

Executive Summary

Be Customer Wise or Otherwise



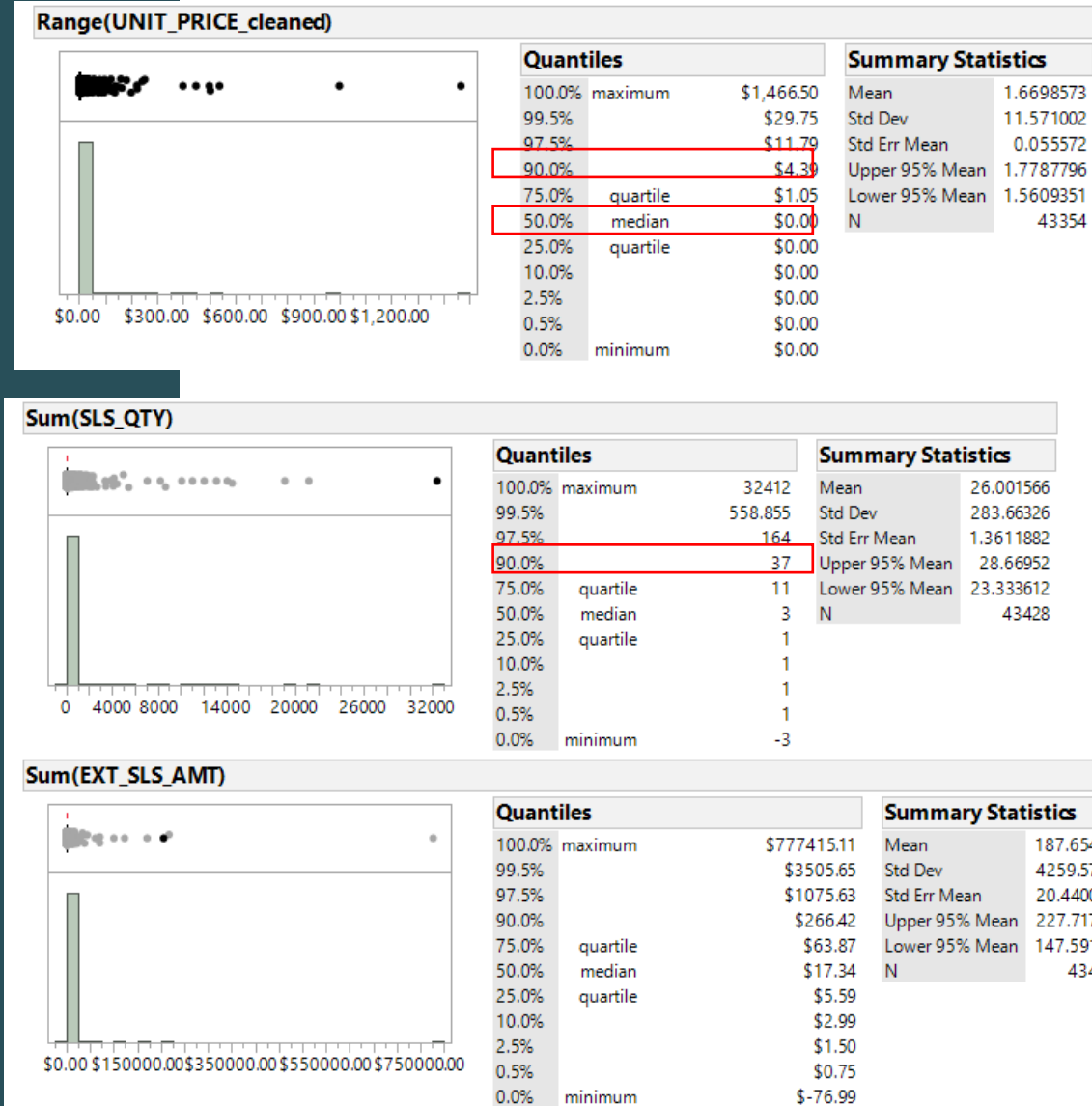
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20th October 2019

