

ElecKart Market Mix Modelling

RSCN Analytics

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Business Objective and Goal

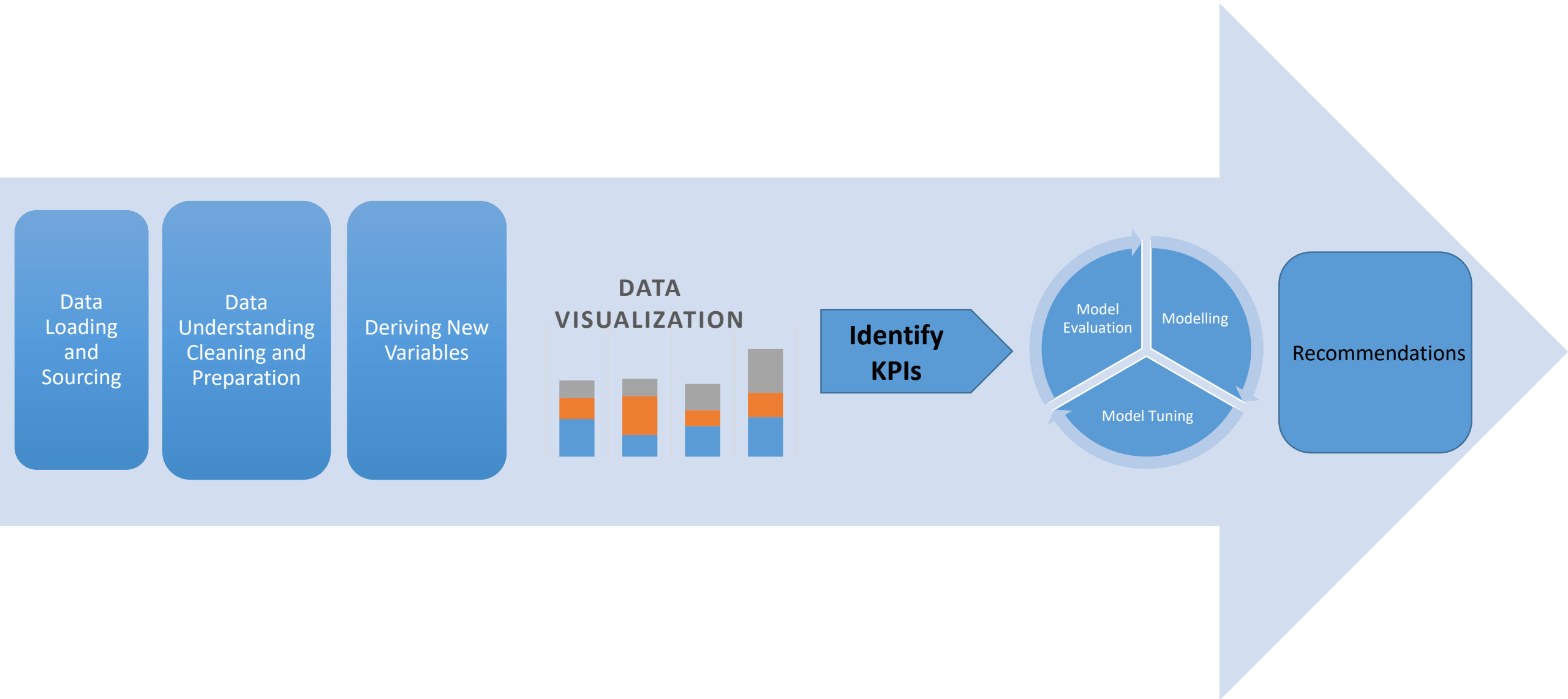
❑ Business Objective :

- Develop a market mix model to observe the actual impact of different marketing variables From July 2015 to June 2016 for three product sub-categories - camera accessory, home audio and gaming accessory

❑ Data Analysis Steps :

- Find the right KPIs
- Build Market Mix Model using various Techniques
- Evaluate the Model.

