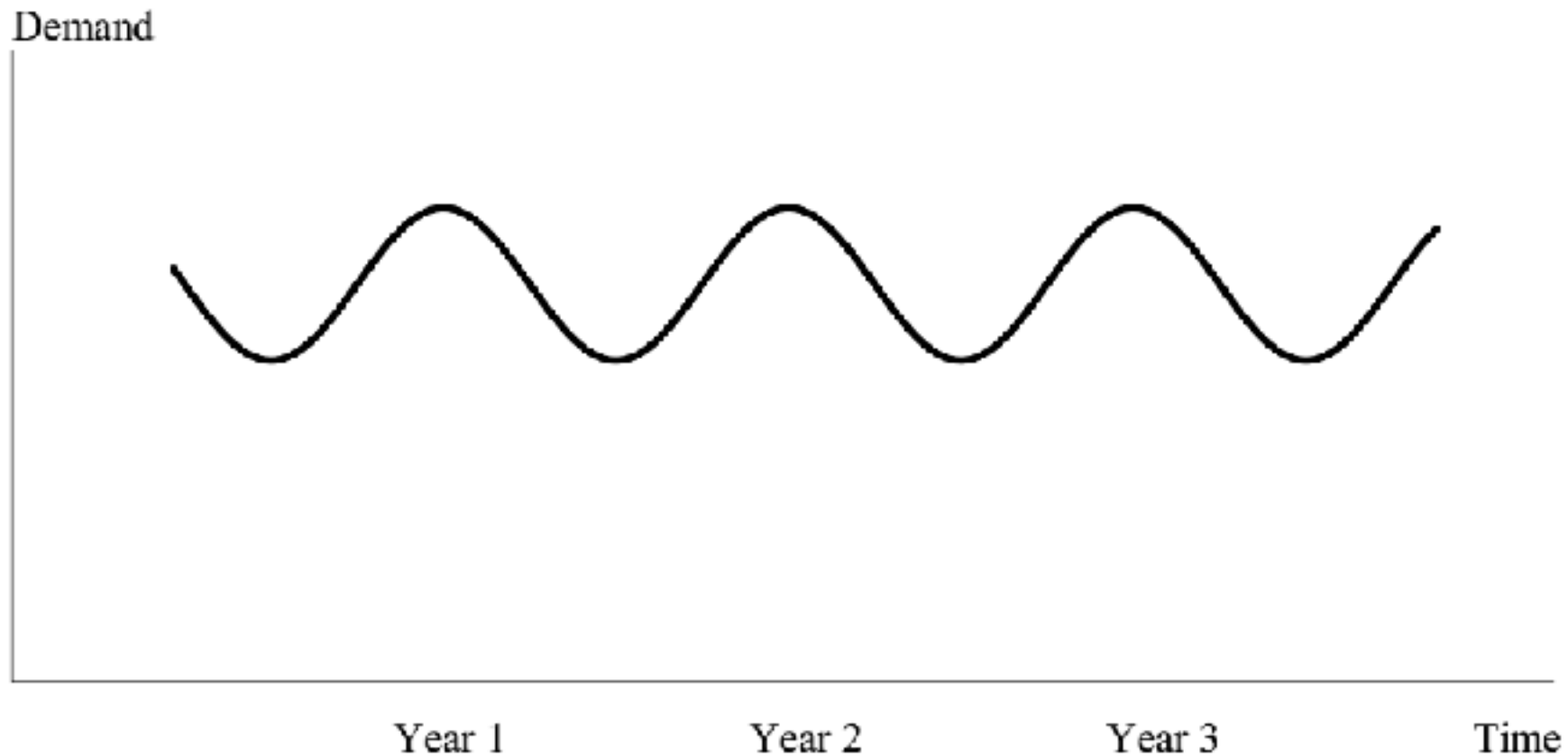
# ILLUSTRATION OF TIME SERIES DECOMPOSITION