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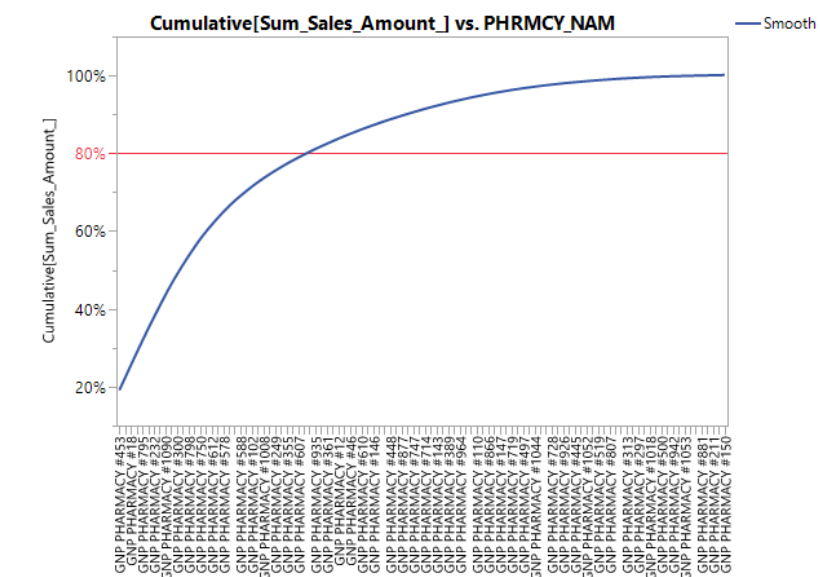
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Insights into products transacted to pharmacies



- Prices of most of products are unchanged or fluctuate moderately among different transactions.
 - half of the products have unchanged unit price and 90% of them have unit price ranges smaller than \$4.4.
- Half of the products' sales volumes are under 3 pieces for the first half year.
- The best-selling product is of home health care category and the product with largest sales amount is of general merchandise category.
- The total sales amount of 3494 biggest-selling pharmacies, which account for about 8% of all the products, occupies 80% of the company's total sales amount.

