RETAIL-GIANT SALES/DEMAND FORCASTING

Submitted by:

1. Sanjay Kushwah
2. Winnie Unninkrishnan
3. Ravi Gandhi
4. Rahul Dalvi

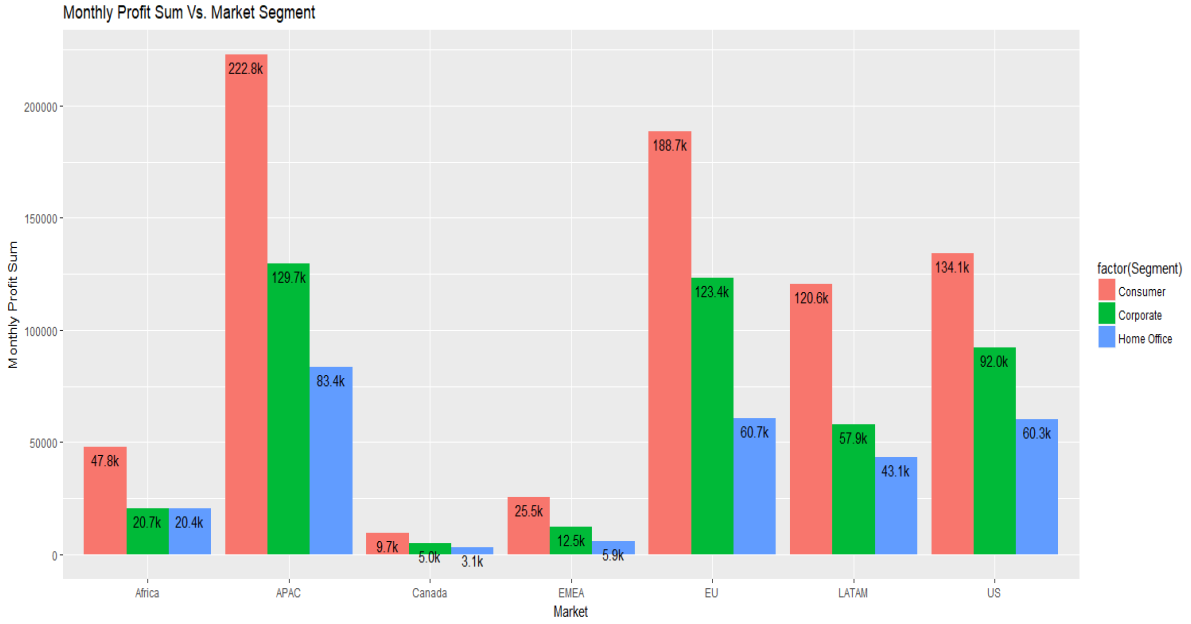
Business Understanding

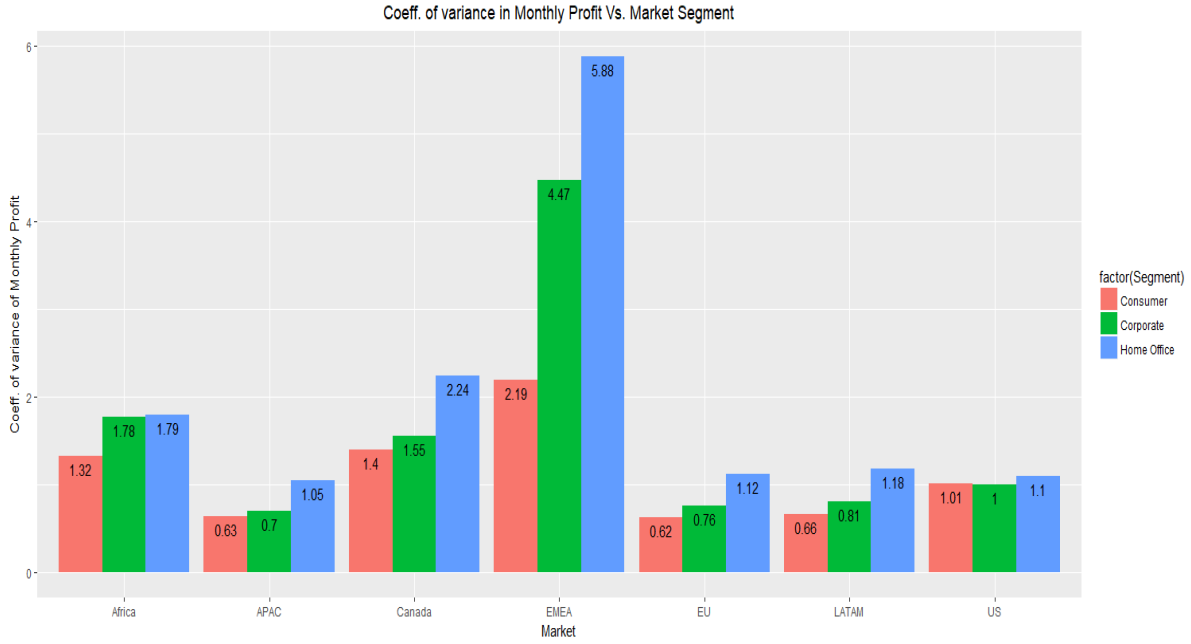
- **Global Mart** is an online store super giant having worldwide operations. It takes orders and delivers across the globe and deals with all the major product categories.
- The store caters 7 market segments and 3 different categories. The three categories are:
  - Consumer
  - Corporate
  - Home office.
- **Business Goal:**
  - Find out the two most profitable segments out of 21 market buckets i.e. 7 segment * 3 categories.
  - Forecast the sales and demand for the two most profitable segments for the next 6 month, which would help us in managing the revenue and inventory and finalise the plan for next 6 months

Data Understanding

- **Data available:**
  - The data consists of the transaction level data from January 2011 to December 2014
  - We have 51290 observation/transactions with 24 attributes
  - Out of all the 24 attributes available we need only 6 attributes. The attributes required for the forecasting are:
    - Order Date - Date on which the order was placed
    - Segment - The market segment to which the product belongs
    - Market - Market segment to which the customer belongs
    - Sales - Total sales value of the transaction
    - Quantity - Quantity of the product ordered
    - Profits - Profit made on the transaction