Problem solving methodology – Flow Chart



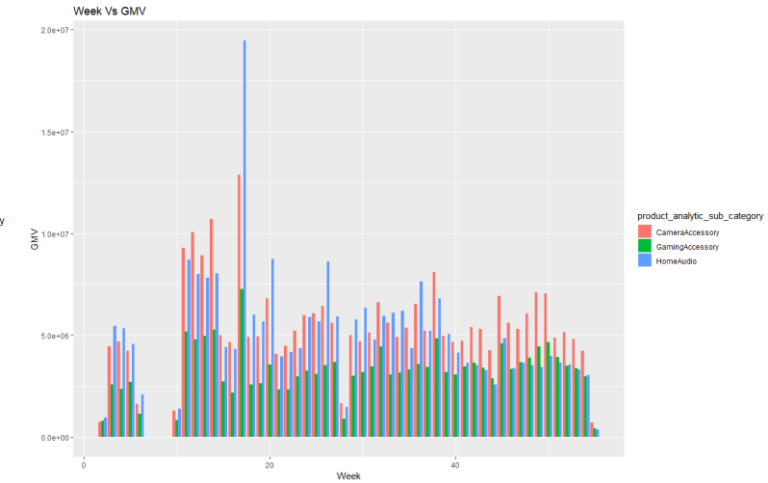
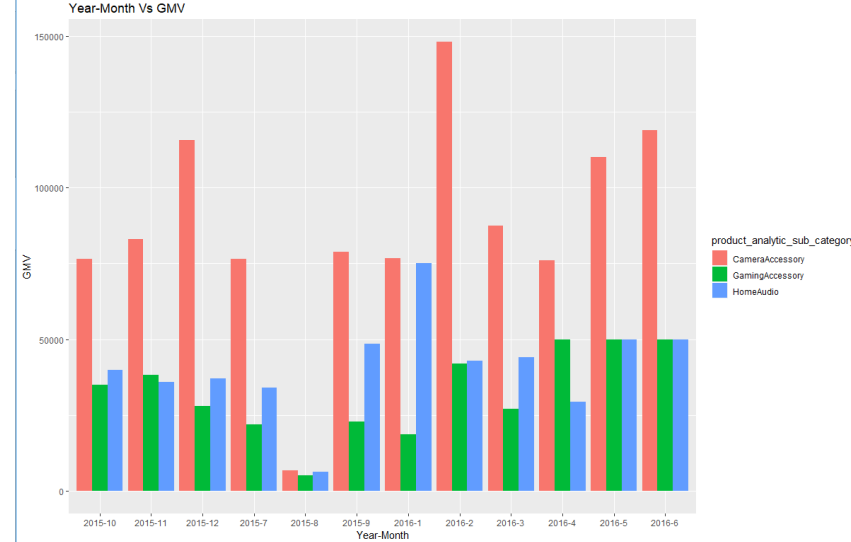
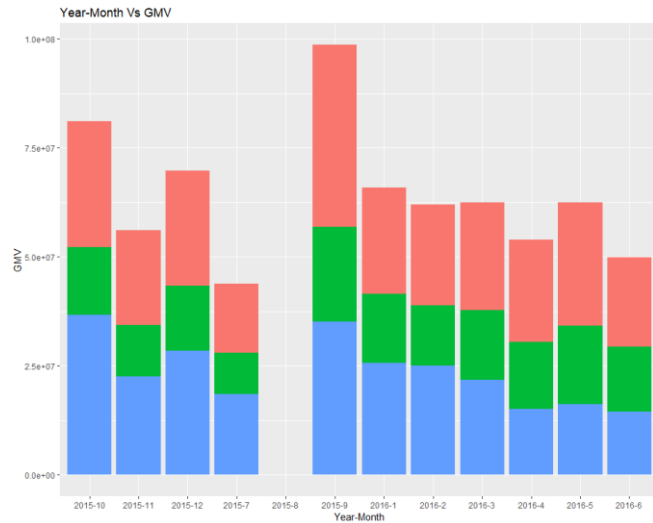
Data Understanding , Cleaning and Preparation

- **GMV** is the dependent variable and all others are independent variables.
- Filter consumer electronics data for period between **July 2015 and June 2016**.
- Further filter consumer electronics data for 3 Product sub-categories - **camera accessory, home audio and gaming accessory**
- Check number of NAs for each column and remove all the data points with NAs.
- Remove all the data points where `product_mrp > 0`
- Subset data where `MPR * Units >= GMV`.
- Convert Order date column to date format.
- Remove unwanted Columns
 - FSN ID , Order ID , Order Item ID , Cust ID , Pincode , Deliverycdays and deliverybdays
- Convert `sl_fact.order_payment_type` as binary variable “is_COD” with value 1 for COD and 0 for Prepaid.
- Convert NPS score data into data frame with columns Month , Year and NPS Score.
- Converting Monthly Ad spends into weekly , considering equal spends for each week of the month.
- Aggregating consumer electronics sales data data:
 - Summing below columns per week
 - Gmv , Units , Is_COD , Special_sale
 - Taking average for below columns per week
 - Sla , Product_mrp, Product_procurement_sla , List_price , Promotion_off

