Production Planning & Control
BMM4823

Forecasting

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Chapter Description

- Aims
  - To understand types of forecasting methods.
  - To apply quantitative, causal and time series methods for future forecasting demand.

- Expected Outcomes
  - Able to differentiate between qualitative and quantitative forecasting methods
  - Able to determine future demand by using these forecasting methods
  - Able to determine the influence factors for the future demand

- References
  - Heizer, J and Render,B. 2011. Principles of Operations Management, 8th Edition, Pearson Prentice Hall, Inc.

Introduction

What is forecasting?

- A method to determine the future demand.
- Knowing the future demand could assist a company to prepare;

I. production
II. Facilities
III. Inventory
IV. resources

Good forecasting

The forecast should be

- right time
- accurate
- reliable
- simple to understand and use
- cost effective
- external and internal factors
- right data

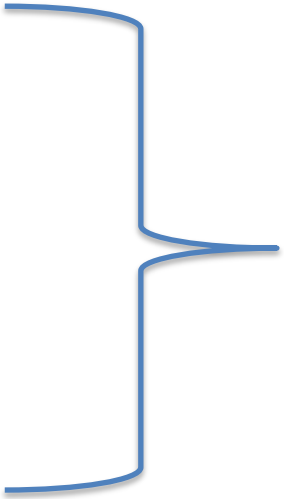
Example

Exora

Satria Neo

Pesona

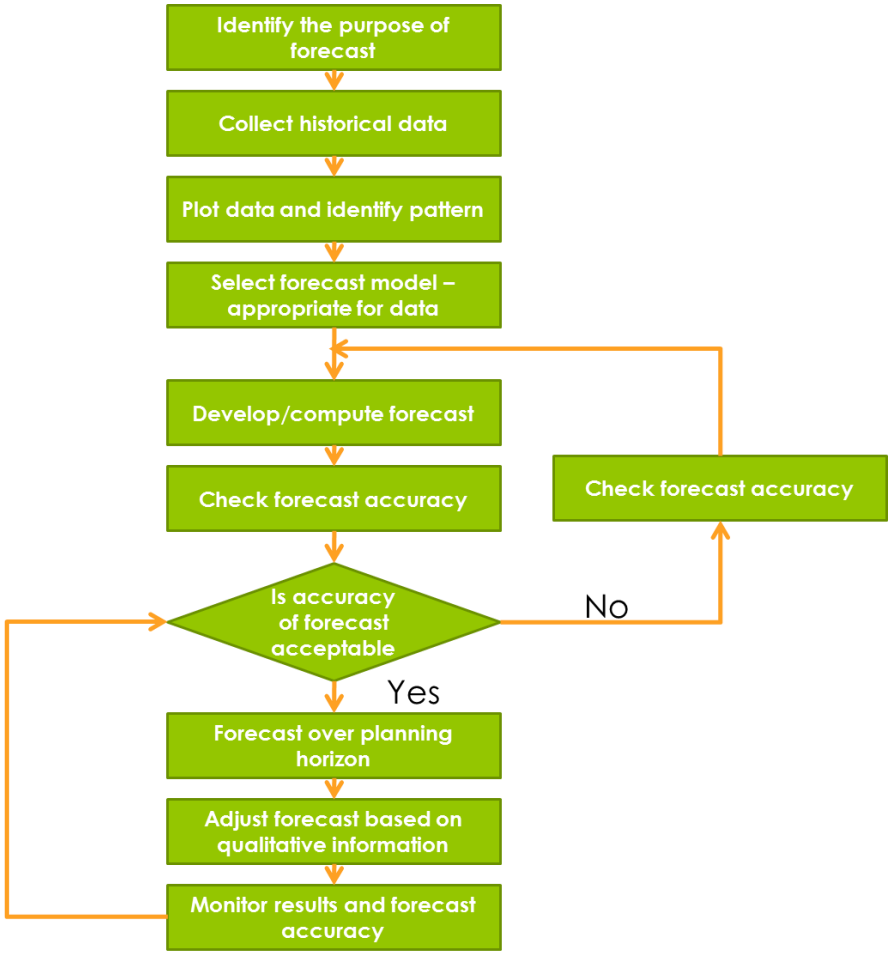
Saga



How to forecast?