Two Most important Market Segments





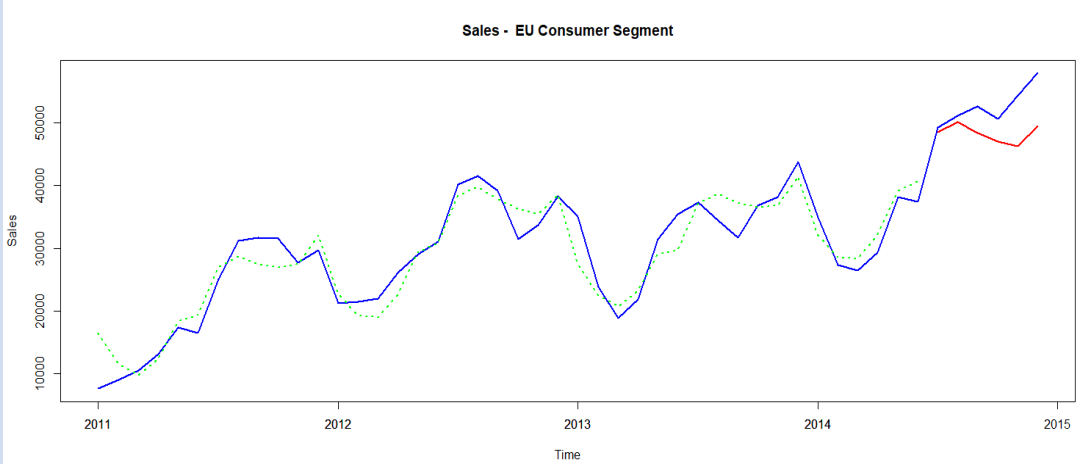
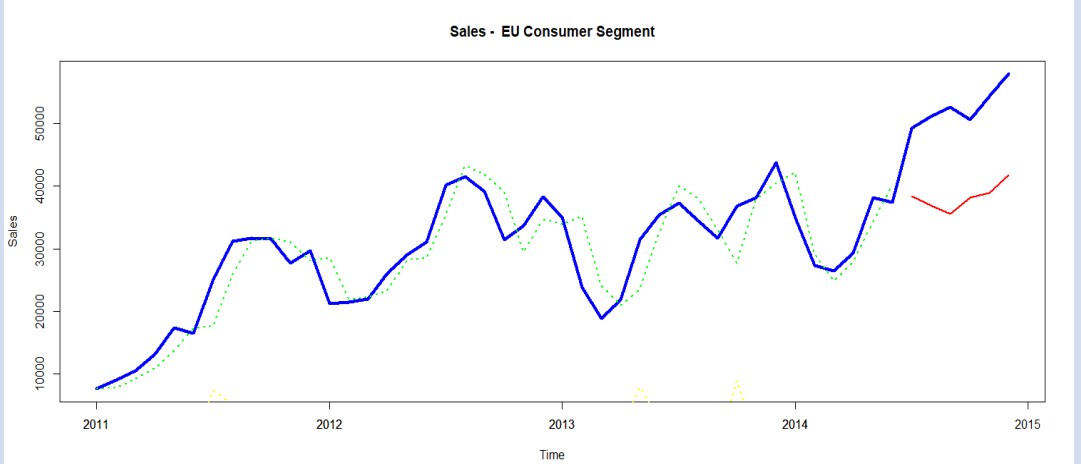
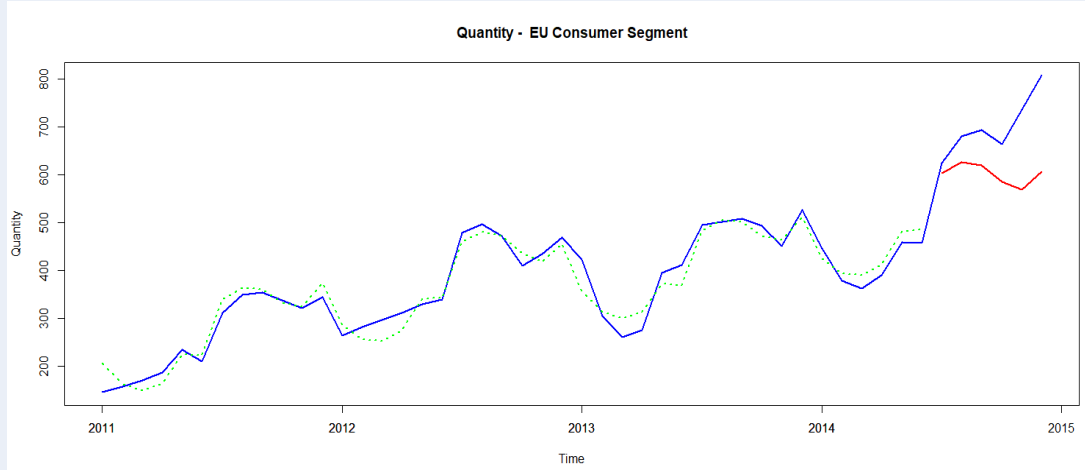
