Market Mix Modelling for ElecKart

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ElecKart Case Study – Overview

About ElecKart

- ElecKart is an e-commerce firm specializing in electronic products
- ElecKart spent significant amount of money in marketing during the previous year.

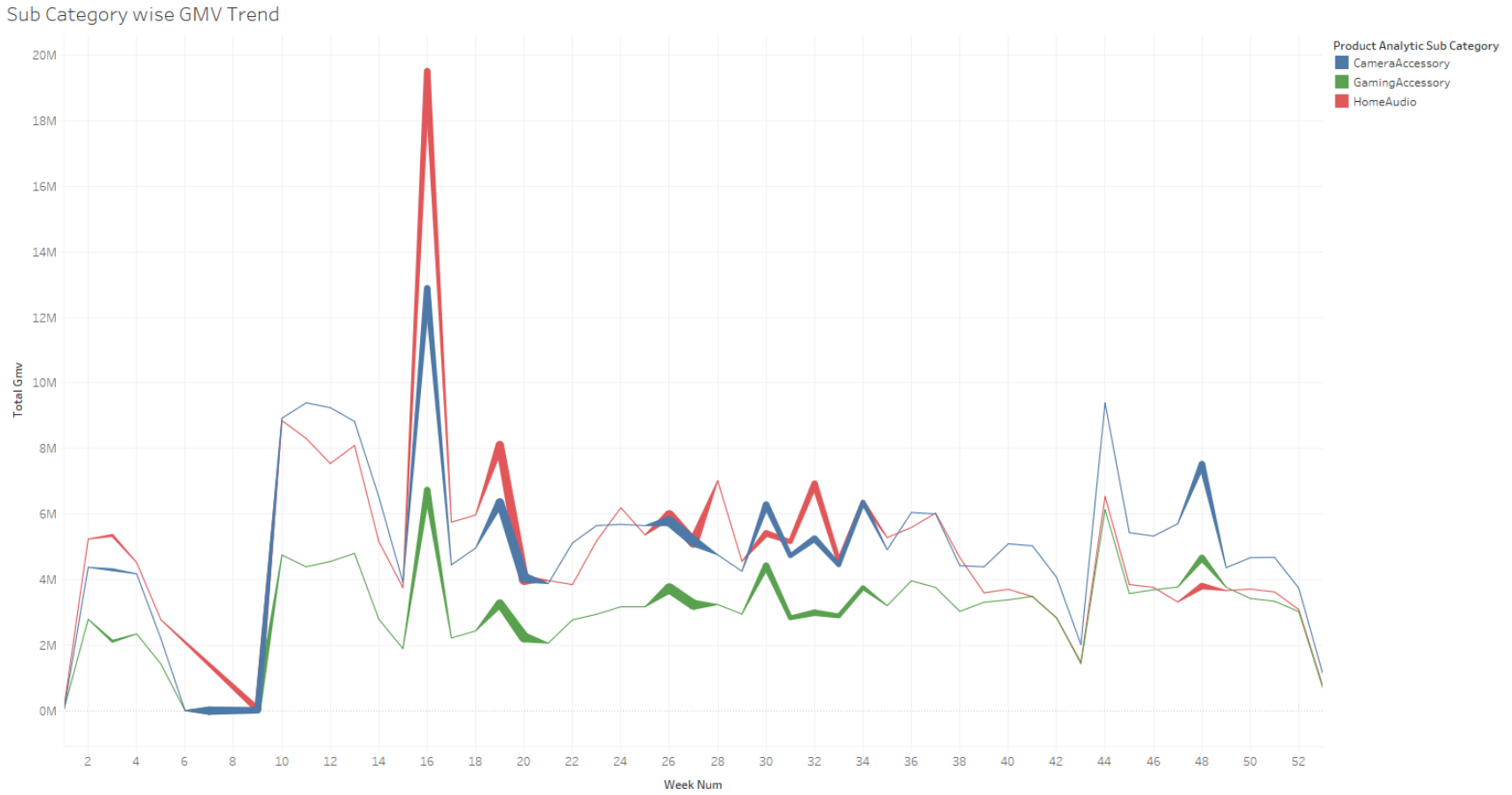
Understanding the problem

- ElecKart spent money on marketing which was not impactful. They need to re-allocate across different marketing levers to improve revenue response.
- Objective is to develop a Market Mix Modelling to identify actual impact of different marketing variables over last year.
- Need to provide optimal budget allocation for different marketing levers for next year.