- Short-term forecast
  - 3 months – 12 months
  - Purchasing, job scheduling, workforce levels, job assignments, production levels
- Medium-term forecast
  - 3 months to 3 years
  - Sales and production planning, budgeting
- Long-term forecast
  - Normally 3^{+} years
  - New product, new plant, R&D
  - E.g. Proton at Tanjung Malim

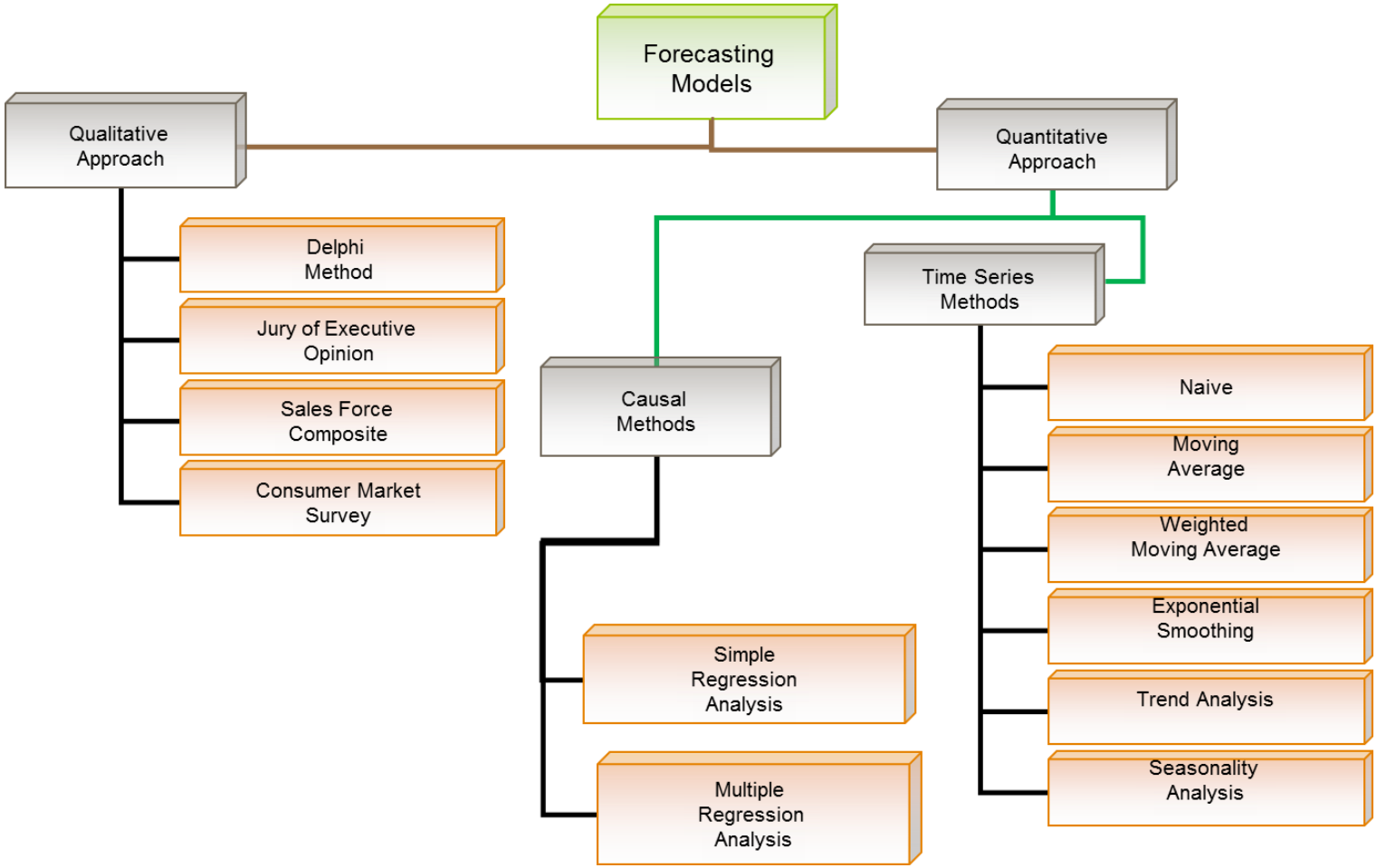
Process flow



Forecasting experience

- Forecasts are always not perfect
- The historical data play important role in forecasting
- Overall forecasting is more accurate compared to individual product forecasts

Forecasting models



- Qualitative
- Normally used when little data exist and no indication
  - A new product
  - A new technology
  - A new plant
- Depending on intuition, experience
  - e.g., forecasting sales on Internet

Quantitative

- Normally used when there is historical data and demand stable
  - Existing products
  - Current technology
- Uses formula / mathematical techniques
  - e.g., forecasting sales of smart phones

Qualitative techniques

1. **Experts opinion**
2. **Delphi method**
3. **Sales opinion**
4. **Customer Survey**

Qualitative models

- **Experts opinion**
  - Pool opinions experts, supported with statistical model
- **Delphi method**
  - Panel of experts, few rounds
- **Sales opinion**
  - Get opinion from salesperson. They know better on sales demand
- **Customer Survey**
  - Distribute simple questionnaire
  - Interviews

Expert opinions

- Formation small group of experts and managers
- Estimation of demand by the groups
- Support with statistical models
- Fast determination

Sales opinion

- Each salesperson will estimate sales
- Gather all information from others e.g.. district, state and national levels
- Sales person knows better what the customers really want
- Overly optimistic

Delphi method

- Consensus approach by interactive process
- 2-3 rounds until everyone agrees on decision made
- Three categories of participants
  - Top management / Decision makers
  - Staff
  - Respondents

Delphi method

Customer survey

- Should ask customer purchasing plans
- Let them speak
- Not always same as they are saying
- Sometimes not accurate
- Provide some souvenirs

Quantitative

1. Naive approach
2. Moving averages
3. Weighted moving averages
4. Exponential smoothing
5. Trend projection/analysis
6. Linear regression
7. Multiple regression