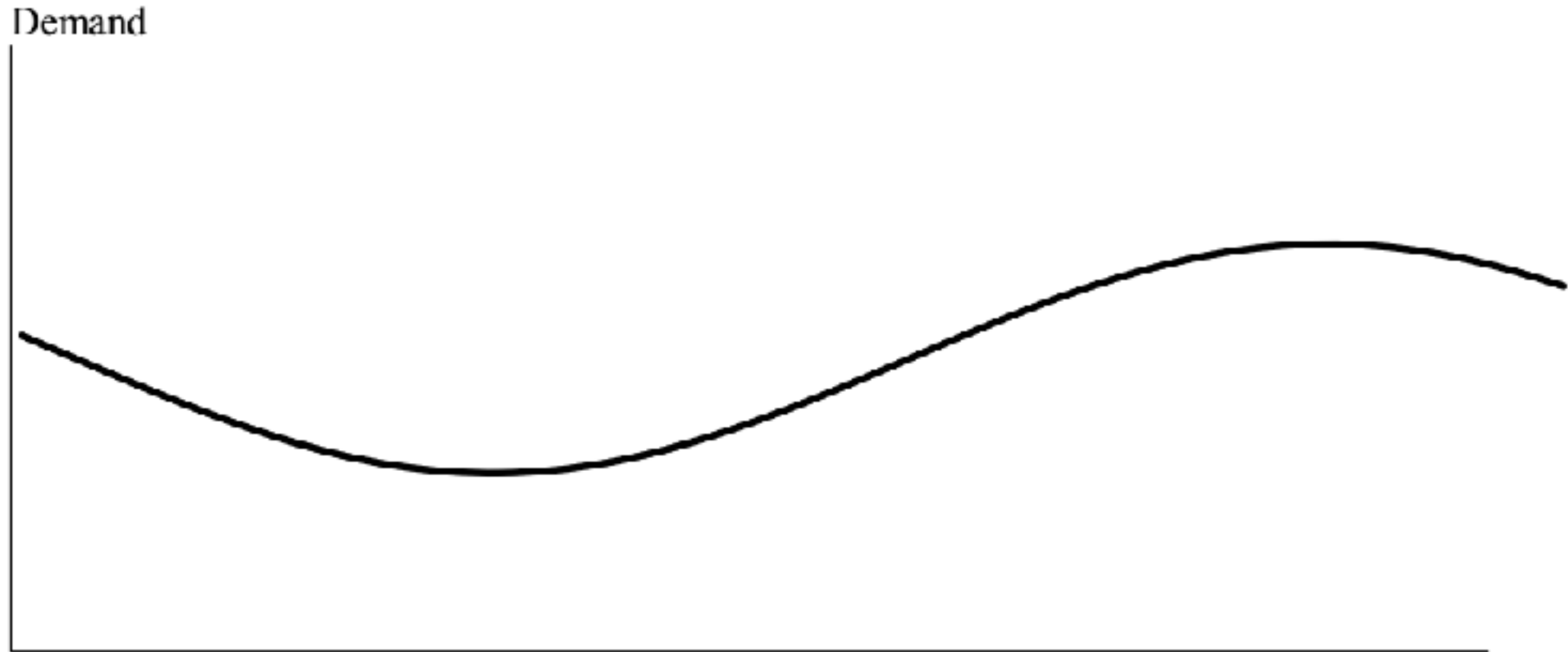
# TREND COMPONENT IN HISTORICAL DEMAND



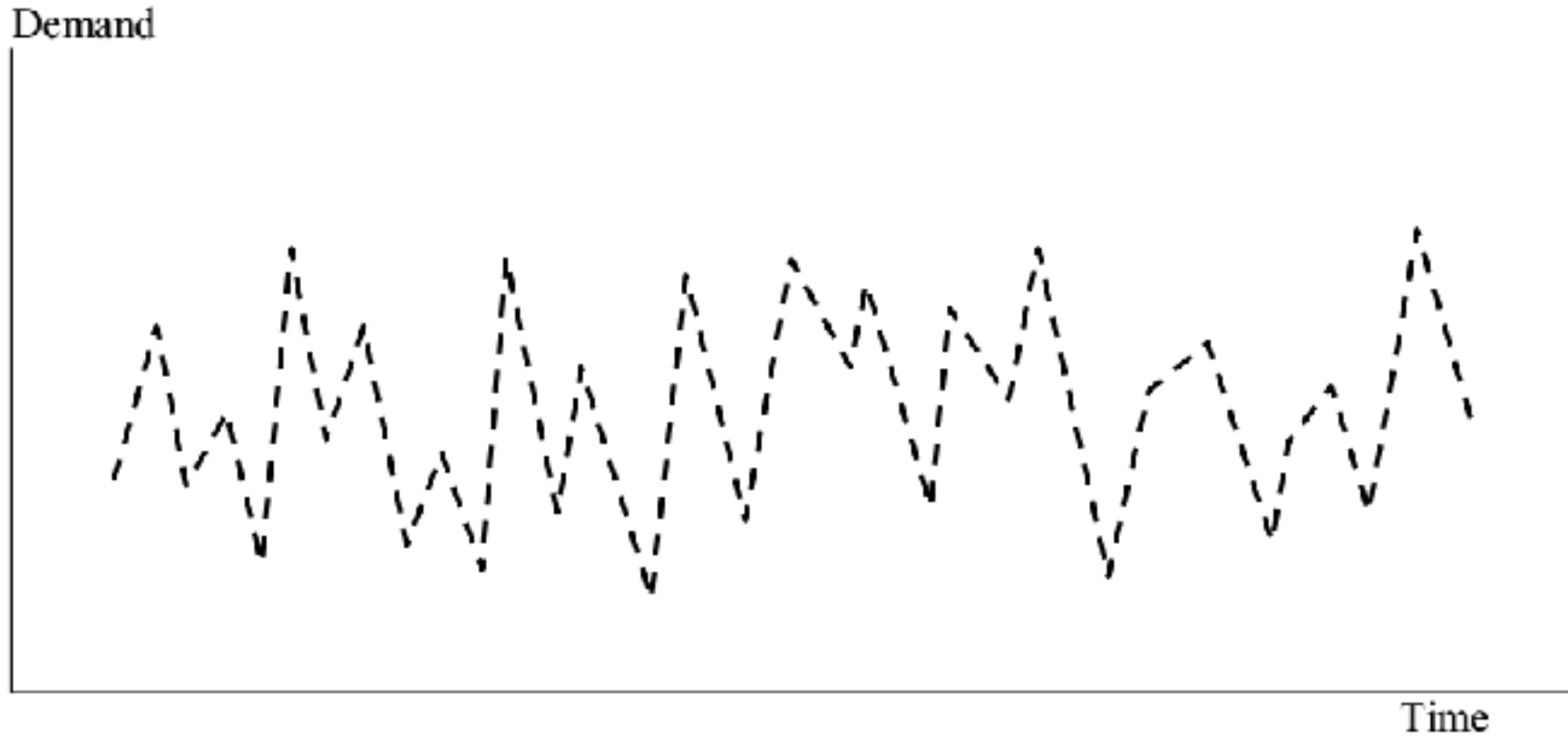
# SEASONAL COMPONENT IN HISTORICAL DEMAND



# CYCLE COMPONENT IN HISTORICAL DEMAND



# RANDOM COMPONENT IN HISTORICAL DEMAND



# TIME SERIES FORECASTING

- ✓ Making predictions about the future is called extrapolation in the classical statistical handling of time series data.
- ✓ More modern fields focus on the topic and refer to it as time series forecasting.
- ✓ Forecasting involves taking models fit on historical data and using them to predict future observations.

# CONCERNS OF FORECASTING

How much data do you have available and are you able to gather it all together?

What is the time horizon of predictions that is required? Short, medium or long term?

Can forecasts be updated frequently over time or must they be made once and remain static?

At what temporal frequency are forecasts required?

# EXAMPLES

Forecasting the closing price of a stock each day.

Forecasting the birth rate at all hospitals in a city each year.

Forecasting product sales in units sold each day for a store.

Forecasting the number of passengers through a train station each day.

Forecasting unemployment for a state each quarter.

Forecasting utilization demand on a server each hour.

Forecasting the size of the rabbit population in a state each breeding season.

Forecasting the average price of gasoline in a city each day

# SELECTION OF FORECASTING METHOD

What technique or techniques to select depends on six criteria:

- What is the cost associated with developing the forecasting model, compared with potential gains resulting from its use?
- How complicated are the relationships that are being forecasted?
- Is it for short-run or long-run purposes?
- How much accuracy is desired?
- Is there a minimum tolerance level of errors?
- How much data are available? Techniques vary in the amount of data they require.

