GLOBAL STORE CASE STUDY

SUBMISSION

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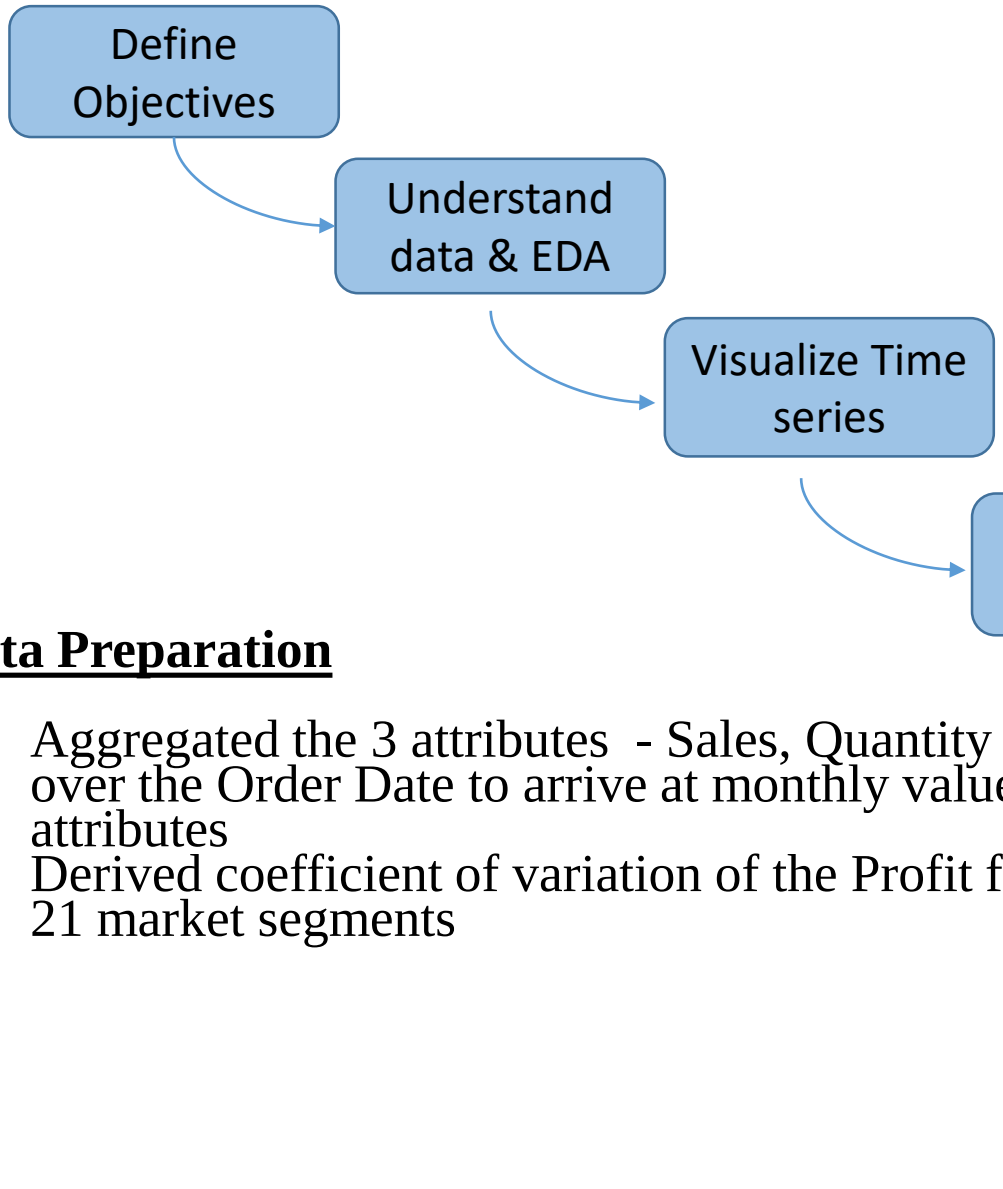
Business Objectives

- Forecast the sales and the demand of the given retail giant global store, for the next 6 months
- Recommend ways to manage the sales and inventory.

Data

- Data has transaction level data, where each row represents a particular order made on the online store – 51290 instances with 24 attributes
- Data includes orders for 48 months, period starting from 2011 Jan until 2014 Dec.
- Major attributes considered in this forecasting solution are the sales, quantity and profit of 7 markets in various geographies, 3 segments – consumer, corporate & home office – under 3 types of product categories – furniture, technology & office supplies.

