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Assignment 5

Problem:

How to cluster customers based on transaction data for promoting more suitable sales strategies and improving sales? In order to know some useful information regarding customers and profits, we do cluster analysis and ANOVA test using TI's Transaction Data.

Analysis:

To find the segment, we use the numeric variables in TI transaction data. However, three variables (TRAN_NETTOTI_VALUE, TRAN_RESALE_VALUE, COBM) are highly correlated which means only one variable could be chosen. To get a more accurate model, we added some new variables, such as total cost, unit cost, unit profit and unit margin of distributor kept, and standardized them to avoid over-scaling. (Please see Appendix for detailed formulas.)

At first, we cluster TI's customer into six groups by using these new variables and order quantities. However, percentage of both two groups (cluster 1 and cluster 4) are less than 10%. According to the nearest rule, we merge cluster 1 into cluster 2 and cluster 4 into cluster 3. After merging, TI'S customer can be divided into four different clusters: 21.94% of TI's customers are fallen into cluster 2, 43.03% in cluster 3,23.15% in cluster 5 and 11.88% in cluster 6, respectively.

Next, we analyze features of each cluster and name them. The table below shows the given name and description of each cluster by integrating and analyzing the mean of unit cost, the unit profit, the unit of the margin the distributor kept, order quantities and total margin.

Cluster No	Cluster Name	Descriptions
Cluster 2	Core Customers	low profit rate with high demand, most of them located in Asia and Europe
Cluster 3	Valuable Customers	medial-high profit rate, high value of cost but low demand
Cluster 5	Third Party Customers	very low demand from resales, price of these customers is not sensitive. All of these customers are from distribution channel.
Cluster 6	Entry Products Customers	Highest profit rate (around 586%) with very low unit cost and medial demand quantity. These customers are looking for the components.

After that we use the ANOVA test by ACCOUNT CLASSIFICATION, treat 14 noisy data as missing values and reduce the degree of freedom from 6 to 2. The results show that the profit to TI, unit cost, order quantity are not equal between salesperson assigned and salesperson not assigned. Besides, the transaction amount is declined from Q1 2017 to Q2 2017 but the mean of total profits are ascending as the order quantities increased.

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Finally, In order to find variable changing patterns through time, we compared the transaction frequency, the total profit, average net to PI revenue per unit, and average unit cost by each cluster and

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Assignment 5

season. In 2017 Q2, the transaction frequency of cluster 2 and cluster 6 are reduced 8% and 42% respectively. While it of cluster 3 and cluster 5 are increased 6% and 4% respectively. The total revenue from customers are all increased except customers in cluster 6. The performance of revenue per unit and cost per unit of each cluster are different. Both revenue per unit of cluster 2 and cluster 3 are reduced with the cost per unit reduced. This lead to the order quantity growth up. The cost per unit of cluster 5 is raised while the revenue per unit does not change too much. For cluster 6: In the second quarter of 2017, the unit cost is increased by 23%, meanwhile the corresponding net price is raised by 38%. This is one reason for the decreasing of their total profit. The customers of this cluster are little bit price sensitive.

Recommendations:

For Core Customers: Slightly reduce the unit price if it can further reduce the unit cost, which can stimulate the purchase quantities from customers and increase the total profit. Discount is a good idea.

For Valuable Customers: Slightly reduce the unit price meanwhile increase the unit profit margin.

For Third Party Customers: Don't change price strategies. But can do further research to find if some of them are new customers. If they are, it may have some opportunities to increase their purchase volume in further. This kind of customer could become direct high value customers.

For Entry Products Customers: Due to the medium quantity and pervious price marked up in the 2nd quarter of 2017, it is better to reduce the profit rate to ensure customer purchase product from TI, and grow their purchasing volume.

At the end, TI should focus on core customer, Valuable Customer, and Entry products Customers, around 76.85% of total customers who place the order, in a sequence to improve their further performance.