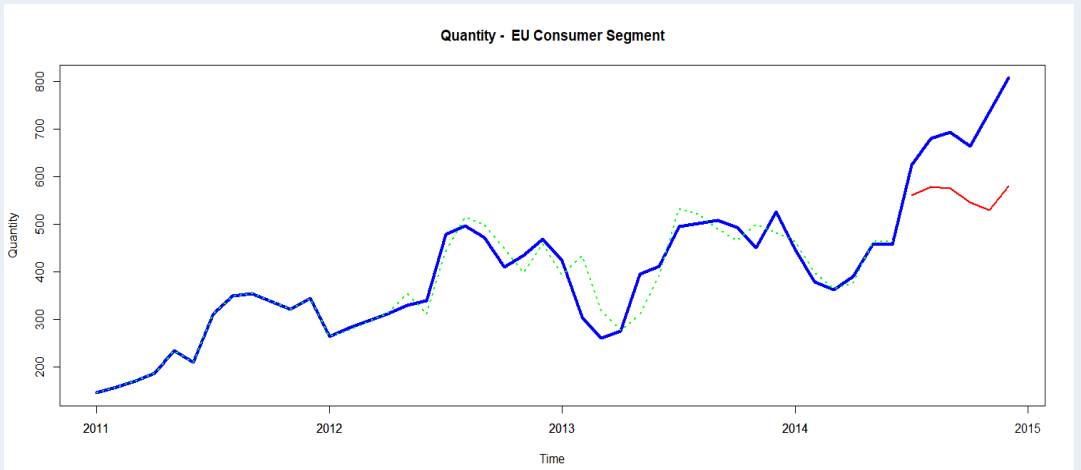
Out of total 21 market segment, the two most profitable market segments having least coefficient of Variation are:

