Group Case Study - Ecommerce

By

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- Objective : To develop a market mix model to observe the actual impact of different marketing variables over the data from July 2015 to June 2016. . Using your understanding of the model, and to recommend the optimal budget allocation for different marketing levers for the next year.

The Below data files were available to us for analysis of Product budget optimization

- ✓ Main Consumer data with order details at a daily basis
- ✓ Net Promoter score data showing net promotion score and company stock value for last year
- ✓ Weather data having detail weather reports from last year in the state of Ontario, Canada
- ✓
- ✓ Media Investment data with amount invested in each advertising medium for
- ✓ the past Years for the Promotion
- ✓ Sale Calendar data showing dates from past year when there was a promotional offer

Feature engineering to with New KPI’s

- Generated Week column from order date
- Generated list price using GMV and no of units
- Derived products into two categories: Luxury and Mass-market
- Performed Simple moving average for advertising channels
- Derived Holiday week column for pay day

EDA – Figuring out Important Variables – Home Audio

- Based on linear regression model, below are the important features/variables for the model

Features	Coefficients
product_vertical_homeaudiospeaker	0.392
is_mass_market	0.148
Digital_SMA_3	0.139
product_vertical_fmradio	0.133
is_cod	0.131

EDA – Figuring out Important Variables – Game Accessories

- Based on linear regression model, below are the important features/variables for the model

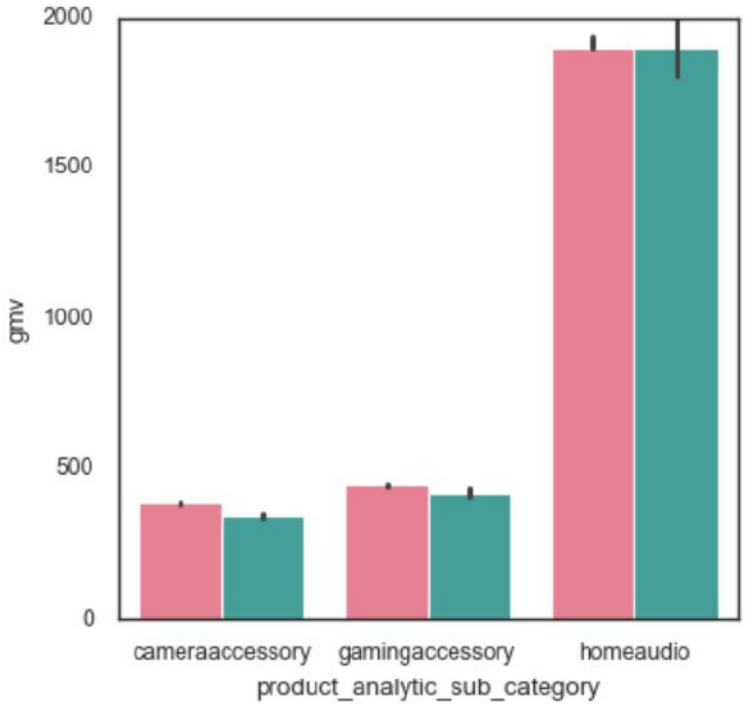
Features	Coefficients
product_vertical_gamepad	0.201
product_vertical_gamingheadset	0.183
is_mass_market	0.167
product_vertical_gamingaccessorykit	0.126
product_vertical_gamingmouse	0.107

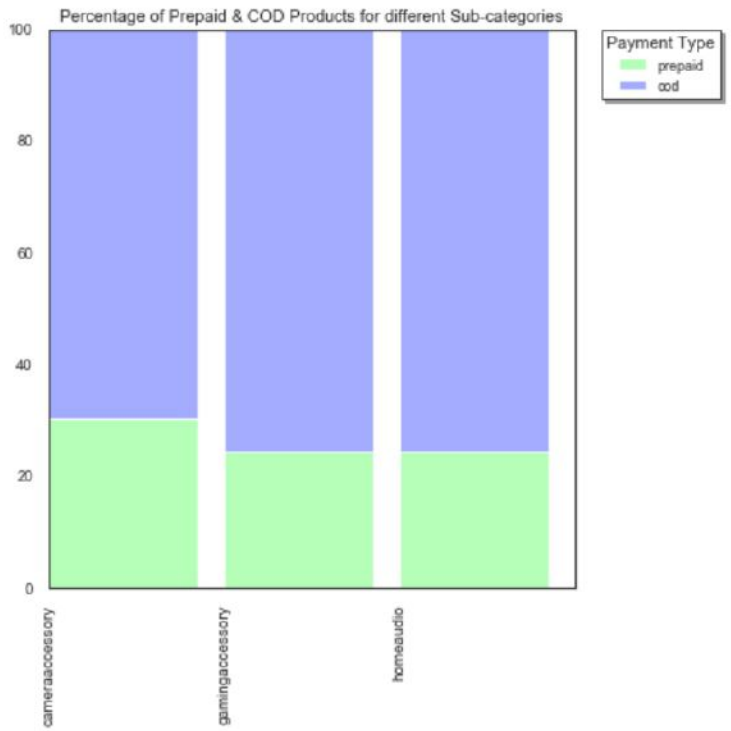
EDA – Figuring out Important Variables – Camera Accessory

- Based on linear regression model, below are the important features/variables for the model

Features	Coefficients
product_vertical_lens	0.432
product_vertical_camerabattery	0.200
product_vertical_camerabag	0.182
product_vertical_camerahousing	0.171
Online marketing	0.151

EDA – Figuring out Important Variables – Other Important Variables (Holidays)





- This shows that the gmv is almost equal for holidays/non holidays.