Derive New Variables for Initial Linear Model

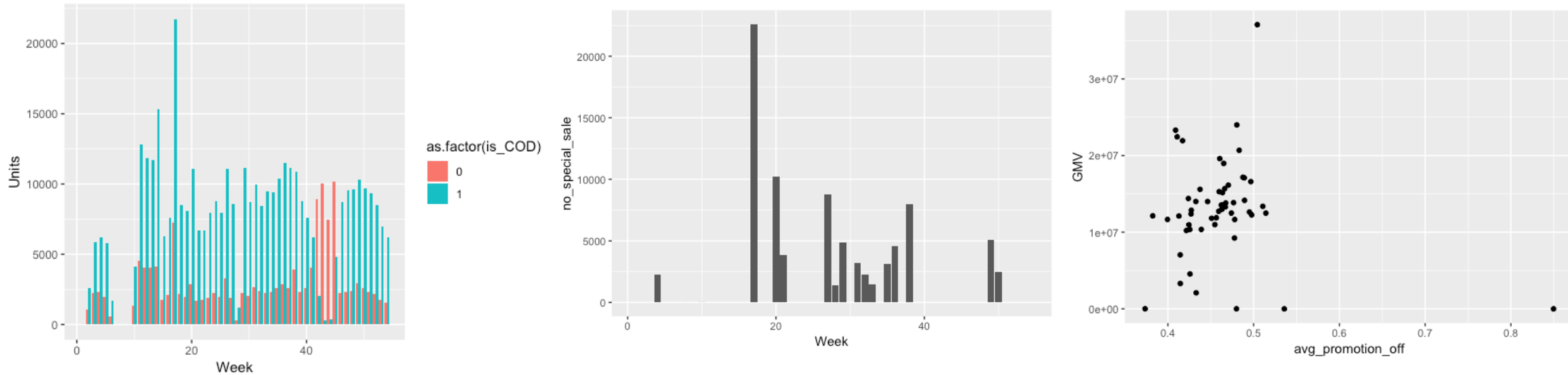
- Derive column “Week” from the order date .
- Derive List Price = $GMV/Units$
- Discount/Promotion offered w.r.t. mrp = $(MRP - List Price)/MRP$
- Create a Holiday List from data in *Media data and other information.xlsx* and create a column “special_sale” with 2 levels 0 & 1
- Tagging the products based on
 - Premium product with $mrp > 5000/-$
 - Mass Product with order frequency > 5000 and $mrp < 5000$
 - Aspiring products with order frequency < 5000 and $mrp < 5000$
 - Products under $mrp 5000/-$
 - Products between $mrp 5000/-$ and $10000/-$
 - Products between $mrp 10000/-$ and $15000/-$
 - Products between $mrp 15000/-$ and $20000/-$
 - Products above $mrp 20000/-$

Initial EDA and Data Visualization



- September 2015 Generated maximum Revenue , Camera Accessories were sold most in the same month
- Camera Accessories have generated maximum revenue between July 2015- June 2016
- Week 17 (2015 Oct 12-18th)had Dussehra sale Discount offered , which attracted maximum customers
- Maximum revenue is generated when promotion discount offered is between 40-55%

Initial EDA and Data Visualization



Week 17 (2015 Oct 12-18th)

- had the maximum Revenue of 37084412/- ,Home Audio generated maximum Revenue
- had the Maximum sales with Payment type COD
- had maximum sale of Gaming Accessories followed by Camera Accessories