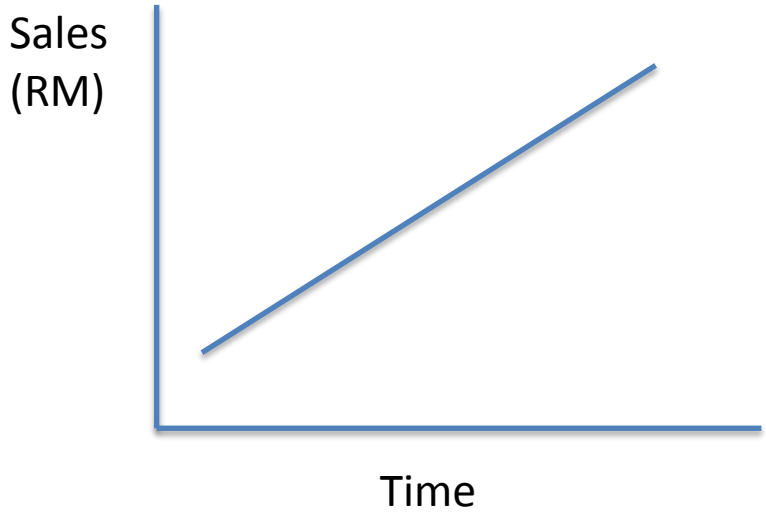
} time-series models

} causal model

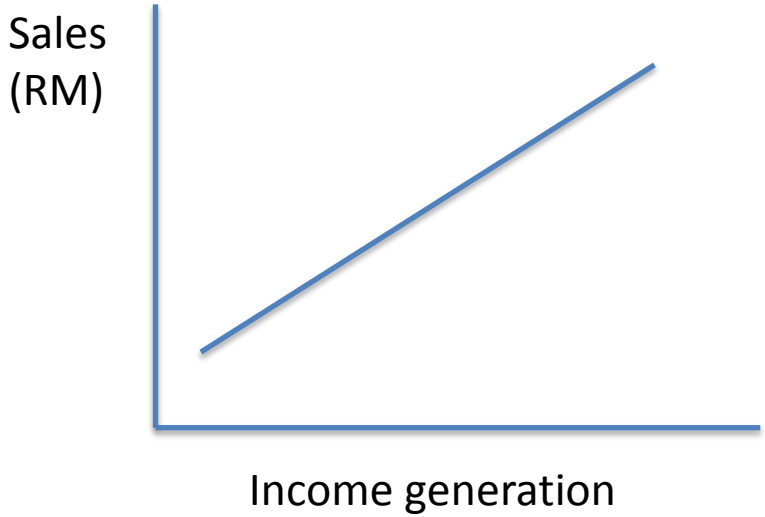
Time series forecasting

- Use previous data for forecasting
- Use relevant data with regular time periods
- Based on regular time
- Assumes the same factors will influencing past and present demand
- Very important the data used is accurate

- **Time Series Models:**
  - Use previous data to predict the future
  - Assumes the previous data will generate information for future demand
  - Assumes the same pattern will be followed as the past