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 $\|\mathbf{f}_{t}\|_{L^{2}(\mathbb{R}^{n})} \leq \|\mathbf{f}_{t}\|_{L^{2}(\mathbb{R}^{n})} + \|\mathbf{f}_{t}\|_{L^{2}(\mathbb{R}^{n})}$

Appendix

1. Formula of adding variables

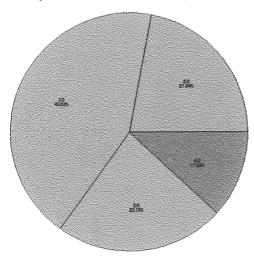
total_cost =TRAN_NETTOTI_VALUE -COBM;

 $unit_cost = total_cost/TRAN_QUANTITY;$

Unit_Profit = COBM/TRAN_QUANTITY;

unit_DISTIMARGIN = DISTIMARGIN/TRAN_QUANTITY;

2. The pie chart for the percentage of each cluster in the TI transaction data



3. Anova test Table.

ANOVA TEST CLASS: ACCOUNT CLASSIFICATION

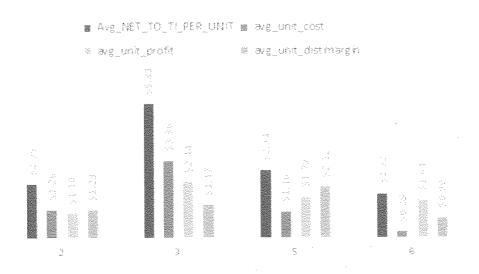
dependent variable	Sum of Squares	Mean Square - Fivalue	$p_t > t$	Risquare Coe	eff Var	Roost MSF	Mean
(OBM (profit)	6.083466+12	3.041/3E+12	10865.40001	0.010871 11	39.362	16731.61	1468,508
Unit Profit	323348	161674	107,110001	0.000108 20	43.676	38,85189	1.901079
TRAN QUANTITY	1.747966 • 14	8.73986 +13	5979.32 + .0001	0.005962 17	13.586	121408.3	7085,047
unit_cost	34035	17017	18.270001	0.000018 159	07,392	30.51673	2.024473
unit_DISTIMARGIN	76619.2	38309.6	150.79 < .0001	0.000153 10	46,802	15,93935	1.522671
AsseMET TO STOR UNIT	147363	73681	28.36 ₹.0001	0.000029 129	99.235	50,97132	3.92318

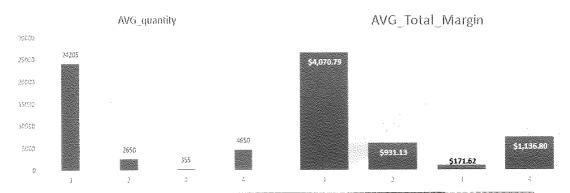
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4. Performance comparison among clusters

Note: the label of bar chart shows 1,2,3,4 means cluster 2, 3, 5,6 respectively

DIFFERENCE OF EACH CLUSTER





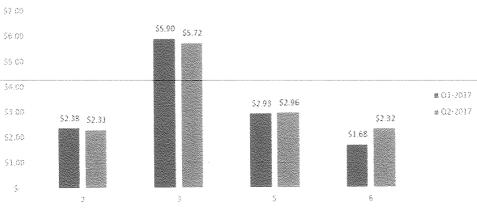
		тот	AL PROF	:IT		# PE
cluster	quarter	sum	mean		median	variance
	2 Q1-2017	\$ 842,218,110.00	\$	3,729.80	\$ 241.00	848861452
	2 Q2-2017	\$ 923,450,184.00	\$	4,441.09	\$ 264.40	995844889
	3 Q1-2017	\$ 391,056,573.00	\$	945.43	\$ 64.55	159390235
	3 Q2-2017	\$ 401,084,605.00	\$	917.61	\$ 56.85	108964676
	5 Q1-2017	\$ 37,788,355.49	S	168.55	\$ 3.37	7350288.88
	5 Q2-2017	\$ 40,767,630.93	\$	174.57	\$ 3.22	38281368.44
	6 Q1-2017	\$ 147,839,947.00	\$	995.74	\$ 25.55	96272952.57
	6 Q2-2017	\$ 119,253,110.00	\$	1,378.98	\$ 42.25	212226167

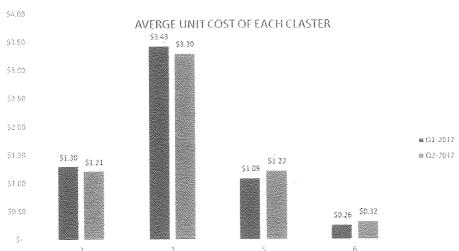
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AVG NET TO TIPER UNIT