# HOW DOES FORECASTING WORK?

A problem or data point is chosen

Theoretical variables and an ideal data set are chosen

Assumption time

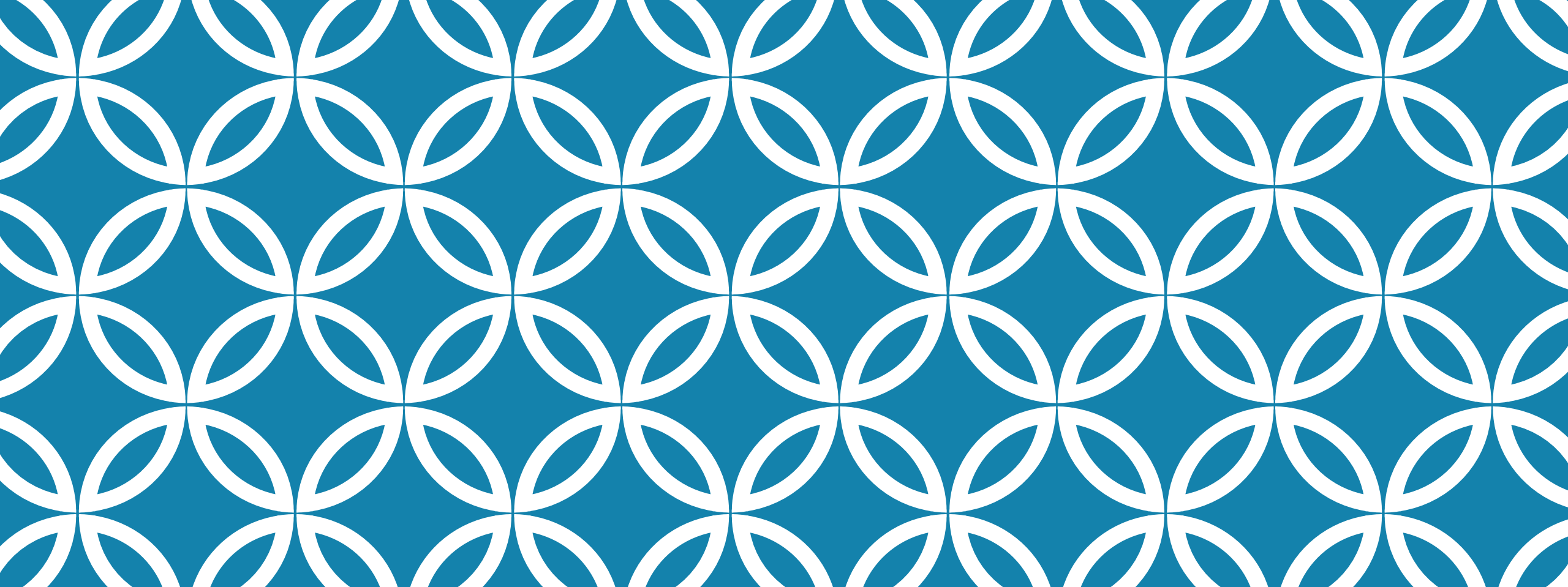
A model is chosen

Analysis

Verification

# EXPLORING THE VALUE OF FORECASTING METHODS IN BUSINESS PRACTICE

- ✓ Simple methods for forecasting are at least as good as complex statistical methods
- ✓ Some methods are better for short time horizons than others.
- ✓ Different methods vary in accuracy depending on the method of evaluating accuracy
- ✓ Averaging of forecasts using more than one method results in more accurate predictions.
- ✓ Short term predictions can take advantage of inertia in business phenomena and use this with seasonality and cyclical patterns to make useful forecasts
- ✓ Medium term predications are likely to be affected greatly by economic and environmental changes, so may vary in effectiveness depending on assumptions about the direction and speed of these changes.
- ✓ Long term predictions will decrease the effectiveness of statistical modeling at the business level and the use of creative technique may be the way forward here
- ✓ Key advice for improvements in forecasting includes the keeping of accurate records – without these we have only intuition.



**THANKS FOR YOUR  
ATTENTION |**