- Based on the EDA, we see that number of prepaid orders arehigher than COD.

Home Audio– Building the Models

- Adjusted R Square figures are based on the the training data.
- The SSE figures are based on the 10 fold cross
- validation again on the training data
- The multiplicative model and the combination of the multiplicative & distributed lag model are ruled out because of the very low Adj. R Sq values
- Out of the remaining 3, the decision was made on the basis off the elasticity of KPIs and their business sense
- So, we select the Koyck model and the Distributed on the account of higher Adj. R Sq values

Model	Variables	Adj. R Square	Cross-Validation
Simple Linear model	holiday_freq + Sponsorship	0.3064	0.897

Game Accessories – Models

- Adjusted R Square figures are based on the performance of the model on the training data.
- The SSE figures are based on the 10 fold cross validation again on the training data
- The multiplicative model and the combination of the multiplicative & distributed lag model are ruled out because of high SSE value
- We are also looking for models that include more business actionable variables
- So, we select the Koyck model and the Distributed on the account of higher Adj. R Sq values

Model	Variables	Adj. R Square	Cross-Validation
Simple Linear model	NPS + SEM + inc_PO_MA2	0.3606	0.821

Camera Accessories – Models

- Adjusted R Square figures are based on the performance of the model on the training data.
- The SSE figures are based on the 10 fold cross validation again on the training data
- Even though, the Multiplicative model has a decent Adj. R sq figure, but it has just 2 important variables. Also, these variables may not be too important from business point of view.
- The combination of multiplicative and distributed lag model is ruled out because of high SSE value.
- So, we select the simple linear model & Koyck model on the account of higher Adj. R Sq values

Model	Variables	Adj. R Square	SSE (10 - CV)
Simple Linear model	SLA + Digital + Sponsorship + inc_PO_MA1	0.3539	0.861

Recommendations

For

Electakart

Recommendations Based on Elasticity of KPIs Home Audio

For Home Audio segment, the linear model suggests that more resources be allocated in Sponsors

Recommendations Based on Elasticity of KPIs Game Accessories

ElecKart should channelize more of the resources in offering discounts rather than focusing on marketing channels.

Recommendations Based on Elasticity of KPIs Camera Accessories –

Going with the Basic Linear Model, ElecKart should focus more on the Digital channel and decrease its spending on Sponsorships

General Recommendations

- During the Thanksgiving Electakart invested heavily in advertising and made good promotional offers. This usually increases revenue. However, offering a discount without responding properly on many media channels does not help. Although the average deduction has increased% since the initial drought, at 32 - 35 (August) weeks, we have seen that earnings are the lowest among the 3 product subdivisions. In fact, this decline in revenues can be seen as a direct correlation with the minimum amount of total investment in advertising over a period of time.

- Most sales happen when the discount% is between 50-60%. However, it does not help increase revenue. The EDA shows that the average discount of 10-20% is the most profitable for the company, especially among those luxury items.

- The majority of home audio items sold are those Aury luxury items, so customers prefer to use COD instead of paying in advance.

Home Audio

- Elektakart home audio speakers and FM radios should be promoted as they have high returns.
- Mass market products contribute greatly to increased revenues compared to luxury products.
- Radio adstock (increasing the effectiveness of radio advertising) helps boost revenue significantly.
- Advertising spend for sponsorship has a positive impact on revenue. Content marketing is adversely affected.
- Generally, COD payments for this subsection are bad at reducing income.

Gaming Accessory:

- To get the highest income, Electakart should promote the gaming headset, gaming mouse and gamepad. In contrast, gaming memory cards cause loss.
- Ad spending on online marketing, radio and others have a positive impact on revenue. Sponsorship spending has a negative cumulative effect.
- Mass market products contribute greatly to increased revenues compared to luxury products.
- The high percentage of deductions generally paid for this subsection is counterproductive to the reduction of income.

Camera Accessory

- Camera Lense, camera batteries and camera battery chargers should be promoted by Ellicart (an e-commerce company based in Ontario, Canada).
- Advertising on TV has a positive effect on revenue. The cost per unit of TV increases by 0.105 units. Content marketing is adversely affected.
- Mass market products contribute greatly to increased revenues compared to luxury products.
- The high percentage of deductions generally paid for this subsection is counterproductive to the reduction of income.