Insights into pharmacies traded with point-of-sales

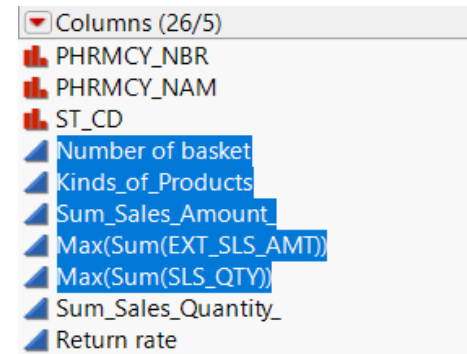
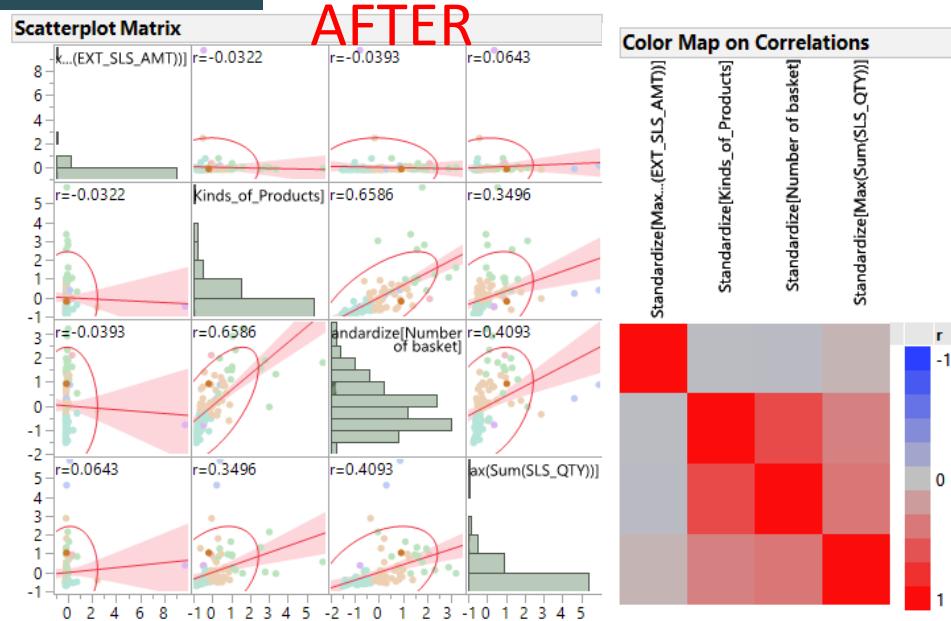
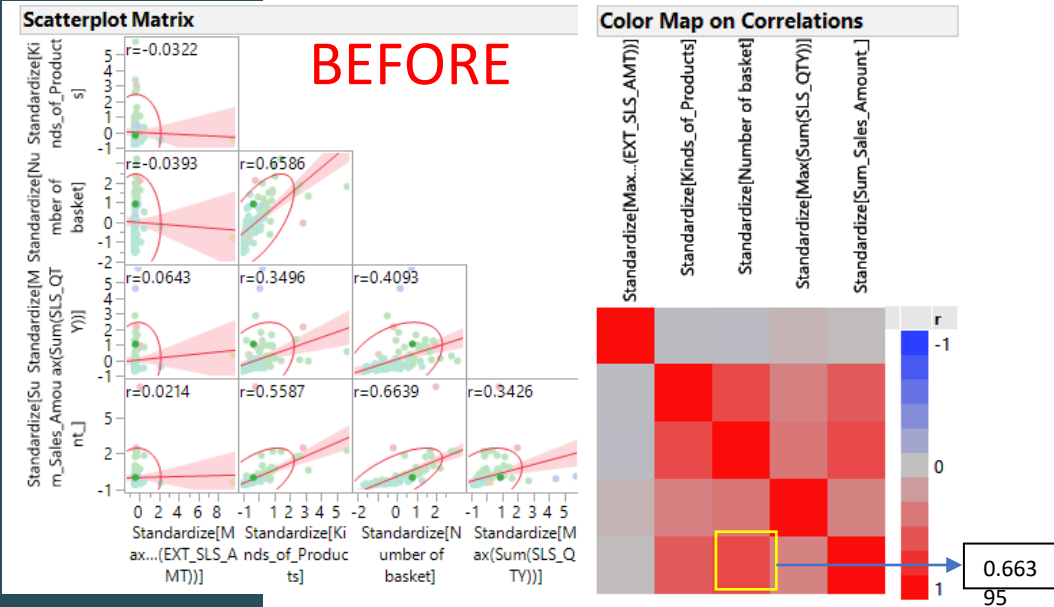


PHRMCY_NAM ordered by Cumulative[Sum_Sales_Amount_] (ascending)