- APAC - Consumer:
  - Monthly Profit of 222.8k
  - Coefficient of variation of the Profit is 0.63
- EU - Consumer:
  - Monthly Profit of 188.7k
  - Coefficient of variation of the Profit is 0.62

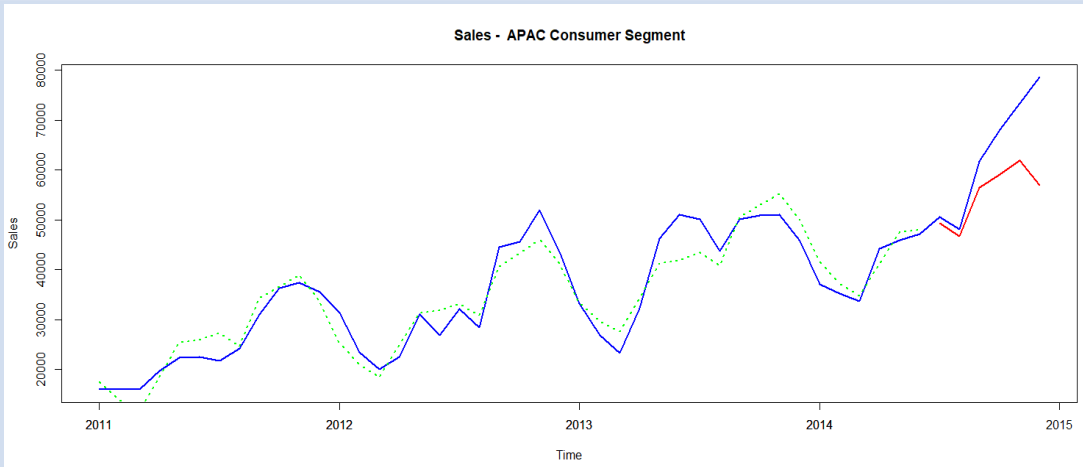
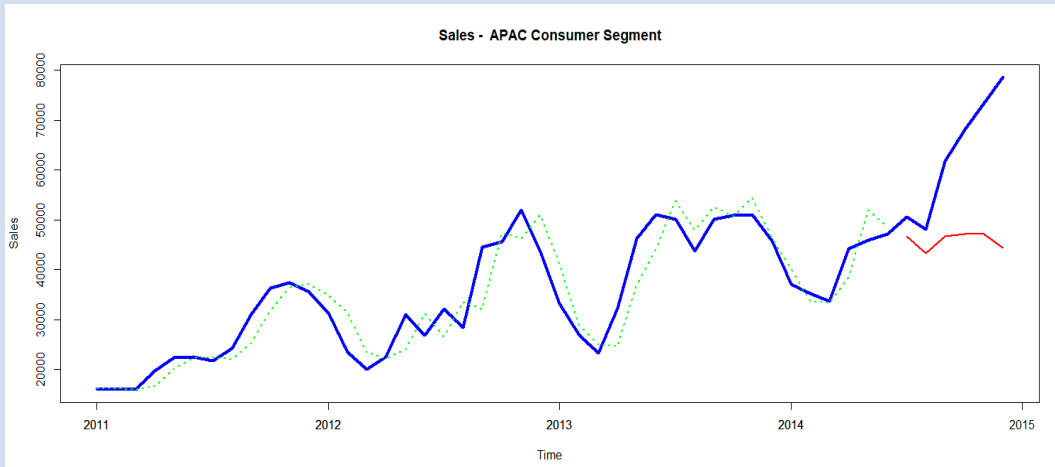
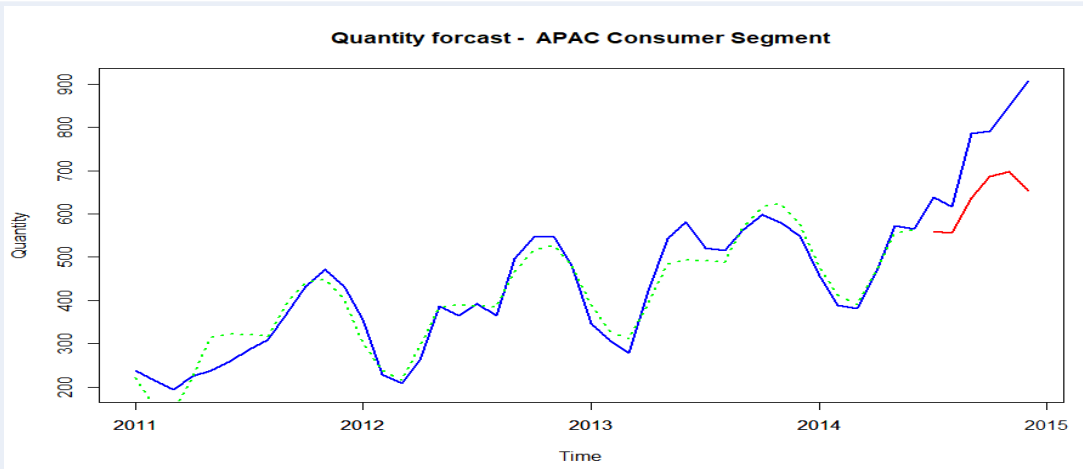
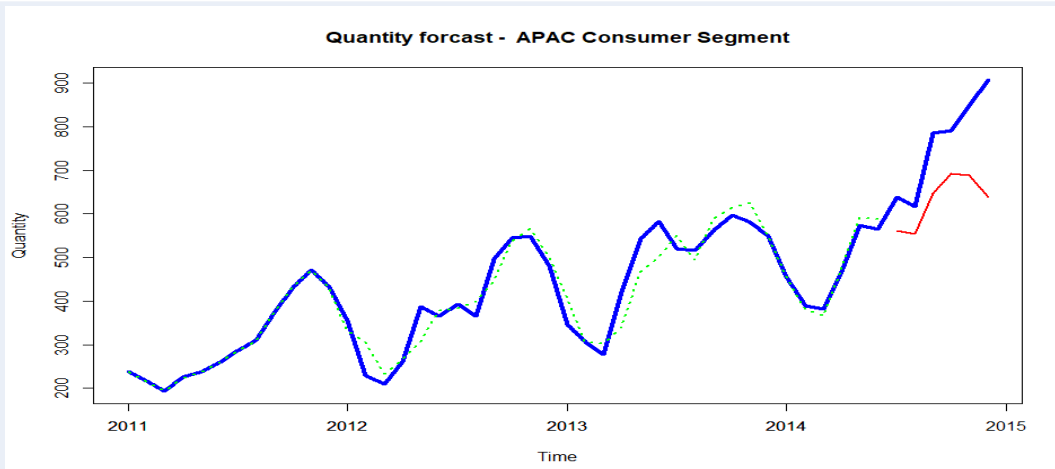
Model Building - Strategy

- Build a model using Classical Decomposition and Auto Arima models for the sales and demand for EU – Consumer and APAC – Consumer.
- **Steps in building model:**
  - Smoothen time series using Moving Average method
  - Divide the TS data in train and test data
  - **Modelling**:
    - Use Classical Decomposition model and Auto Arima model for model building
    - Evaluate model using Mean Absolute Percentage Error(MAPE) as an evaluation metric to chose between the model
    - Use ACF and PACF plots of residuals to make sure that the residual is noise.