Current Sales Situation

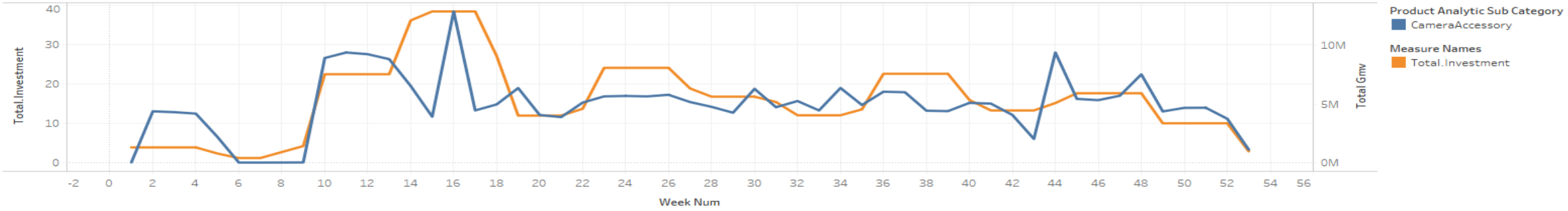
- The graph shows the total GMV for each sub-category*
- The data is aggregated at week level.
- Thick lines shows the presence of special days.

* Similar Graph is produced in R-code as well

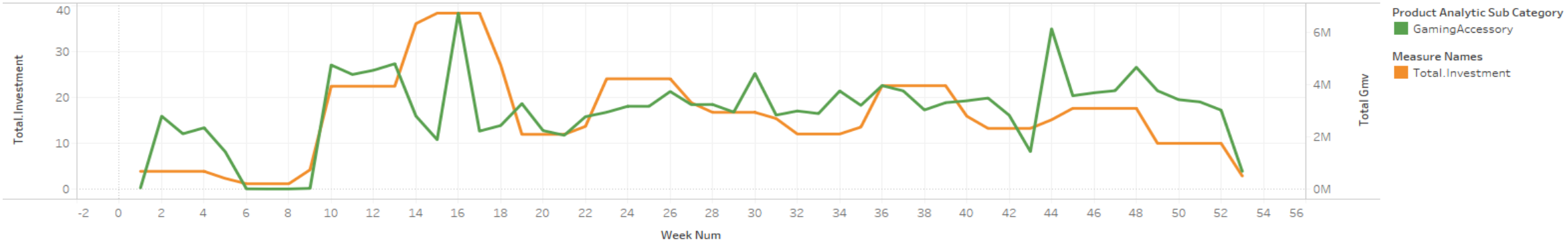