	PHRMCY_NBR	PHRMCY_NAM	Number of basket	Kinds of Products	Sum(Sales Quantity)	Sum(Sales Amount)	Cumulative[Sum(Sales Amount)]
1	44161003994566...	GNP PHARMACY ...	84	1577	55826	\$1085820.59	13.32%
2	61520549788616...	GNP PHARMACY ...	35	7730	72223	\$407791.25	18.33%
3	11744501540225...	GNP PHARMACY ...	77	13407	68876	\$379011.20	22.98%
4	30096931081501...	GNP PHARMACY ...	102	3850	50608	\$370082.79	27.52%
5	69913567054592...	GNP PHARMACY ...	109	4894	55894	\$369517.97	32.05%
6	24874269388536...	GNP PHARMACY ...	48	2344	15778	\$323363.39	36.02%
7	27594066934340...	GNP PHARMACY ...	79	7293	44900	\$315314.84	39.89%
8	85062302571847...	GNP PHARMACY ...	72	6815	40823	\$307931.23	43.67%
9	92015183312330...	GNP PHARMACY ...	81	2469	47473	\$210928.05	46.26%
10	62066295778297...	GNP PHARMACY ...	61	3656	22123	\$191564.19	48.61%
11	32165409137709...	GNP PHARMACY ...	89	4143	29453	\$181359.69	50.83%
12	22309130987365...	GNP PHARMACY ...	73	3783	24131	\$172825.09	52.95%
13	70030256862149...	GNP PHARMACY ...	70	3306	26562	\$162244.52	54.95%
14	32419466278644...	GNP PHARMACY ...	66	8421	32959	\$159057.76	56.90%
15	66337963393794...	GNP PHARMACY ...	70	3756	23503	\$153736.84	58.78%
16	66932498476113...	GNP PHARMACY ...	59	2760	17539	\$142862.05	60.54%
17	56189810266422...	GNP PHARMACY ...	58	2859	18807	\$124026.26	62.06%
18	79995805106221...	GNP PHARMACY ...	65	1932	20354	\$123800.14	63.58%
19	53671923223431...	GNP PHARMACY ...	55	3034	18974	\$123583.05	65.09%
20	33893481912423...	GNP PHARMACY ...	48	3149	14587	\$115640.41	66.51%
21	64436676459374...	GNP PHARMACY ...	63	2606	19193	\$110104.04	67.86%
22	54640727345449...	GNP PHARMACY ...	38	429	17843	\$97937.40	69.07%
23	57173454524580...	GNP PHARMACY ...	56	2499	13319	\$91239.15	70.19%
24	17882708948460...	GNP PHARMACY ...	55	2842	15316	\$88918.34	71.28%
25	10860603488723...	GNP PHARMACY ...	43	2363	10460	\$79745.30	72.26%
26	86060048169670...	GNP PHARMACY ...	57	1312	13949	\$79231.95	73.23%
27	40348666392500...	GNP PHARMACY ...	41	2122	10572	\$78530.59	74.19%
28	28685027526422...	GNP PHARMACY ...	40	2067	9463	\$75311.00	75.12%
29	28418062240230...	GNP PHARMACY ...	41	2722	10825	\$72283.12	76.00%
30	36954326800443...	GNP PHARMACY ...	37	3536	12657	\$71369.61	76.88%
31	84066381426033...	GNP PHARMACY ...	41	2301	8463	\$69483.29	77.73%
32	55610815057437...	GNP PHARMACY ...	39	2289	10217	\$67856.44	78.56%
33	32693963849426...	GNP PHARMACY ...	39	1828	8846	\$64878.66	79.36%
34	65704604850432...	GNP PHARMACY ...	43	2155	10675	\$64268.79	80.15%
35	81106358683896...	GNP PHARMACY ...	56	1553	11892	\$62808.00	80.92%

■ Draw the plot of cumulative sales amount by Pharmacies, we see About 31.1% of the pharmacies account for 80% of the sales amount, while the top 10 biggest-selling pharmacies take up 48.6% of the sales amount.

Customer Segmentation – Check Correlation Matrix



These variables are used to differentiate pharmacies into various economic scale, market segmentation and purchase behavior.

The above map of correlation shows that the number of baskets is correlated to the sum of sales amount, which is understandable. Here we can reduce the variable “Sum sales amount”, which can be represent by the variable “the number of baskets” and “Max sales amount”.

Customer Segmentation – Find the Relationship among Clusters

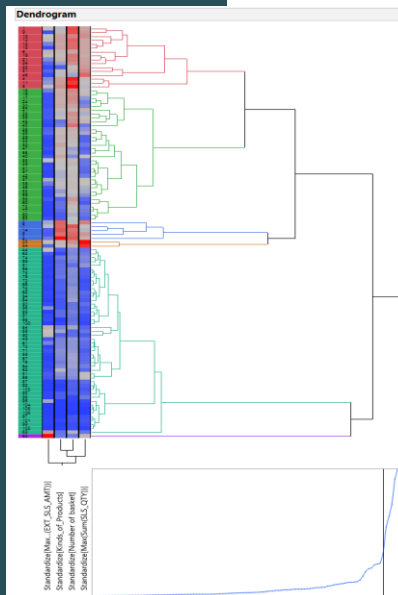
Cluster Means

Cluster	Count	Standardize[Max...(EXT_SLS_AMT)]	Standardize[Kinds_of_Products]	Standardize[Number of basket]	Standardize[Max(Sum(SLS_QTY))]
1	16	0.0150	0.5259	1.3853	1.0321
2	34	-0.1613	0.0654	0.2823	-0.2306
3	5	-0.0934	3.5187	1.3133	0.8003
4	2	1.817e-5	0.3154	0.5965	5.2783
5	48	-0.0840	-0.5917	-0.8069	-0.4918
6	1	9.7463	-0.4612	-0.7886	0.3753