Problem solving methodology



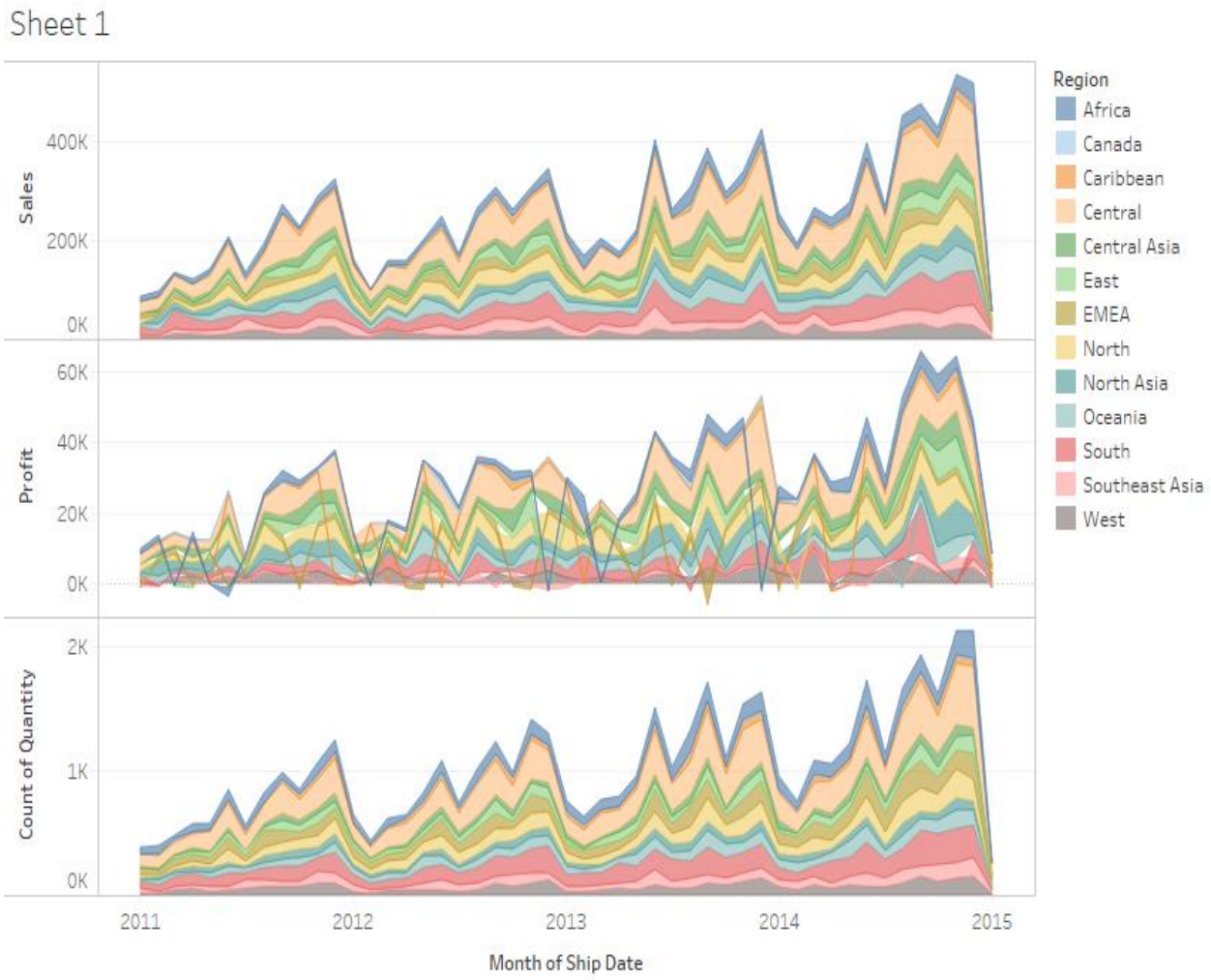
Data Cleansing

1. Missing 80% of postal code values, hence dropped the attribute from analysis
2. Order date format changed to represent the months & years of period under consideration

Data Preparation

1. Aggregated the 3 attributes - Sales, Quantity & Profit, over the Order Date to arrive at monthly values for these attributes
2. Derived coefficient of variation of the Profit for all the 21 market segments