Marketing Spend Analysis

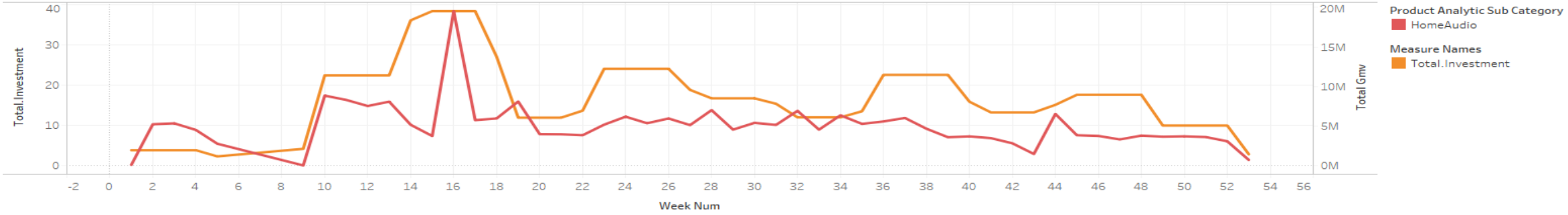
Total Investment vs Camera Accessories



Total Investment vs Gaming Accessories



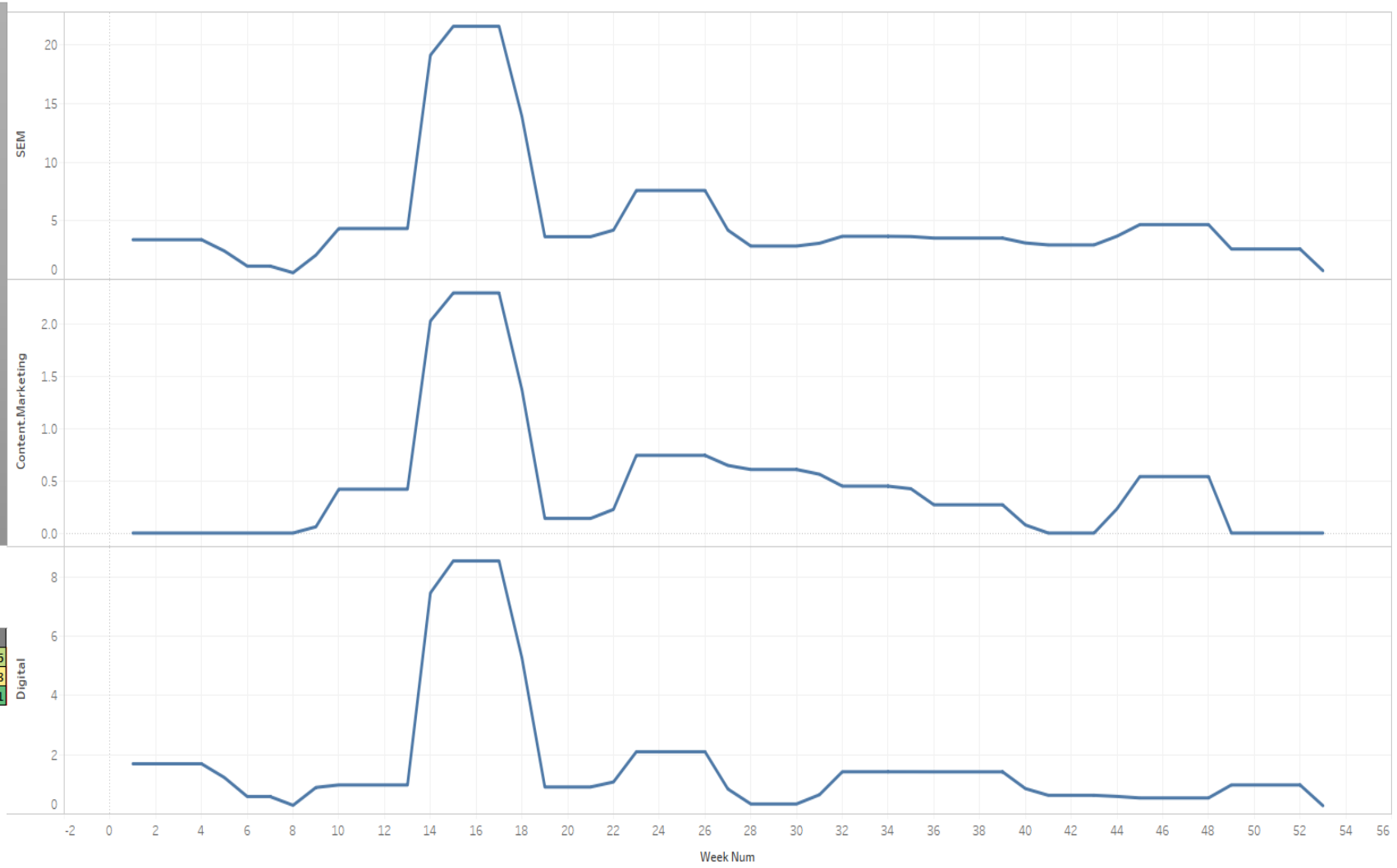
Total Investment vs Home Audio



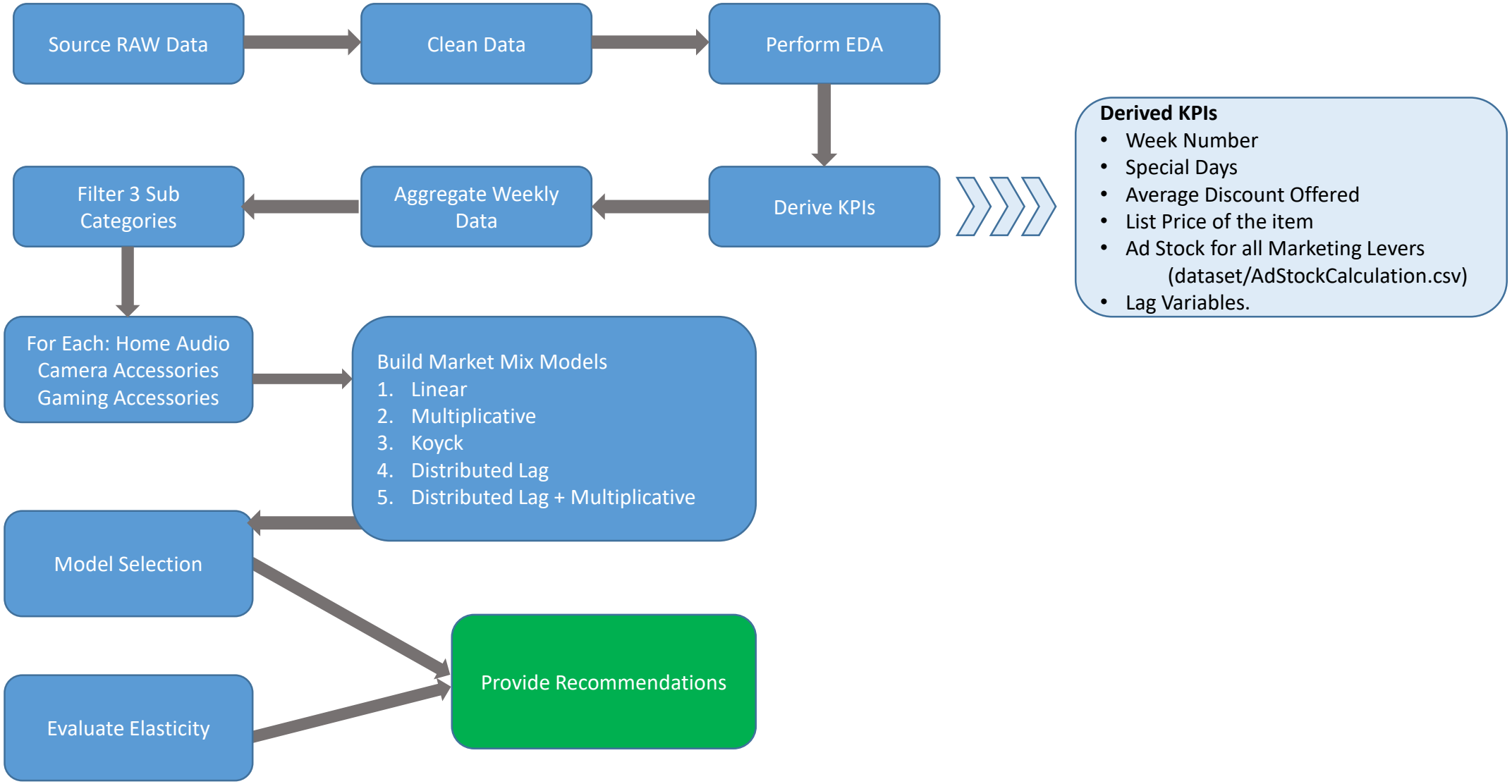
Marketing Spend Analysis: High Co-relation observed for following spends

- Hi Correlation observed with these three Marketing Spends.
- Similar investments are made in these Marketing levers every week.
- The change in the GMV will be due to the combined effect of these three marketing levers.