	TOP 2 frequency in			Top 2 Frequency in Level 1			5ales Channel			Top 2 Account Category		
	MTI_MG1			name	1		#*************************************	1		Caucachi	—— i	
Cluster 1	Commodity Material	148602	34,3%	Europe	198990	45,9%	d	22774	5,3%	5	257648	59.4%
	Multi Source Material	101846	23.5%	Asia	165485	38.2%	resale	410967	94.7%	3	86560	20.0%
	: ! •											
	Commodity	Πİ			i							
cluster2	Material	278851	32.8%	Americas	334420	39.3%	d	19181	2.3%	5	661231	77.7%
850728	Sole Source Material	225794	26.5%	Europe	319416	37.5%	resale	831547	97.7%	3	108037	12.79
	Commodity		20.42/	, ,	245425	47 10/		0	0.00/		411682	89,99
cluster 3	Material	152874	33.4%	Americas	215425			1	0.0%			
457728	<u> </u>	L		europe	171695	3/,5%	resale	457722	100.0%	. 3	24428	5,3%
	Commodity	Γ :		<u> </u>	T							
cluster 4	Material	88949	37.9%	europe	88570	37.7%	d	2997	1.3%	.5	179272	76.39
234952				americas	78877	33,6%	resasle	231955	98.7%	3	28406	12.19

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5. Details in four clusters

a) 1 st Cluster

The FREG Pr	rocedure			SALES	SCHANNEL		
Cluster	r=X		SALESCHANNEL	Frequency		Cumulative (Frequency	Comulative Percent
MTL_M			Direct	22774	5.25	22774	5 25
MTL_MG1 Frequency P		Comulative Percent	Resale	410967	94.75	433741	100 00
Commodity Material 148602	34.27 148602	34.27					
Functional Equiv. 84036	19.38 232638	53.65		ACCOUN	TCATEGO	RY	
Multi Source Materia 101846	23.49 334464	77.14	ACCOMMICS TECOTO	V C			Cumulative
Sole Source Material 99118	22.86 433602	100 00	ACCOUNTCATEGOR		•	,	
Frequency Mis	ssing = 139			1 1184	2 2 73	3 11842	2.73
				2 5215	0 12.02	2 63992	14 75
LEVEL1_I				3 8656	0 19.96	5 150552	34 71
LEVEL1_NAME Frequency Perc	Cumulative C ent Frequency	umulative Percent		4 2551	4 5.88	176066	40 59
AMERICAS 46507 10	1.72 46507	10.72		5 25764	8 59.4	1 433714	100.00
A SIA 165485 38	3.15 211992	48.88		Frequenc	y Missing	= 27	
EUROPE 198990 45	68 410982	94 75					
JAPAN 22759 5	5 25 433741	100 00					

b) 2 nd Cluster

	Cli	uster=3				MTL	_MG1		
	MT	L_MG1			MTL_MG1	Frequency	Percent		Cumulative Percent
MTL_MG1 Commodity Material	27885	1 32.79		Percent 32.79	Commodity Material Functional Equiv. Multi Source Materia	278851 154967 190838	32.79 18.22 22.44	278851 433818 624656	32 79 51 01 73.45
Functional Equiv. Multi Source Materia	15496 19083			51 01 73 45	Sole Source Material	225794 Frequency	26.55	850450	100.00
Sole Source Materia		4 26.55 v Missing =		100.00		, ,	CHANNEL	210	
		L1_NAME			SALESCHANNEL F	tequency F		umulative C Frequency	umulative Percent
LEVEL1_NAME (requency I		umulative Cu requency	mulative Percent	Direct Resale	19181 831547	2,25 97.75	19181 850728	2 25 100.00
AMERICAS ASIA	334420 157771	39 31 18 55	334420 492191	39 31 57 86		ACCOUNT	CATEGOR	ξY	
EUROPE	319416	37 55	811607	95.40	ACCOUNTCATEGORY	Frequency	Percent		Cumulative Percent
JAPAN	39121	4 60	850728	100 00	1 2	5625 45303	0 66 5.33	5625 50928	0 66 5 99
					3	108037	12.70	158965	18.69
					4 5	30509 661231	3.59 77.73	189474 850705	22.27
						Frequency	Missing =	23	