KPIs For Building Models

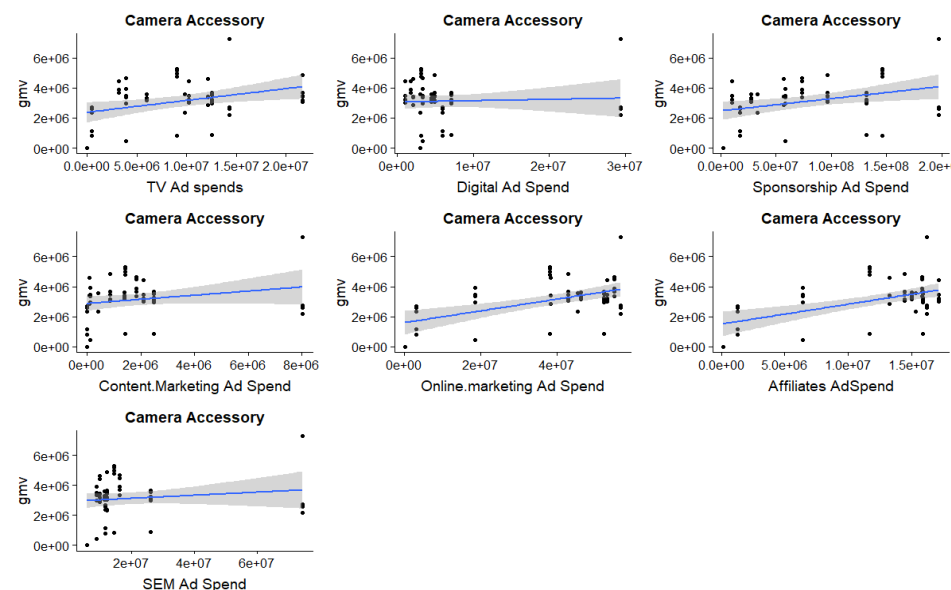
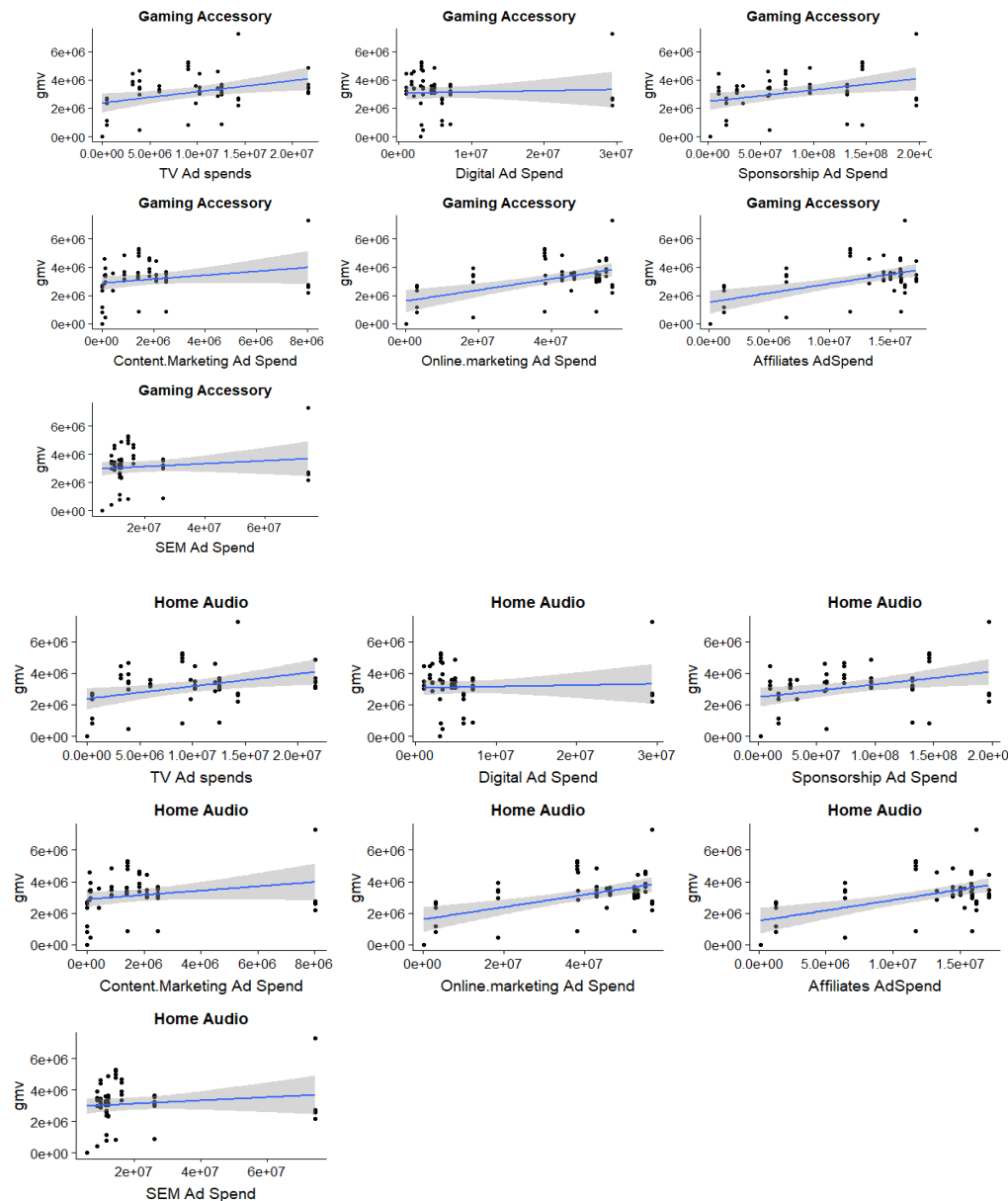
KPIs for Initial Linear Model