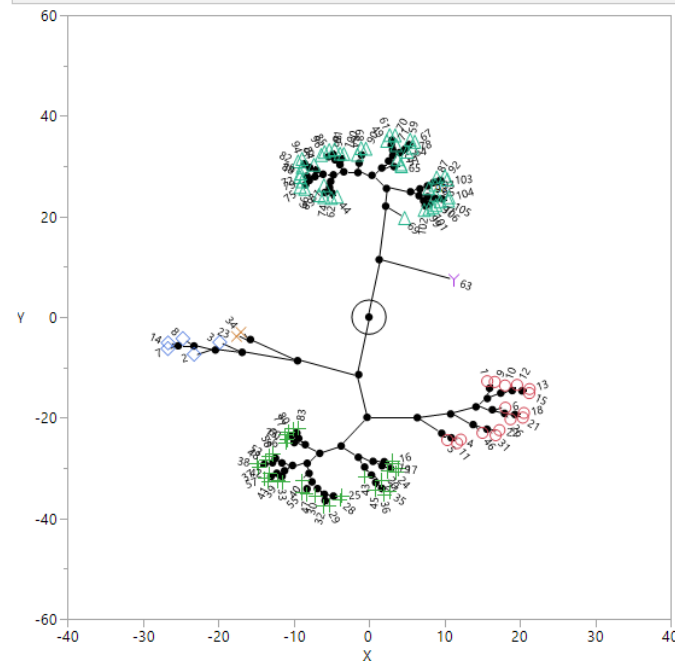
Cluster Standard Deviations

Cluster	Count	Standardize[Max...(EXT_SLS_AMT)]	Standardize[Kinds_of_Products]	Standardize[Number of basket]	Standardize[Max(Sum(SLS_QTY))]
1	16	0.253298	0.608618	0.987427	0.690922
2	34	0.043038	0.451455	0.439705	0.285410
3	5	0.067000	1.339447	0.788682	0.935357
4	2	0.190882	0.121631	0.404208	0.922955
5	48	0.403725	0.197480	0.378135	0.164745
6	1

- The tables of clusters means and of standard deviations above show that these clusters are significantly different from each other. Cluster 6 only consists of 1 single pharmacy, which could be an outlier.