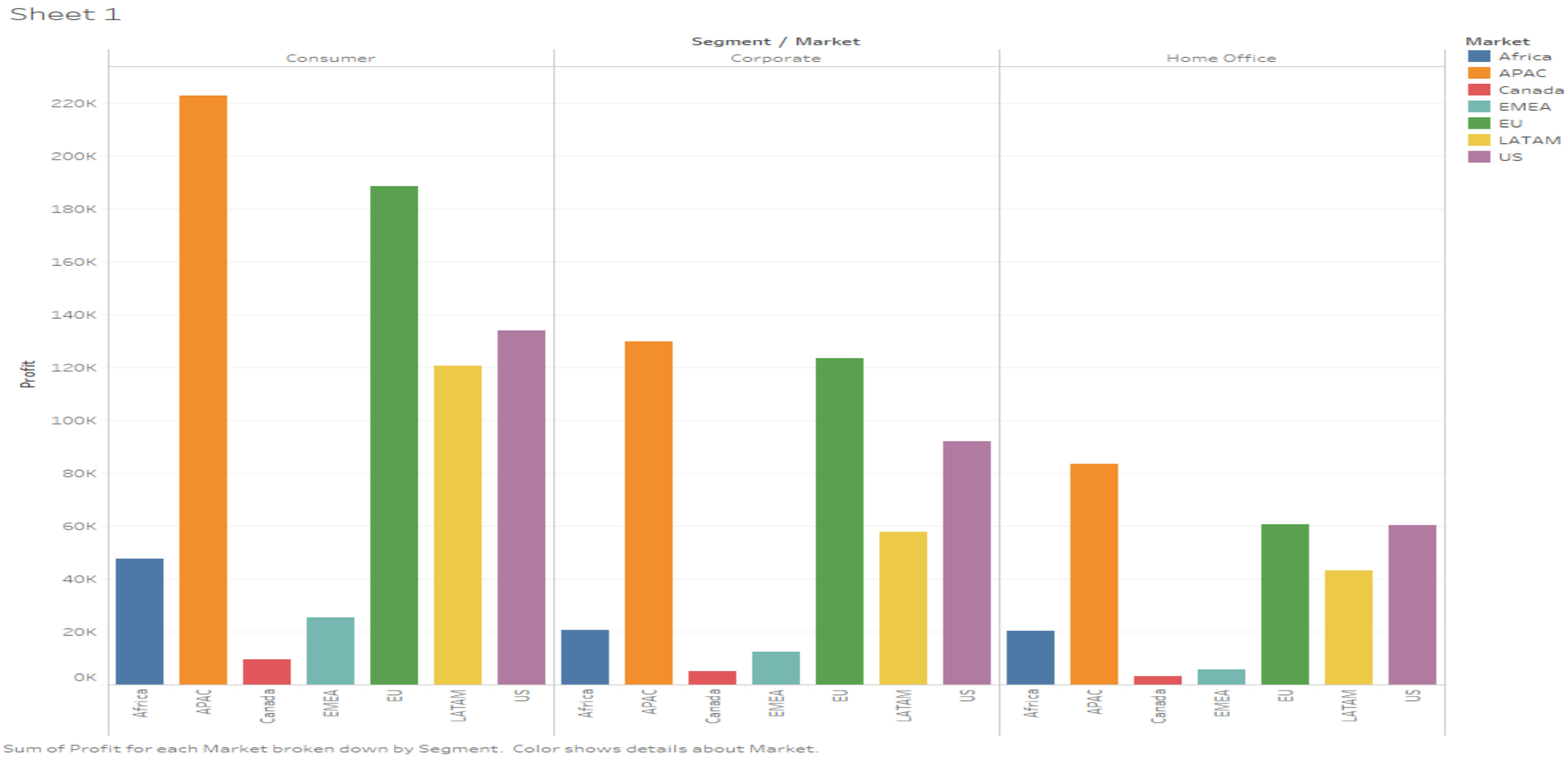
Sales, Inventory and profit against different regions/segments



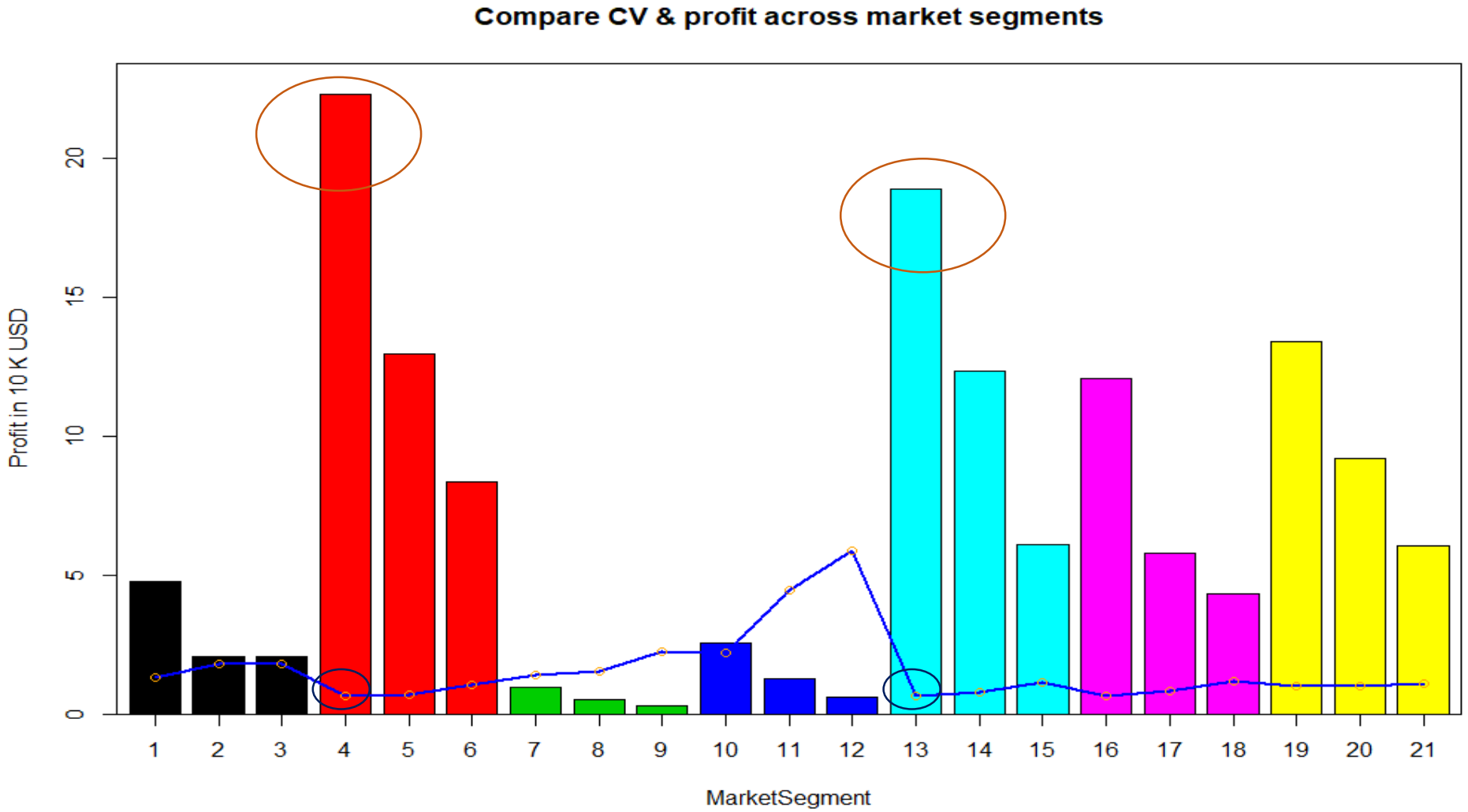
The plots of sum of Sales, sum of Profit and count of Quantity for Ship Date Month. Color shows details about Region.