- Payment Type - COD/Prepaid – **is_COD**
- Special Sale days in a week – **special_sale**
- Product with mrp > 5000 – **premium_product**
- Product with mrp < 5000 and sold more than 5000 units – **mass_product**
- Product with mrp < 5000 and sold less than 5000 units – **aspiring_product**
- Products with mrp under 5000/- - **product_under_5000**
- Products with mrp between 5000 & 10000 – **product_btwn_5000_10000**
- Product with mrp between 10000 & 15000 – **product_btwn_10000_15000**
- Products with mrp between 15000 & 20000 – **product_btwn_15000_20000**
- Products with mrp > 20000 – **product_above_20000**
- Time taken to deliver an Order - **sla**
- MRP of the product - **product_mrp**
- Time taken to procure a product – **product_procurement_sla**
- Discount offered – **promotion_off**
- **NPS** score
- Ad Spends on TV , Digital , Sponsorship , Content Marketing , Online Marketing , Affiliates , SEM , Radio & Other

Additional KPIs for Advanced Models like Koyck and Distribution Lag

- Adstock for each Ad Spends (considering 50% affect)
- GMV for Previous Week (For Distribution Lag Model)
- Discount offered Previous Week
- Percentage change in Discount offered w.r.t previous week
- List Price Inflation w.r.t
 - Previous week
 - Moving average of previous 2,3,4 weeks

Visualizing Each Sub Category Product Vs Ad Spends



Results for Linear and Multiplicative Models

	Linear Model		Multiplicative Model	
	KPIs	R2	KPIs	R2
Camera Accessories	premium_product mass_product product_mrp	96.5%	product_under_5000 product_mrp promotion_off	99.93%
Gaming Accessories	mass_product aspiring_product promotion_off Digital	96.8%	mass_product product_under_5000 sla	99.56%
Home Audio	premium_product mass_product product_mrp	99.25	product_under_5000 product_mrp promotion_off	99.90%

R2 is the % of variation in Revenue (GMV) that can be explained by the KPIs

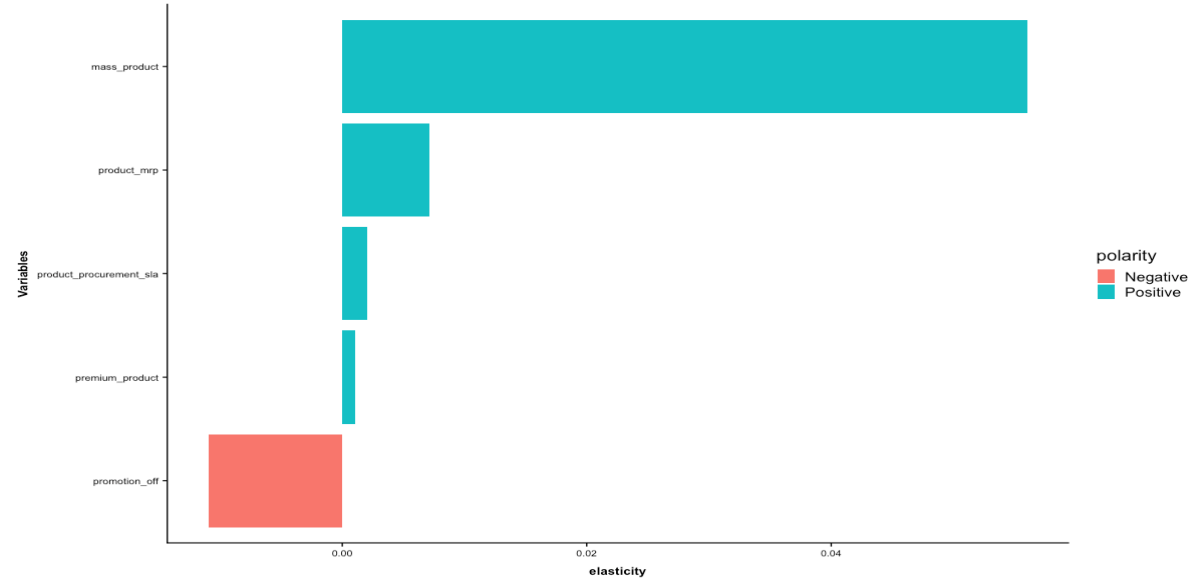
Results for Koyck and Distribution Lag Models