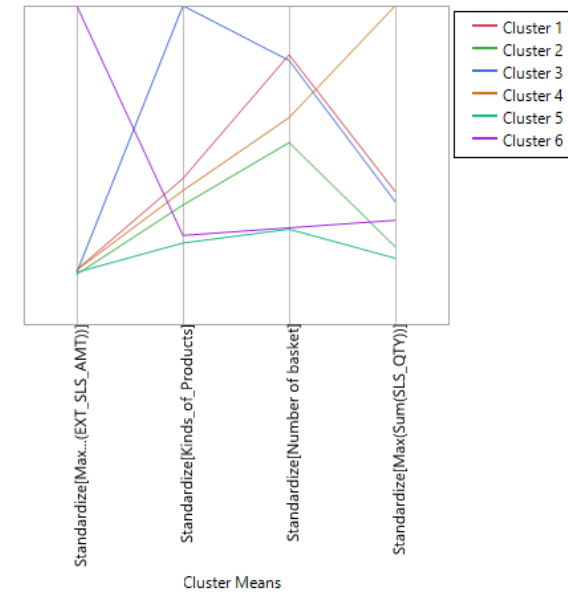
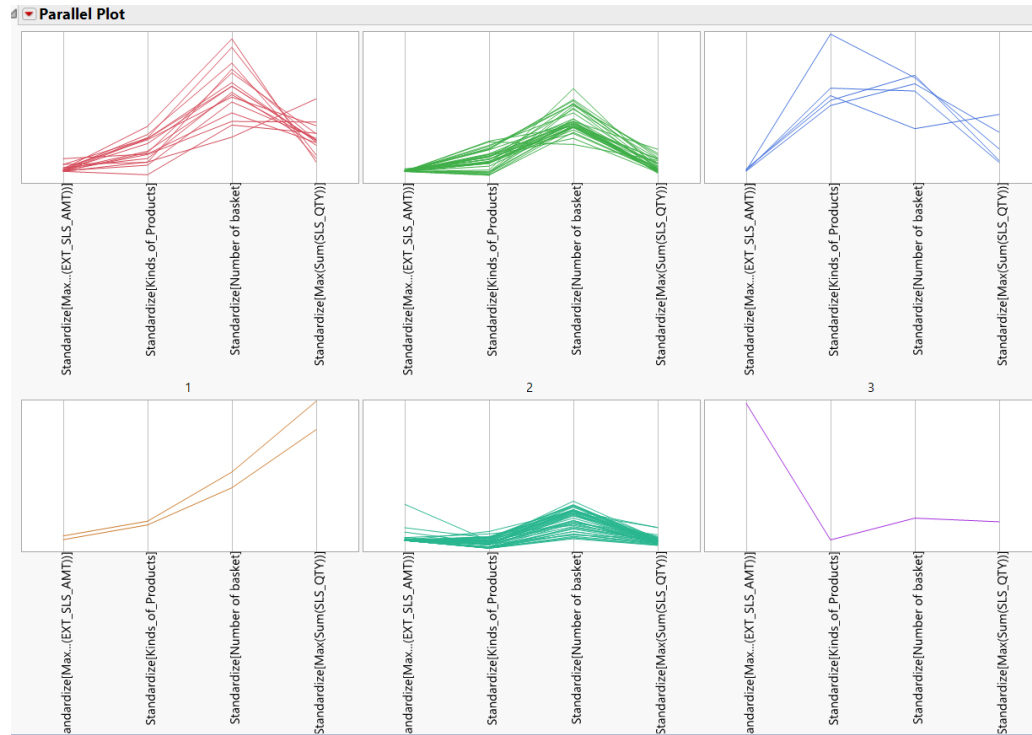


Constellation Plot



- We can also find the relationship among clusters from the constellation plot, which display a great distance between cluster 5 and cluster 1 or 2, while cluster 1 and 2 are relatively close to each other in distance. We also see cluster 3 and 4 are close in distance.

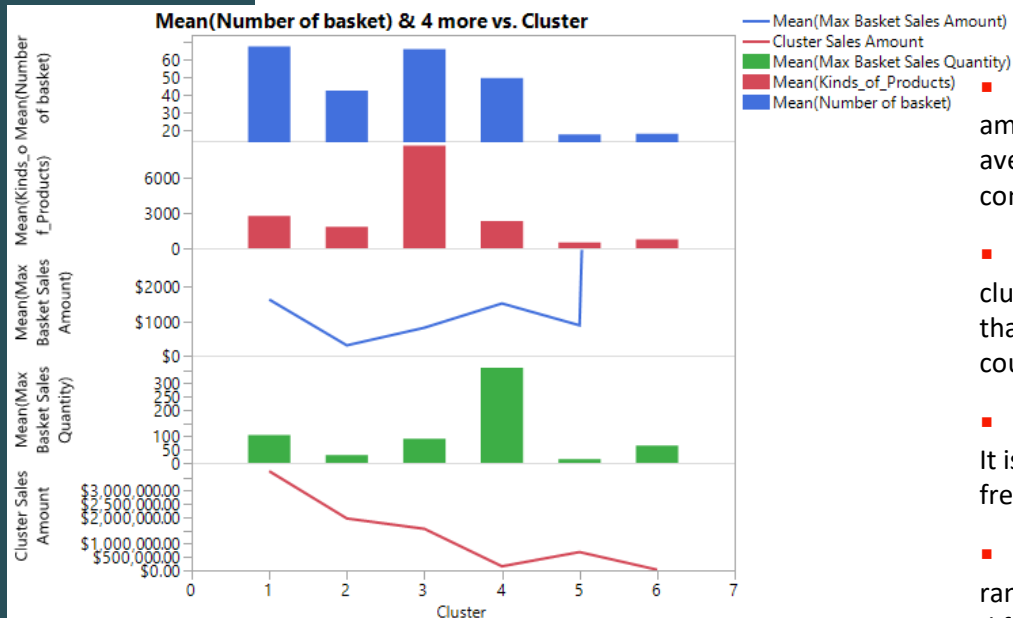
Customer Segmentation – Identify Clusters



- Parallel Plot shows the profile of the clusters across variables and the number of records of each cluster. We can identify different patterns of standard deviations for each cluster.