CORREL	Digital	Content.Marketing	SEM
Digital	1	0.896780477	0.97315366
Content.Marketing	0.896780477	1	0.95531708
SEM	0.97315366	0.95531708	1



Approach Document



Model Building: Camera Accessories

- Dropping the following models because of low R2 and high error:
  - Multiplicative
  - Koyck
  - Distributed Lag Model
  - Linear
- Choosing models based on good R2 values and choice of explanatory variables:
  - Distributed Lag + Multiplicative: 0.946

	Linear	Multiplicative	Koyck	DLag	DLag + Mul
(Intercept)	1667291.162**	12.992***	1204916.935	2367397.747**	−12.309**
	(576680.611)	(0.411)	(621820.464)	(754709.376)	(3.636)
TV	−1299060.084*		−1392600.263*		
	(634443.343)		(654711.737)		
Sponsorship	369183.779***		342696.546***		
	(77203.354)		(73605.803)		
Affiliates	2428933.182***		2776021.946***		
	(592141.251)		(648484.797)		
SEM	−572002.565*				
	(231480.667)				
Content.Marketing		−0.125*	−4410894.301*		
		(0.053)	(1983695.559)		
Online.marketing		1.460***			
		(0.176)			
AdStock_TV				−0.079*	
				(0.035)	
AdStock_Sponsorship				0.022***	
				(0.005)	
AdStock_Affiliates				0.122***	−16.764***
				(0.034)	(1.888)
AdStock_SEM				−0.035*	−3.310***
				(0.014)	(0.470)
total_gmv_2				−0.247	−0.080**
				(0.132)	(0.027)
avg_discount					1.184***
					(0.202)
AdStock_Digital					1.549***
					(0.289)
AdStock_ContentMarketing					−0.237***
					(0.027)
AdStock_OnlineMarketing					18.798***
					(1.882)
AdStock_Radio					−0.026**
					(0.009)
total_gmv_1					0.261***
					(0.032)
sigma	1731722.801	1.174	1750982.306	1849027.707	0.508
R-squared	0.545	0.662	0.534	0.469	0.946
F	14.056	47.881	13.491	7.774	81.353

Significance: *** = p < 0.001; ** = p < 0.01; * = p < 0.05

Model Building: Gaming Accessories

- Dropping the following models because of low R2 and high error:
  - Multiplicative
  - Koyck
  - Linear
- Choosing models based on good R2 values and choice of explanatory variables:
  - Distributed Lag: 0.705
  - Distributed Lag + Multiplicative: 0.832

	Linear	Multiplicative	Koyck	DLag	DLag + Mul
(Intercept)	−801233.427	15.041***	−801215.879	−1304455.148	−29.612***
	(657767.643)	(0.132)	(657753.292)	(742416.948)	(5.231)
TV	−1973865.793***	0.611***	−1973924.773***		
	(554389.707)	(0.044)	(554398.319)		
Digital	3127858.422*		3128061.129*		
	(1186694.684)		(1186738.996)		
Sponsorship	330481.360***		330485.461***		
	(59362.919)		(59363.399)		
Content.Marketing	−16843610.632**		−16844480.336**		
	(4901074.218)		(4901268.071)		
Affiliates	2884588.302***		2884587.305***		
	(625913.402)		(625905.945)		
Radio	6550599.231***		6550919.954***		
	(1795302.579)		(1795374.550)		
AdStock_TV				−0.222***	
				(0.040)	
AdStock_Digital				0.536***	
				(0.116)	
AdStock_Sponsorship				0.036***	
				(0.005)	
AdStock_ContentMarketing				−1.275***	−0.248***
				(0.298)	(0.044)
AdStock_Affiliates				0.289***	−7.744***
				(0.047)	(1.600)
AdStock_SEM				−0.145***	
				(0.041)	
AdStock_Radio				0.627***	
				(0.122)	
total_gmv_1				−0.525***	
				(0.128)	
total_gmv_2				−0.429***	−0.243**
				(0.117)	(0.087)
AdStock_OnlineMarketing					10.079***
					(1.479)
sigma	930956.979	0.893	930955.014	848529.709	0.820
R-squared	0.620	0.789	0.620	0.705	0.832
F	12.484	190.487	12.484	11.393	59.637