	Koyck Model		Distribution Lag Model	
	KPIs	R2	KPIs	R2
Camera Accessories	premium_product mass_product product_mrp Content Marketing SEM Radio Adstock Other Adstock	96.92%	mass_product premium_product product_mrp	99.6%
Gaming Accessories	mass_product aspiring_product	94.77%	mass_product aspiring_product	94.8%
Home Audio	premium_product mass_product product_mrp product_procurement_sla promotion_off	99.7%	product_mrp promotion_off premium_product mass_product	99.4%

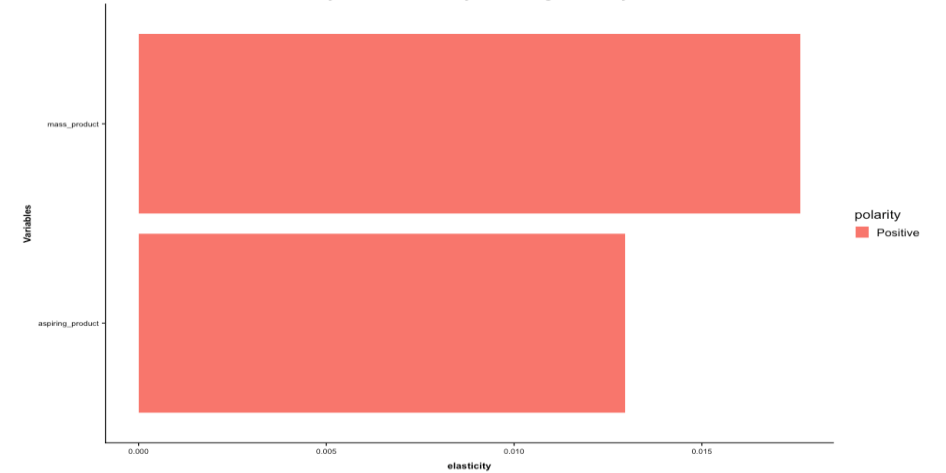
R2 is the % of variation in Revenue (GMV) that can be explained by the KPIs