Customer Segmentation – Interpret Clusters

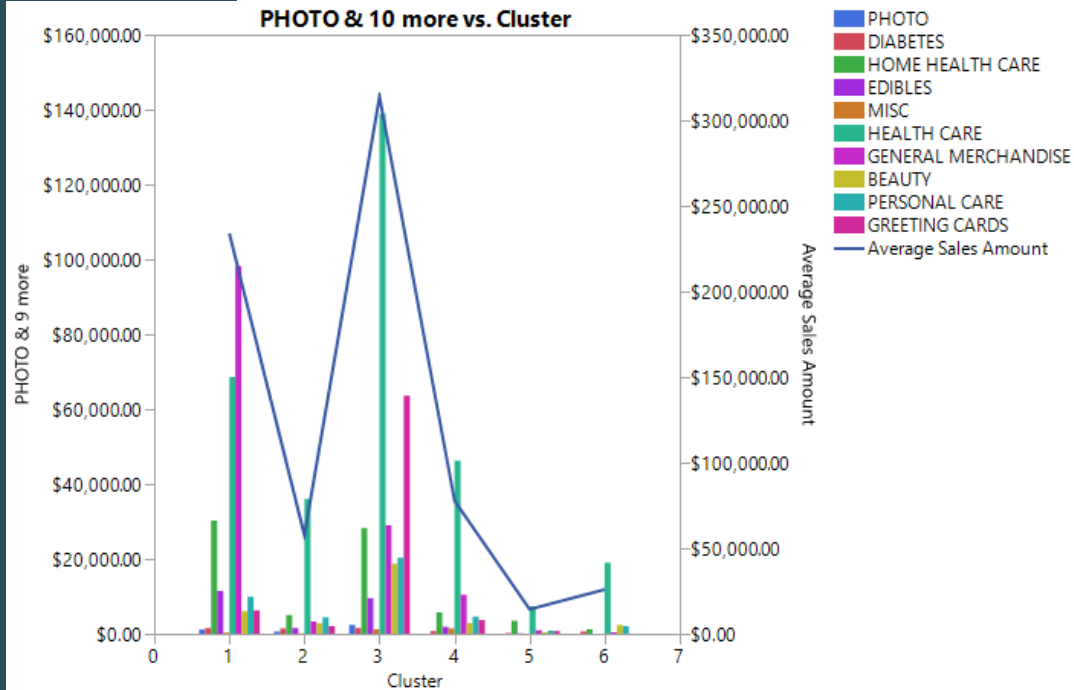
Cluster	NBR of Pharmacy	pharmacy proportion	Mean(Number of basket)	Mean(Kinds_of_Products)	Mean(Max Basket Sales Amount)	Mean(Max Basket Sales Quantity)	Mean(Sum_Sales_Quantity_)	Mean(Return rate)	Cluster Sales Amount	Sum[Cluster Sales Amount]	Average Sales Amount
1	16	15.09%	67	2748	\$1630.25	105	27437	0.855%	\$3,745,004.69	45.95%	\$234,062.79
2	34	32.08%	42	1827	\$301.05	30	9003	0.556%	\$1,961,542.08	24.07%	\$57,692.41
3	5	4.72%	66	8733	\$813.52	91	51956	0.797%	\$1,569,106.28	19.25%	\$313,821.26
4	2	1.89%	50	2327	\$1517.64	359	11997	0.065%	\$155,507.94	1.91%	\$77,753.97
5	48	45.28%	18	513	\$884.01	14	2047	0.763%	\$692,353.99	8.50%	\$14,424.04
6	1	0.94%	18	774	\$75000.00	66	2095	4.812%	\$25,932.31	0.32%	\$25,932.31