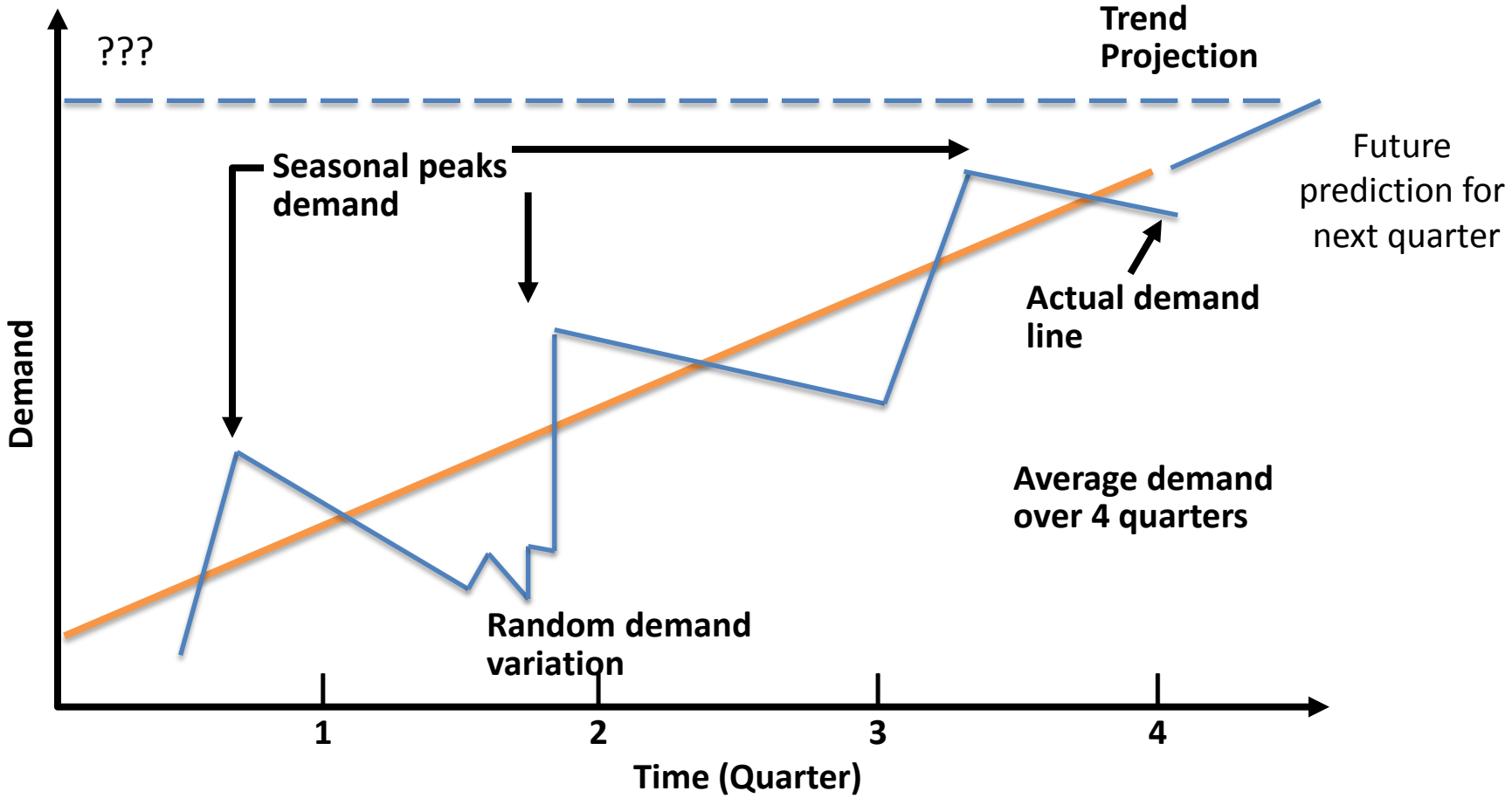


- **Associative Models**
  - Identify cause-and-effect relationships
  - Looking some hints to predict the future
  - E.g.. Income generation with the sales of apartment



Time series components

- Trend
- Seasonal
- Random
- Cyclical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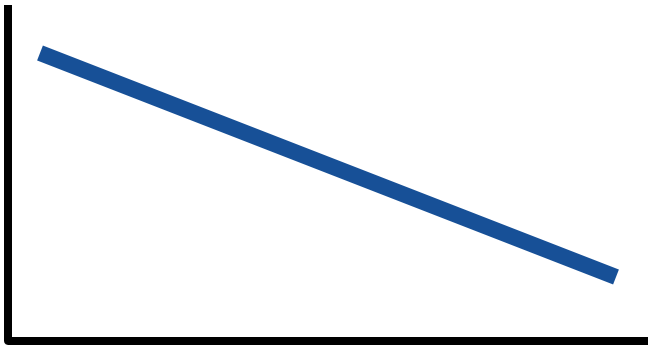
Trend Projection
Seasonal peaks demand
Future prediction for next quarter
Actual demand line
Demand
Average demand over 4 quarters
Random demand variation
1
2
3
4
Time (Quarter)

Trend component

- Consistent, trend upward or trend downward
- Influences factors are such as population, technology, age, culture, etc.



Seasonal component

- Normally the pattern will be fluctuate up and down
- It was due to season change such as customs, weather, event 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

Cyclical component

- Demand will be up and down movements
- It was due to environment cycle such as business, political and economic factors
- Affected in certain duration e.g. yearly
- Often causal or associative relationships
- E.g. airline industry

Discussion

Tragedies of MH370, MH17 deal severe blow to MAS results

BY JOSEPH CHIN

FACEBOOK TWITTER GOOGLE+ LINKEDIN

What do you think when these tragedies incurred to MAS?

Random component

- Unsystematic, with fluctuations
- Unpredictable event
- Randomly happened
- E.g. due haze, diseases

Discussion

- Discuss on how a company could forecast accurately in the situation of poor economy?

- Food & beverages
- Electronic
- Metal fabrication
- Automotive
- Others

Thank you