The plots of sum of Sales, sum of Profit and count of Quantity for Ship Date Month. Color shows details about Segment.

Profit against various market segments



Identify top 2 consistent profitable market segments



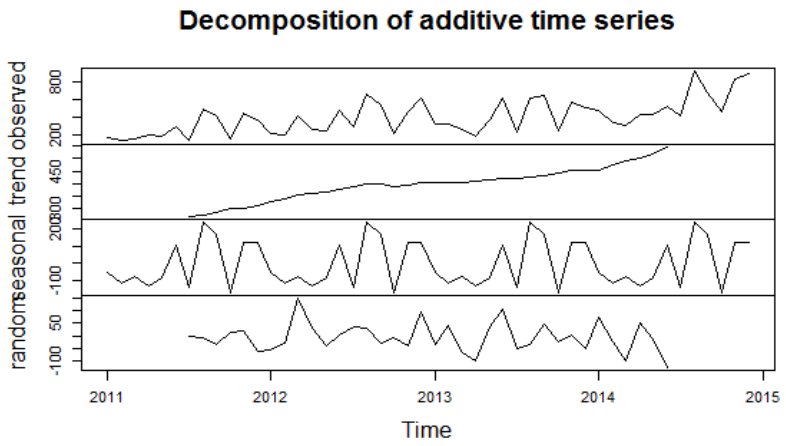
Observation

1. Segments 4 & 13 have the lowest CV(Coefficient of variation) and the highest profit.
2. Checking back the data, see that segment 4 is APAC Consumer and segment 13 is EU Consumer

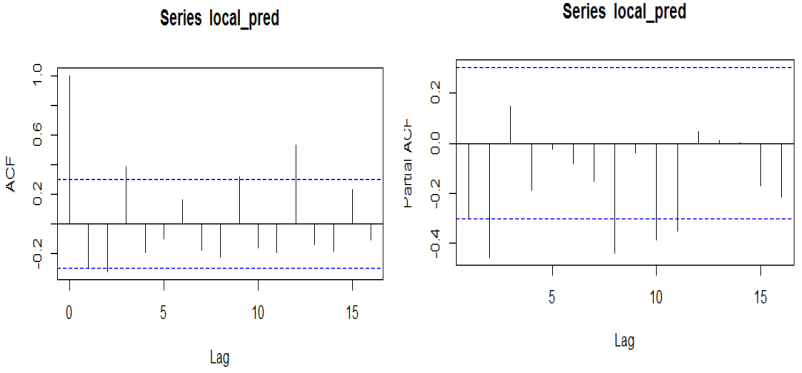
	Market	Segment	agg_pft1	cv	seg
	<fct>	<fct>	<dbl>	<dbl>	<dbl>
1	APAC	Consumer	222818.	0.632	4
2	EU	Consumer	188688.	0.624	13
3	US	Consumer	134119.	1.01	19
4	APAC	Corporate	129737.	0.698	5
5	EU	Corporate	123394.	0.764	14
6	LATAM	Consumer	120633.	0.661	16
7	US	Corporate	91979.	1.00	20
8	APAC	Home Office	83445.	1.05	6
9	EU	Home Office	60748.	1.12	15
10	US	Home Office	60299.	1.10	21