Elasticity of the KPIs For Each Sub-Categories

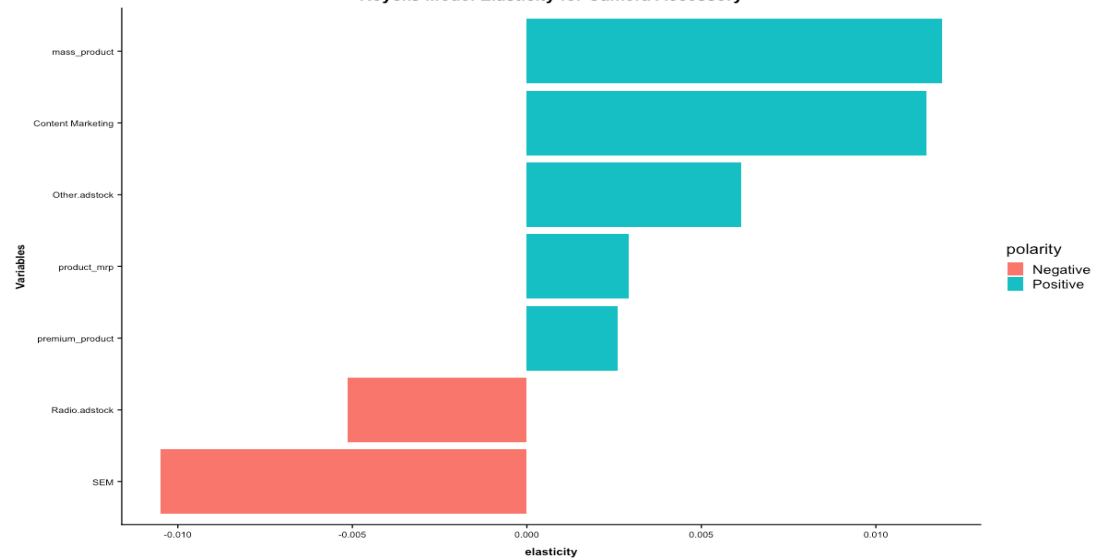
Koycks Model Elasticity for Home Audio



Koycks Model Elasticity for Gaming Accessory

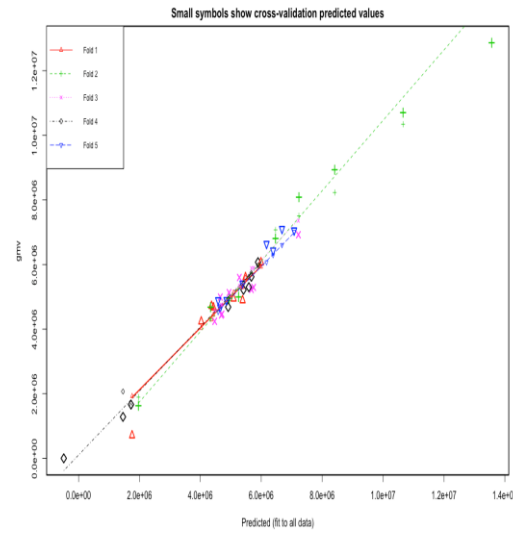
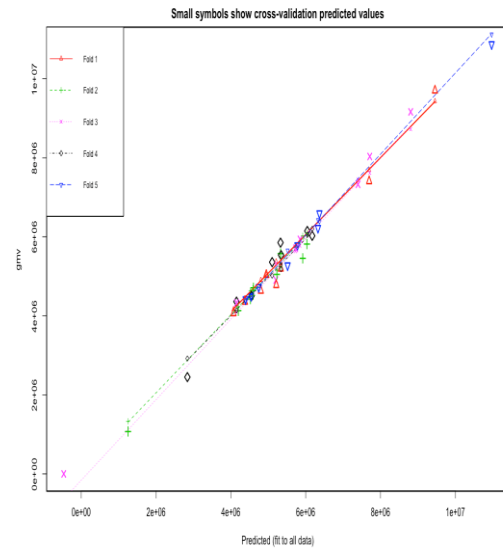


Koycks Model Elasticity for Camera Accessory



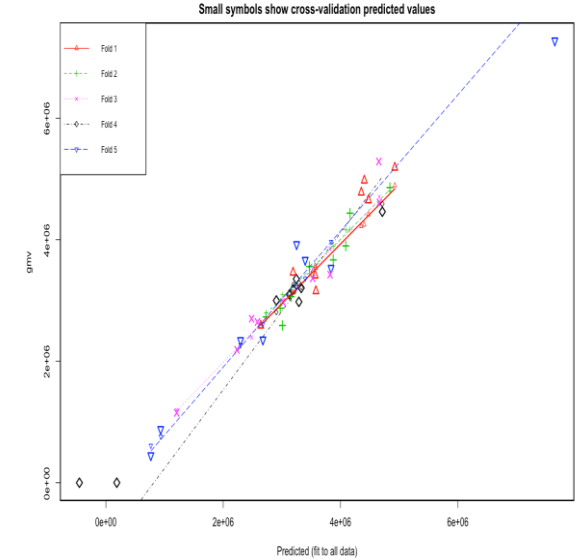
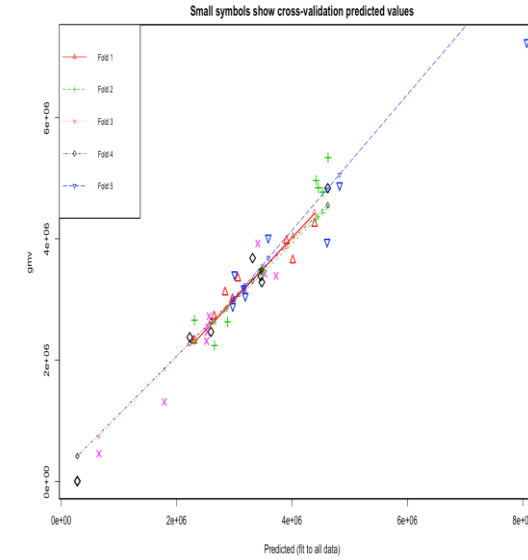
Cross Validation for Gaming Accessory