Model Evaluation – EU Consumer

	Classical Decomposition	Auto ARIMA Model
Sales		
Demand		

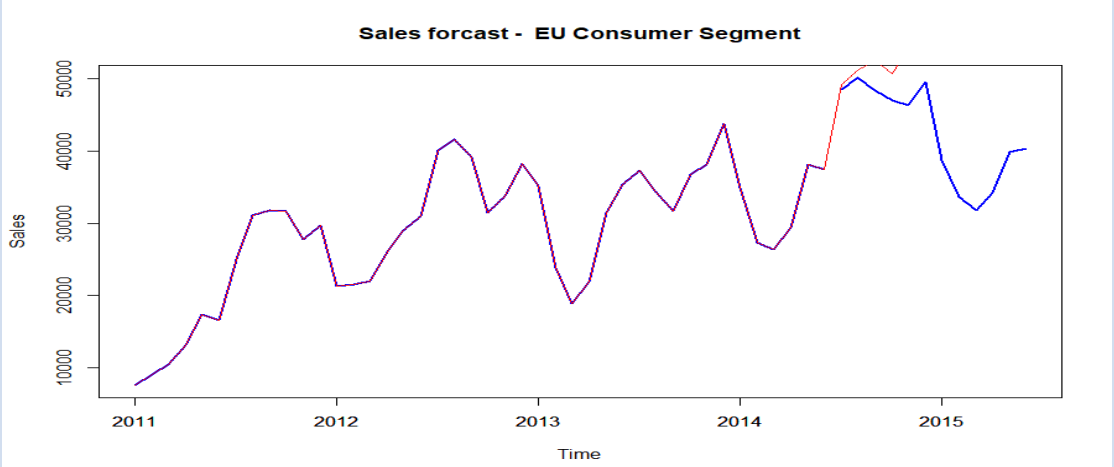
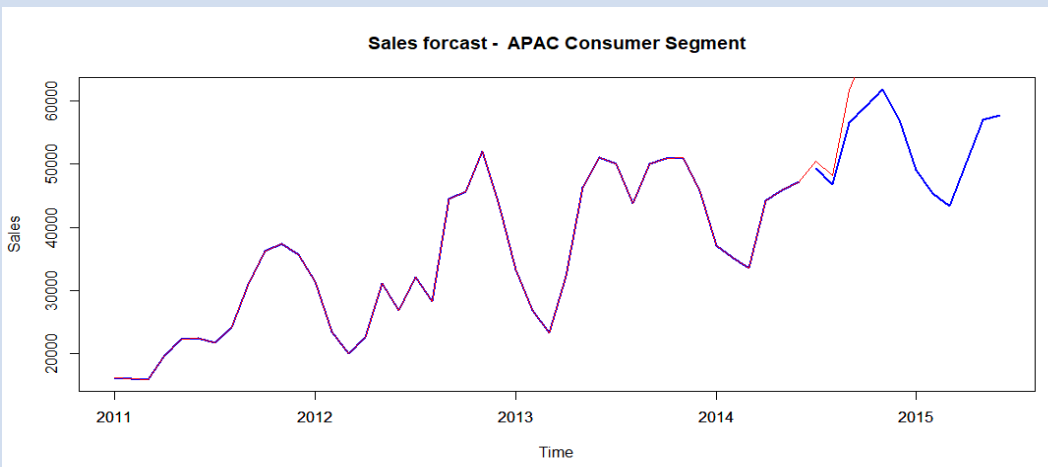
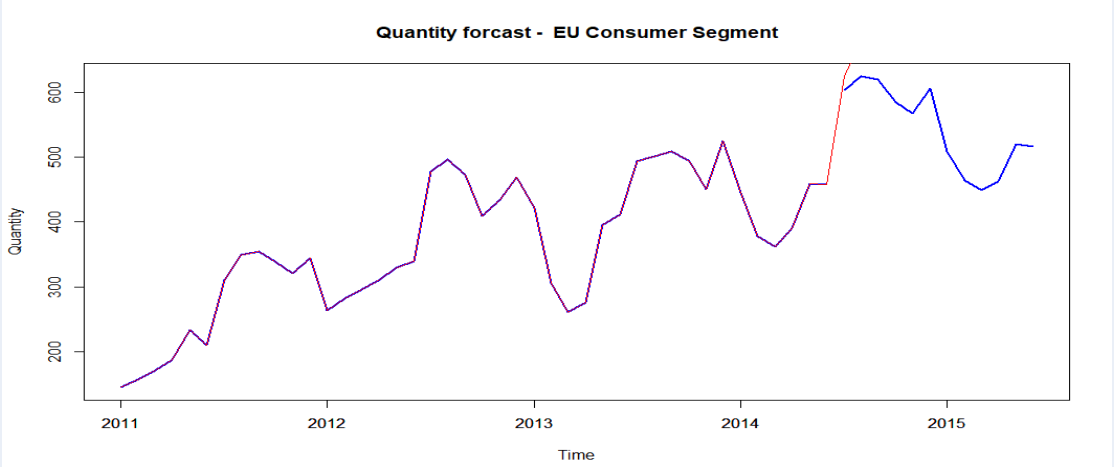
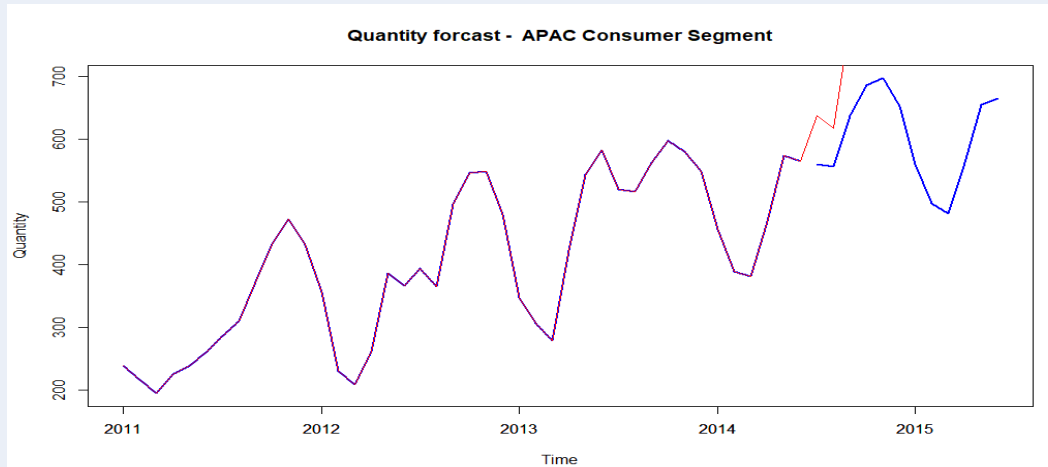
Model Evaluation – APAC Consumer

	Classical Decomposition	Auto ARIMA Model
Sales		
Demand		

Model Evaluation Using MAPE

MAPE Comparison for Models and Market Segments			
Market Segment - Sales/Demand	**ARIMA Model Forecast**	**Classical Decomposition**	**Model Selected**
APAC - Consumer - Sales	25.37	11.7	Classical Decomposition
APAC - Consumer - Quantity	16.78	16.71	Classical Decomposition
EU - Consumer - Sales	27.11	7.96	Classical Decomposition
EU - Consumer - Quantity	19.29	13.64	Classical Decomposition

Forecasting From Jan 2015 to Jun 2015

	EU - Consumer	APAC – Consumer
Sales		
Demand		

Conclusion

- The two most profitable and consistent market segments identified are APAC – Consumer and EU – Consumer
- We were successfully able to select the 4 best models for forecasting next 6 months sales and demand for the two most important market segments
- The Forecasted results are as follows:

Forecast Month	EU Sales	APAC Sales	EU Qty	APAC Qty
Jan-15	38678	49061	509	560
Feb-15	33636	45310	465	498
Mar-15	31817	43376	450	481
Apr-15	34164	50141	463	562
May-15	39833	57083	521	655
Jun-15	40327	57748	516	664