EU Consumer segment sales & inventory forecasting

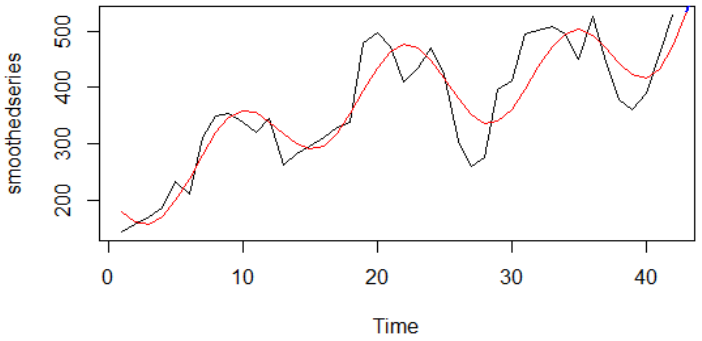
Sales



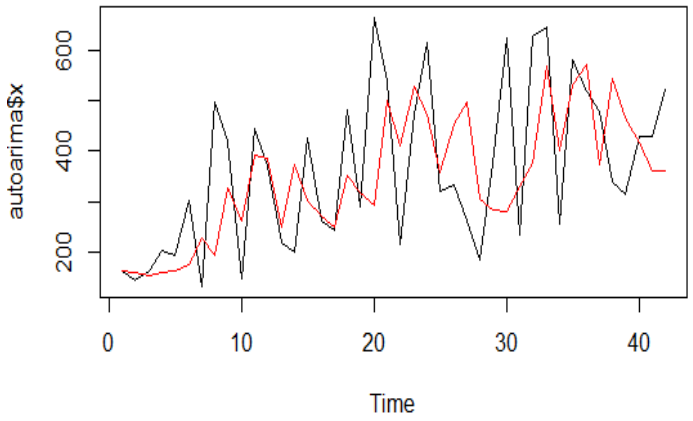
EU Segment sales Time series plot – this shows an upward trend, and a cyclic pattern of sales numbers going upward in Oct & Nov and the numbers dipping in Feb & August.



ACF & PACF plots show that the Autoregressive and Moving Average methods follow a (0,0) order respectively. The same is given by the autoarima model, which gave ARIMA(0,0,0) order for this series.

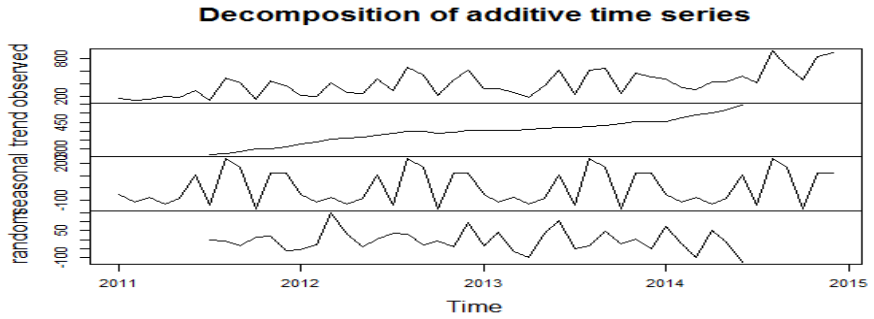


Plot classical decomposition prediction against original time series

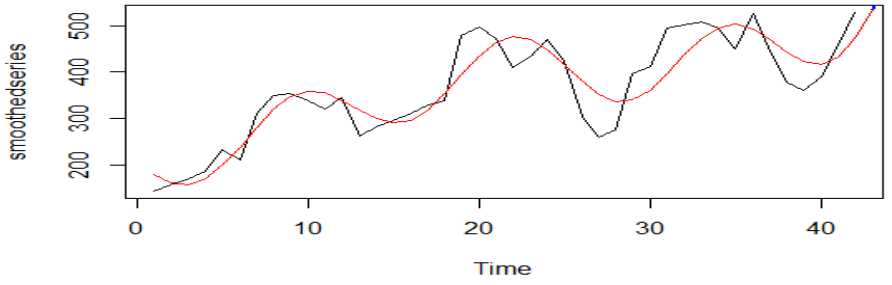


Plot auto arima prediction against original time series

Inventory



Decomposed inventory series shows an upward trend and a seasonal component



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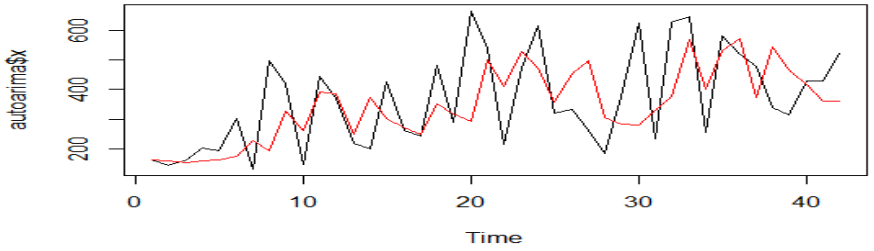
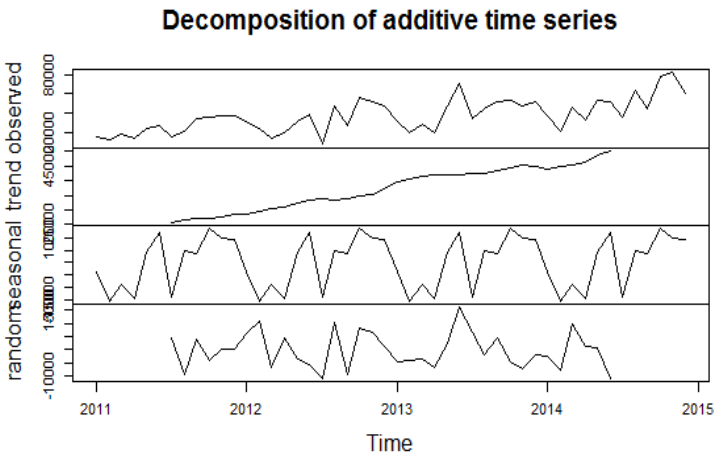


Plot auto arima prediction against original time series – follows a similar series that of sales data.