Significance: *** = p < 0.001; ** = p < 0.01; * = p < 0.05

Model Building: Home Audio

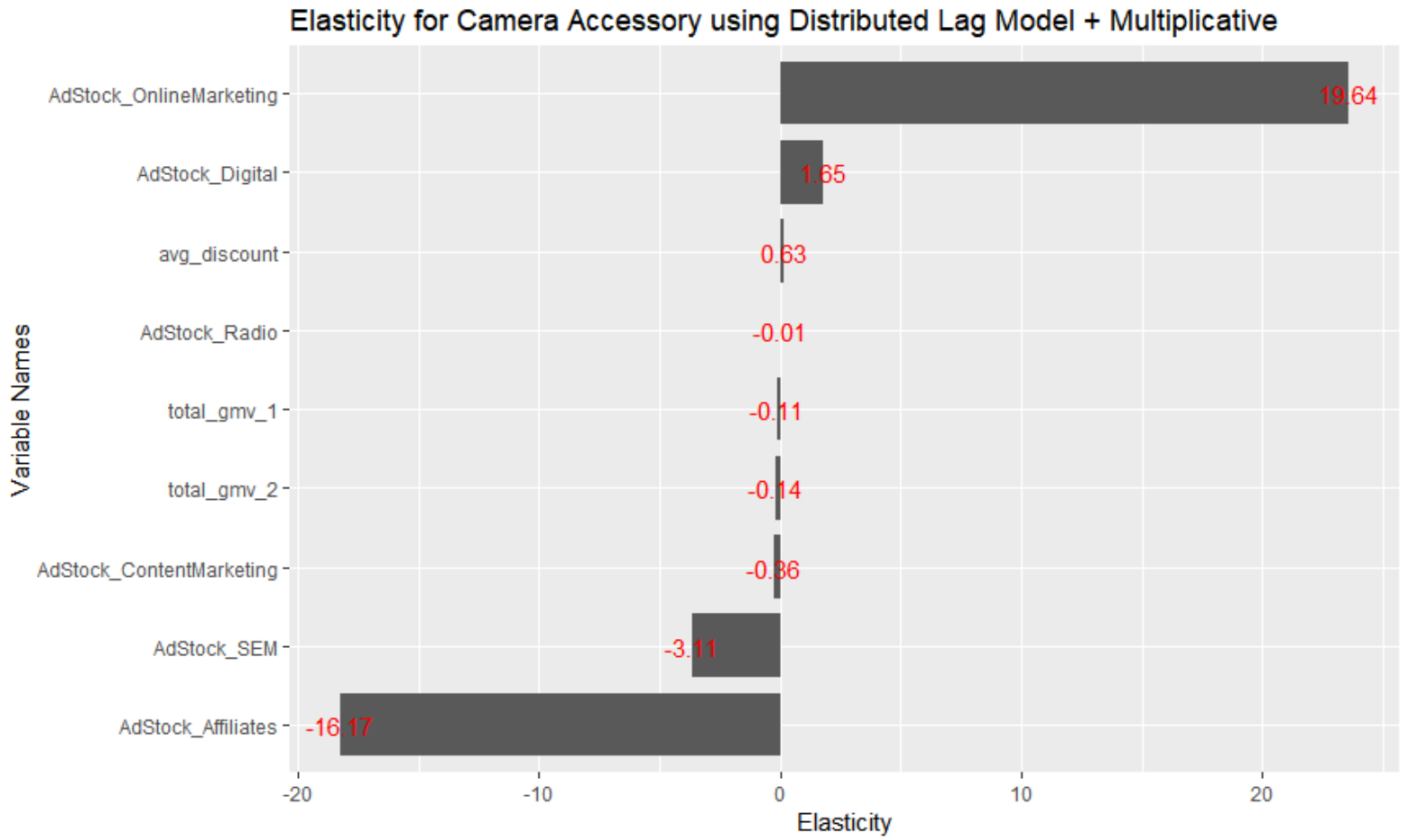
- Dropping the following models because of low R2 and high error:
  - Multiplicative
  - Koyck
  - Distributed Lag
- Choosing models based on good R2 values and choice of explanatory variables:
  - Linear: 0.487
  - Distributed Lag + Multiplicative: 0.640