Koyck Model Distribution Lag Model



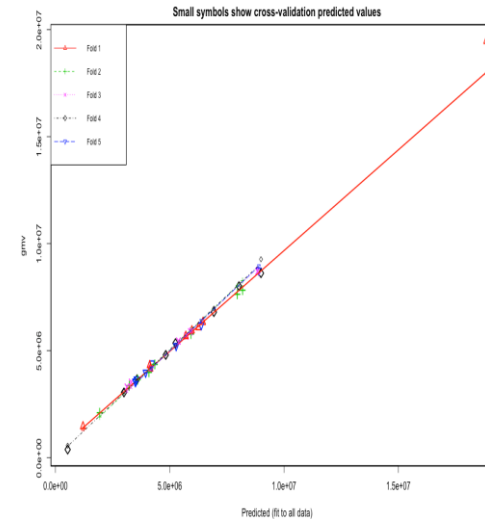
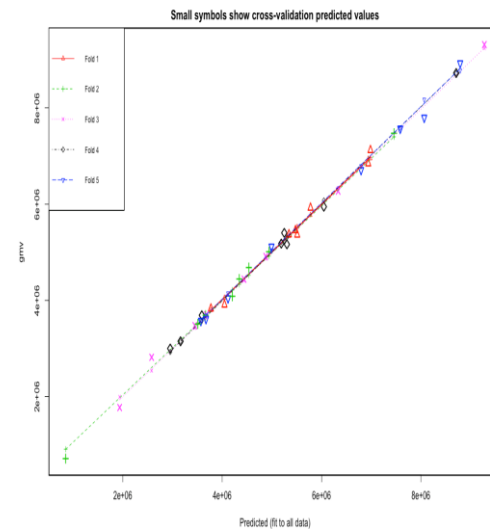
Cross Validation for Camera Accessory

Koyck Model Distribution Lag Model



Cross Validation for Home Audio

Koyck Model Distribution Lag Model



Recommendations For Gaming Accessory

- Gaming Accessories generate maximum Revenue from the Products with MRP < 5000/- and are also sold less than 5000 units.
- Promotions Offered does not seem to impact Revenue.
- None of the Ad spends are impacting Revenue for this sub-category.
- As Mass products are most selling , Time taken to deliver the product has also an impact.
- Digital Ad spends have Negative impact on the Revenue

Recommendations :

- As **Digital** Ad spend has negative impact hence it will yield less Revenue. Reduce Digital Ad spends.
- As SLA has positive impact , make sure the product with MRP less than 5000/- is delivered with in the time committed.

Recommendations For Camera Accessory

- Camera Accessories generate maximum Revenue from the Products with MRP < 5000/- , Although the Premium Product have also provided good response in terms of revenue.
- As both segments (Mass Products and Premium Products) have good response , hence the Product MRP have positive affect.
- **Content Marketing** and **Other** Ad spends have positive impact on the Revenue.
- **Other** Ad spends for previous weeks tend to have 50% positive impact on the Revenue
- **Radio** and **SEM** Ad spends have negative impact on the Revenue

Recommendations :

- Increasing Ad spends on **Content Marketing** will improve sales , hence the revenue.
- Increase in **Other** Ad spends will improve sales of following weeks.
- Reduce Ad spends on **Radio** and **SEM** for Camera Accessories

Recommendations For Home Audio

- Both Segments(Mass and Premium Product) of Home Audio sub-category have good response to the Revenue.
- Product MRP for both the segments also have a good impact.
- **None of the Ad Spends seems to impact sales of this Sub Category.**
- As both the segments are favorable so the time taken to procure the product also have an positive impact.
- Promotion offered have negative impact , Hence **Pricing is a key factor.**

Recommendations :

- As none of the Ad spends impact the revenue , hence Reducing Marketing and Ad cost is advisable.
- Time Taken to procure and deliver the product must be with in the time committed for better sales.
- Increase inventory for Mass and Premium product for this sub category.
- Promotion offered has negative impact hence Pricing both the segments (Mass and Premium Products) affects the revenue.

Thank You!