APAC Consumer segment sales & inventory forecasting

Sales



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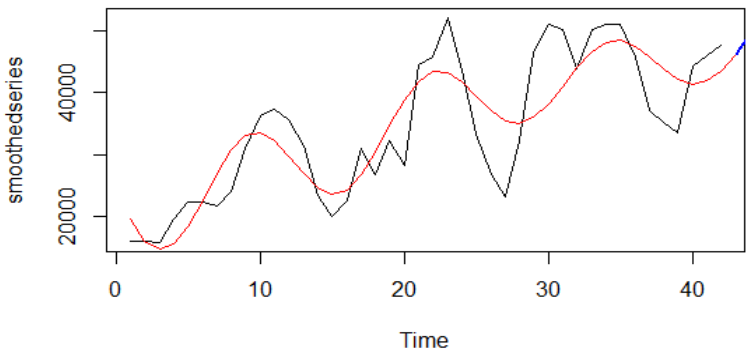
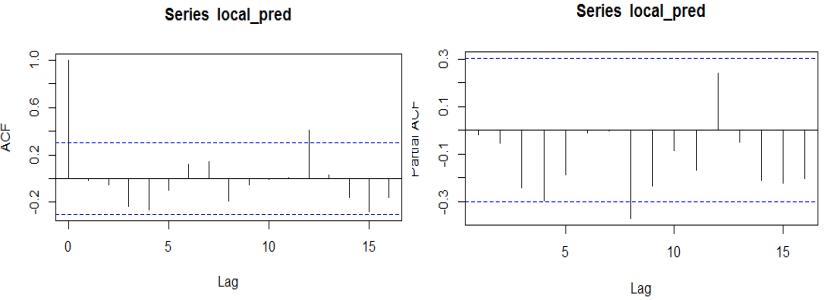


Plot classical decomposition prediction



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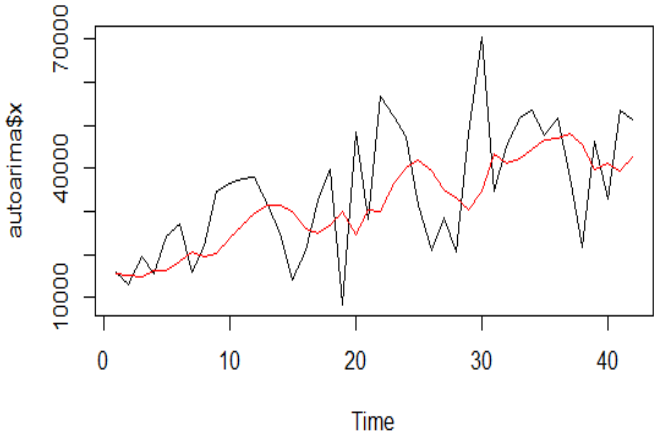
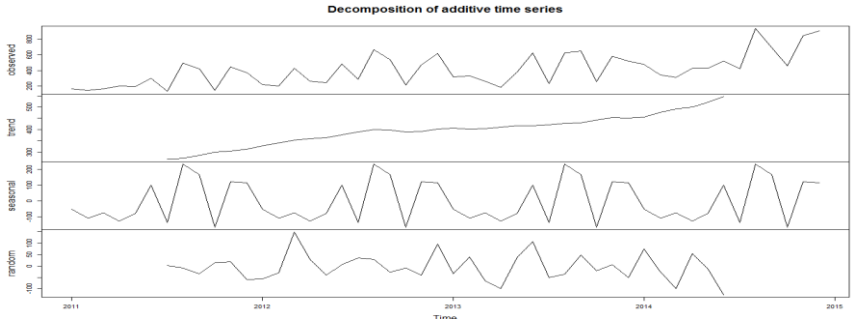