	Linear	Multiplicative	Koyck	DLag	DLag + Mul
(Intercept)	−7132724.553**	−1.313	−7132729.317**	−7739774.573**	−14.710***
	(2560623.670)	(3.422)	(2560623.482)	(2607501.564)	(4.157)
avg_discount	287271.588***	4.639***	287271.650***	312989.356***	
	(74252.157)	(0.961)	(74252.160)	(74432.700)	
Sponsorship	235629.648***		235629.591***		
	(56996.201)		(56996.201)		
spl_days	351863.551		351863.997		
	(206582.384)		(206582.925)		
AdStock_Sponsorship				0.010***	
				(0.003)	
AdStock_ContentMarketing					−0.157***
					(0.032)
AdStock_OnlineMarketing					3.905
					(2.539)
AdStock_Affiliates					−2.414
					(2.547)
AdStock_SEM					0.251
					(0.240)
total_gmv_2					−0.142
					(0.106)
sigma	2104190.058	0.819	2104190.227	2177854.876	0.640
R-squared	0.487	0.327	0.487	0.438	0.623
F	14.546	23.294	14.546	18.338	14.526

Significance: *** = p < 0.001; ** = p < 0.01; * = p < 0.05

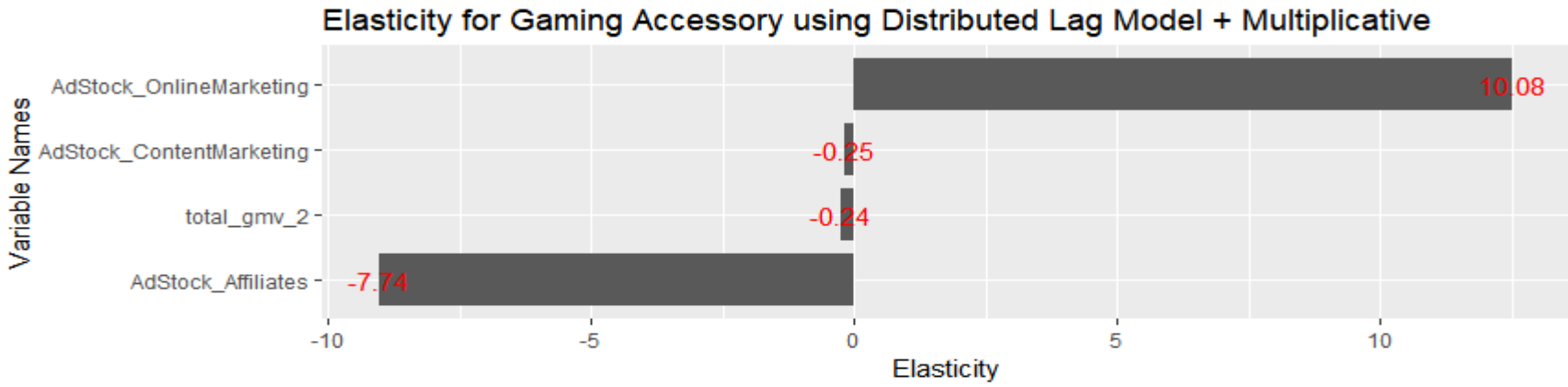
Recommendations: Camera Accessories

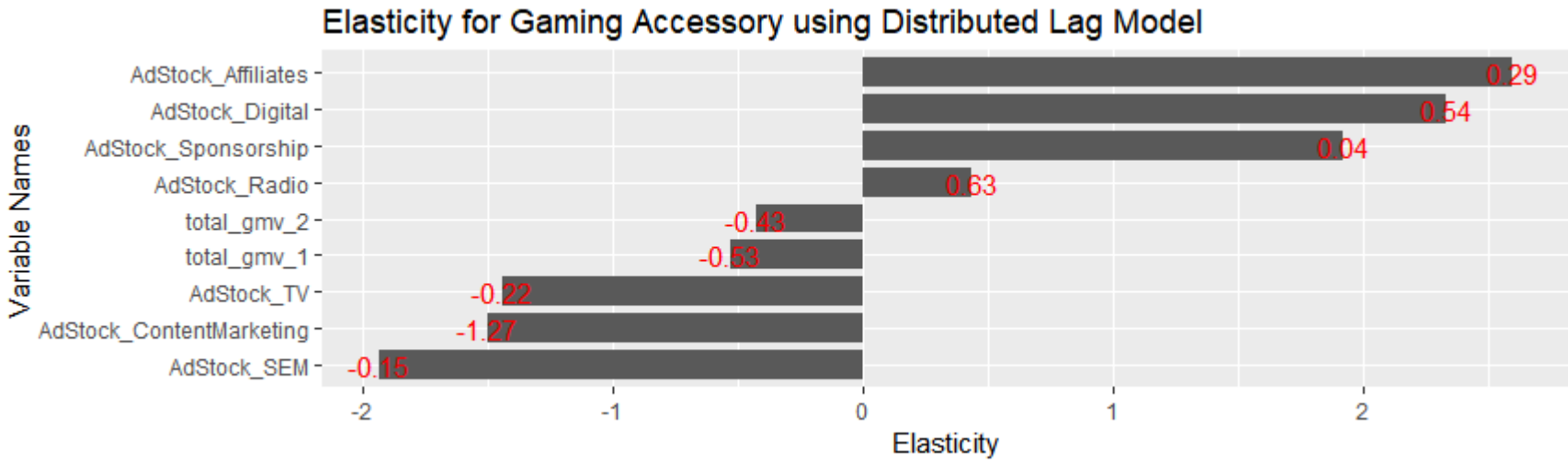
- From the Model's Co-efficients, elasticity is derived.
- The elasticity in case of any multiplicative model indicates α's stand for % change in sales in response to unit change of explanatory variable, i.e. % change in sales in response to 1% change in explanatory variable.
- Numbers marked in red indicate the β (co-efficients) of the corresponding marketing lever.
- From the elasticity graph, it is evident that for Camera Accessories, AdStock of Online Marketing is the key factor.



Recommendations: Gaming Accessories

- Since Content Marketing has negative elasticity in both the cases, it should be avoided, as it is not providing any positive impact to the overall revenue.
- AdStock_Online_Marketing, AdStock_Affiliates, AdStock_Digital & AdStock_Sponsorship are the marketing levers that ElecKart should plan to invest more.
- For Distributed Lag model, a unit increase in a variable will drive β (co-efficient) units impact on total_GMV





Recommendations: Home Audio

- For Linear model, a unit increase in a variable will drive β (co-efficient) units impact on total_GMV
- From the Linear Model, it appears that avg_discount has high elasticity. Hence, along with other marketing levers, ElecKart should consider offering more discounts for home audio.
- AdStock_OnlineMarketing has good elasticity. Hence ElecKart should consider investing more in Online Marketing for Home Audio.