- Cluster 1 have the largest number of sales amounts, accounting for about 45% of the total sales amount but only consist of 15% of the pharmacies. Cluster 1 also has the greatest number of baskets on average for the first half year and a relatively large products range. So, these pharmacies are more concentrated on purchasing a few kinds of products.
- Cluster 2 accounts for about 24% of the total sales amount, which is about half of the contribution of cluster 1 but have twice the number of pharmacies. Cluster 2 has a moderate sales amount of each order that these pharmacies contribute a moderate sales amount for each transaction made. These pharmacies could be regular customers who have cooperative relationship with the company.
- Cluster 3 only consists of 4.7% of the pharmacies but accounts for about 19% of the total sales amount. It is high in both basket number and products range. While these pharmacies don't tend to order frequently, they tend to spend many products for each purchasing.
- Cluster 4 just consists of 2 pharmacies but has the highest maximum sales quantity with a low products range, which means they are more demand on fix kinds of products. Compared to cluster 2, they are mainly different on maximum sales quantity, which could infer that these 2 clusters majored on different kinds of products. Noticed that cluster 4 has similar average sales amount to cluster 2 while purchase much more products. so, the unit price of the products purchased by cluster 4 may be much lower than that in cluster 2.
- Cluster 5 have the largest proportion of pharmacies, which is about 45% but contributes a little for the sales amount. As shown on the graphs, they don't purchase regularly or purchase much kinds of products. These pharmacies could be some retail pharmacies or physicians.

Customer Segmentation – Verify the features of Clusters

Cluster	pharmacy proportion	Average Sales Amount	PHOTO	DIABETES	HOME HEALTH CARE	EDIBLES	MISC	HEALTH CARE	GENERAL MERCHANDISE	BEAUTY	PERSONAL CARE	GREETING CARDS
1	15.09%	\$234,062.79	\$1,188.12	\$1,617.07	\$30,279.67	\$11,462.49	\$393.24	\$68,572.53	\$98,243.19	\$6,095.67	\$9,975.76	\$6,235.05
2	32.08%	\$57,692.41	\$623.55	\$1,430.44	\$5,100.95	\$1,582.23	\$169.28	\$36,024.30	\$3,332.79	\$2,849.49	\$4,453.72	\$2,125.67
3	4.72%	\$313,821.26	\$2,353.75	\$1,619.61	\$28,344.76	\$9,546.91	\$1,236.86	\$138,964.56	\$29,068.21	\$18,730.01	\$20,318.22	\$63,638.37
4	1.89%	\$77,753.97	\$0.00	\$771.46	\$5,760.63	\$1,895.92	\$1,432.44	\$46,259.97	\$10,407.51	\$2,891.19	\$4,642.82	\$3,692.03
5	45.28%	\$14,424.04	\$0.00	\$264.98	\$3,479.30	\$174.63	\$4.58	\$7,388.03	\$993.43	\$484.55	\$823.22	\$811.32
6	0.94%	\$25,932.31	\$0.00	\$665.38	\$1,242.55	\$6.50	\$6.99	\$19,077.63	\$448.48	\$2,366.29	\$2,118.49	\$0.00



- The table above shows that cluster 1 and 3 indeed purchased much more kinds of products than other clusters and have a larger products range with an average higher sales amount. Cluster 2 and 4 all demand mainly for Health Care products and cluster 5 demand low for almost all the products.

Summary

Pharmacies transacted with AmerisourceBergen can be divided into 4 groups according to the above analysis:

- Group 1: Both high in purchase quantity and amount with a large range of products in demand. These may be hospital.
- Group 2: Moderate purchase quantify and amount with a high purchase frequency. These may be cooperative relationship customer, like medical clinics.
- Group 3: Low in purchase frequency but with a high average purchase amount and quantity. These could be some long-term care pharmacies.
- Group 4: Both low in purchase quantity and amount with a small range of products in demand. These may refer to individual or retail pharmacies or physician offices.