Plot auto arima prediction against original time series

Inventory



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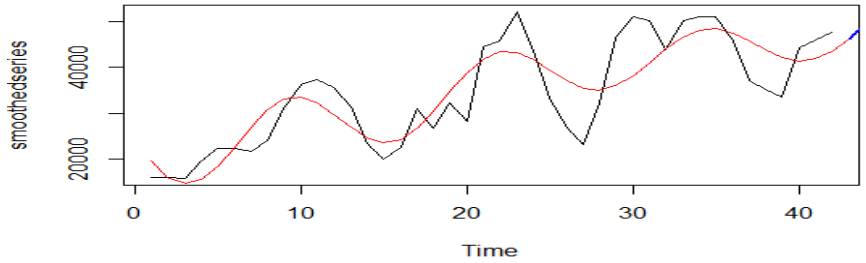
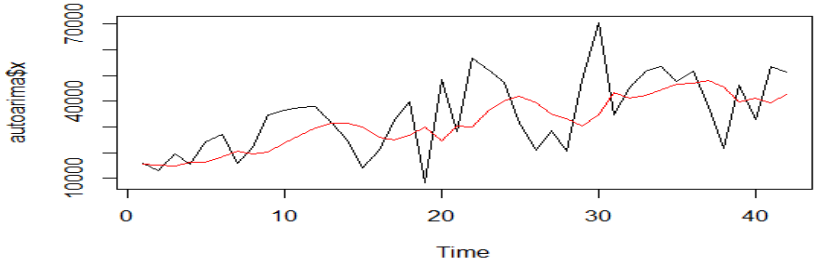


Plot classical decomposition prediction against original time series



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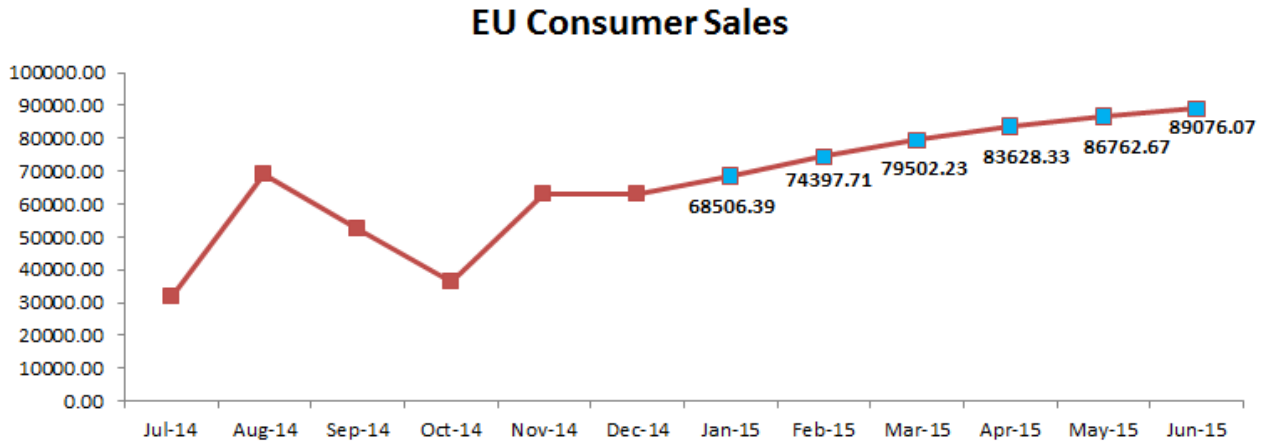
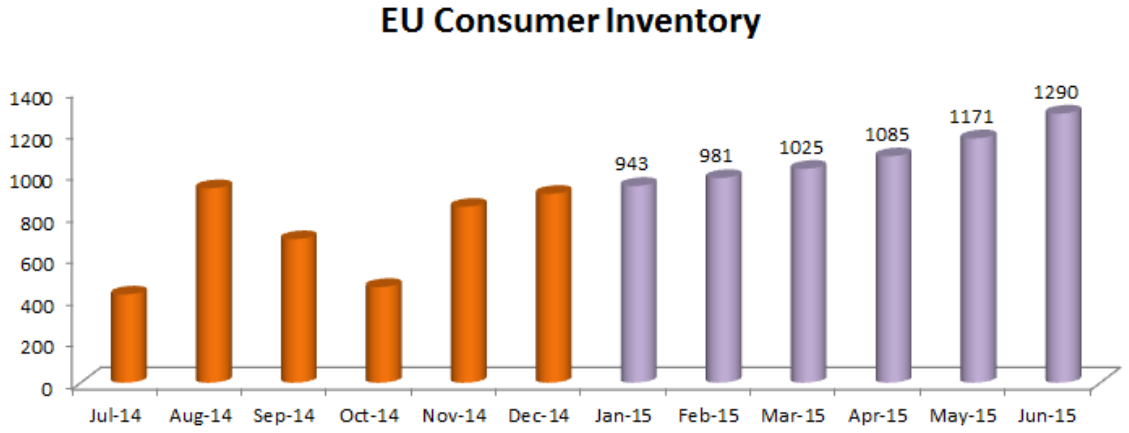
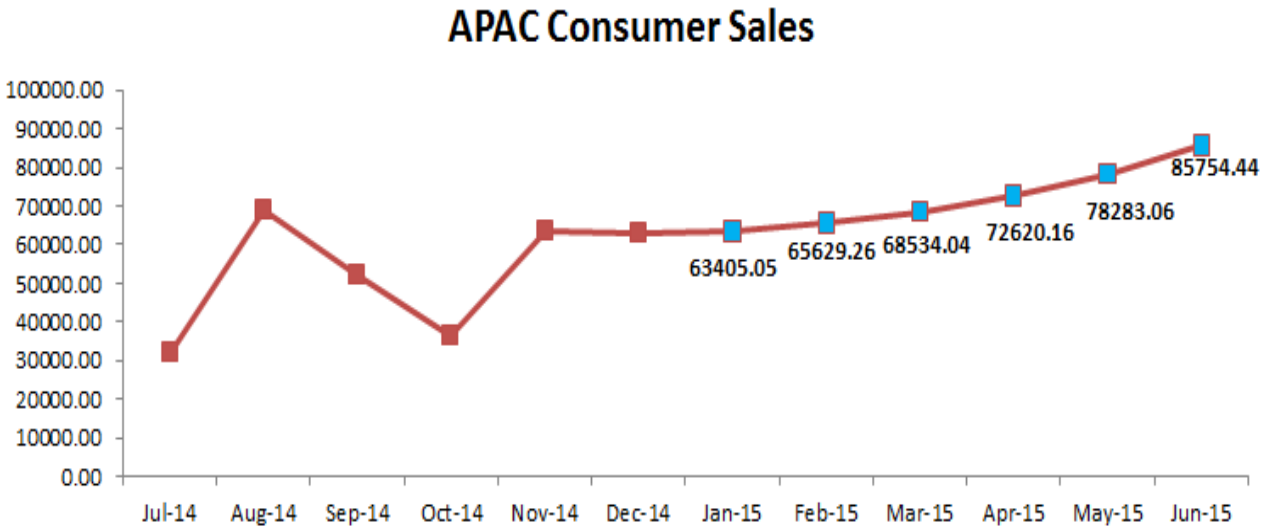
Observations / Recommendations



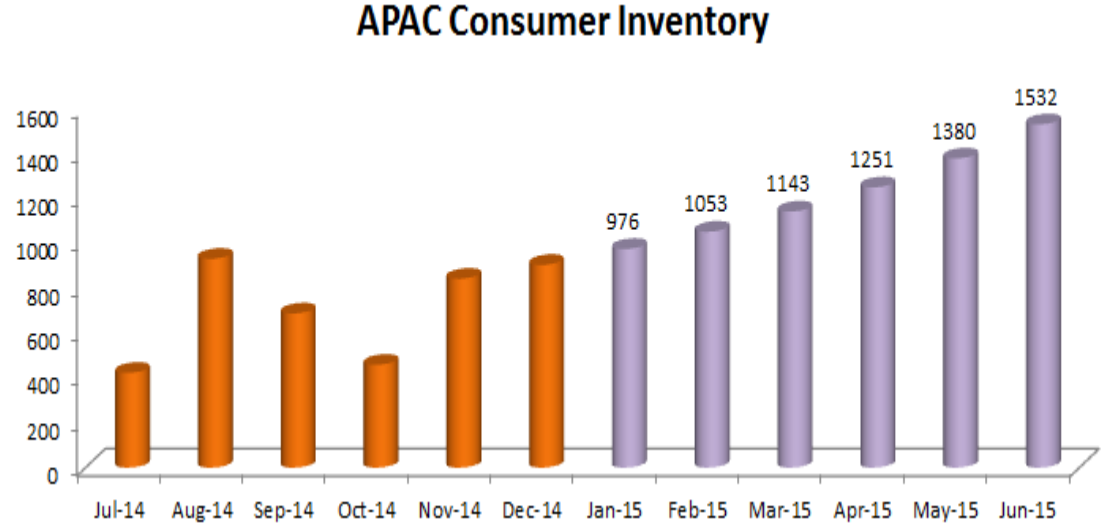
Monthly growth of 8.5, 8.5, 7, 5, 4 & 2.6 percentage of that of prior months are forecasted in EU Consumer sales figures from Jan to June 2015 respectively.



Month on month 4 to 10% of more inventory than that of prior months need to be stocked from the month of Jan to Jun 2015



Monthly growth of 3.5, 3.5, 4, 6, & 9.5 percentage of that of prior months are forecasted in APAC Consumer sales figures from Jan to June 2015 respectively.



Month on month 8 to 11% of more inventory than that of prior months need to be stocked from the month of Jan to Jun 2015

Conclusion

Problem Statement

a) Identify top two consistently profitable segments

- EU Consumer & APAC Consumer segments are found to be the most profitable with lower profit variation across 2011 to 2014.

b) Forecast the sales of the given retail giant global store, for the next 6 months – from January 2015 to June 2015 for the top two consistently profitable segments

- Sales forecast from Jan till June 2015 is given in previous slide – a growth of 41% in EU Consumer and 36% in APAC consumer segments is predicted in sales numbers by June 2015, when compared to that of Dec 2014. The organization needs to plan for the infrastructure, inventory and other resources to handle this growth.

c) Forecast the demand of the store from January 2015 to June 2015 for the top two consistently profitable segments

- Demand forecast from Jan till June 2015 is given in previous slide – a growth of 43% in EU Consumer and 69% in APAC consumer segments is predicted in sales numbers by June 2015, when compared to that of Dec 2014. The organization needs to plan well for the inventory management and other resources to handle this growth.