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c) 3 rd Cluster

	Clu	ster=5				MIL	MG1			
	MTE	_MG1			MTL_MGt #	Frequency	Percent	Cumulative Frequency	Cumulati Perce	
			Cumulative	: Cumulative	Commodity Material	152674	33 40	152874	33	40
MTL_MG1	Frequency	Percent	Frequency	Percent	Functional Equiv.	92287	20.17	245161	53.	57
Commodity Material	152874	33.40	152874	33 40	Multi Source Materia	106678	23 09	350839	76	66
Functional Equiv.	92287	20 17	245161	53 57	Sole Source Material	106809	23.34	457648	100	00
Muhi Source Materia	105678	23.09	350839	76.66	F	Frequency i	Aissing =	80		
Sole Source Material			457648	100.00		SALESC	HANNEL			
	Frequency	Missing =	80		Chi CCCCCCCCC C	499	Cı	amulative C		
	LEVEL	1 NAME			SALESCHANNEL Fre	equency Po			Percent	
	AL 142 H 122 TO	-	unulative C	unistation	Resate		0 00 00 00 00 00 00 00 00 00 00 00 00 0	6 457728	0.00	
LEVEL1_NAME_F	requency Pe		requency	Percent	E 95 - 04 60 E 5	4317EE		431120	100 00	
AMERICAS	215425	47 06	215425	47.06		ACCOUNT	ATEGOR	Y		
ASIA	53555	11 70	268980	58.76	ACCOUNTCATEGORY F	Steameney	Porcont	Cumulative	Cumulati Perce	
EUROPE	171695	37.51	440676	96.27	1	875	0.19	875		19
JAPAN	17053	3 73	457728	100.00	2	14675	3.21	15550		40
					3	24428	5 34	39978		73
					4	6068	1 33	46046	10	
					. 5	411682	89 94	457728	100.	00
d) 4 th cluster										
	The FREQ	Procedure					ITI 28774			
	1110/11112	· rossida	-			R	ITL_MG1			
	Clust		-		MTL_MG1	Frequen	_	Cumu		umulative Percent
		er=6	-		MTL_MG1 Commodity Material		cy Perc	Cumu cent Frequ		
MTL MG1	Clust MTL_	er=6 MG1	Comulative			Frequen	- icy Perc i49 3	Cumu cent Freq 7 87	иепсу	Percent
MTL_MG1 Commodity Material	Clust MTL_ Frequency	er=6 MG1 Percent	Comulative Frequency	Percent	Commodity Material	Frequen 889 414	ecy Perc 49 3:	Cumu cent Freq 7 87 7 63 1	88949 	Percent 37.87
Commodity Material	Clust MTL_ Frequency 88949	er=6 MG1 Percent 37 87	Comulative Frequency 88949	Percent 37.67	Commodity Material Functional Equiv.	Frequen 889 414 546	73 2:	Cumu cent Freq 7 87 7 63 1	88949 30356	Percent 37.87 55.50
Commodity Material Functional Equiv,	Clust MTL_ Frequency 88949 41407	er=6 MG1 Percent 37 87 17 63	Comulative Frequency 88949 130356	Percent 37.87 55 50	Commodity Material Functional Equiv. Multi Source Materia	Frequen 889 414 546	149 3: 149 3: 107 1: 173 2: 167 2:	Cumu Frequent Frequen	36949 30356 85029	9ercent 37.87 55 50 78 77
Commodity Material Functional Equiv, Multi Source Materia	Clust MTL_ Frequency 88949 41407 64673	er=6 MG1 Percent 37 87 17 63 23 28	Cumulative Frequency 88949 130356 185029	Percent 37.87 65.50 78.77	Commodity Material Functional Equiv. Multi Source Materia	Frequen 889 414 546 4 498	149 3: 149 3: 107 1: 173 2: 167 2:	Cumu Frequent Frequen	36949 30356 85029	9ercent 37.87 55 50 78 77
Commodity Material Functional Equiv,	Clust MTL Frequency 88949 41407 64673 49867	er=6 MG1 Percent 37 87 17 63 23 28 21.23	Cumulative Frequency 88949 130356 185029 234896	Percent 37.87 55 50	Commodity Material Functional Equiv. Multi Source Materia	Frequen 889 414 546 498 Frequen	149 3: 149 3: 107 1: 173 2: 167 2:	Cumu Frequent Frequent 7 87 7 63 1 3.28 1 1.23 2	36949 30356 85029	9ercent 37.87 55 50 78 77
Commodity Material Functional Equiv, Multi Source Materia	Clust ##TL_ Frequency 88949 41407 64673 49867 Frequency #	er=6 MG1 Percent 37 87 17 63 23 28 21.23 Aissing = 5	Cumulative Frequency 88949 130356 185029 234896	Percent 37.87 65.50 78.77	Commodity Material Functional Equiv. Multi Source Materia	Frequen 889 414 546 498 Frequen SALI	107 117 22 27 Missin	Cumu cent Frequ 7 87 7 63 1 3.28 1 1.23 2 ng = 56 WEL Cumulat	uency 88949 30356 85029 34896	Percent 37.87 55.50 78.77 100.00
Commodity Material Functional Equiv, Multi Source Materia	Clust MTL Frequency 88949 41407 64673 49867	er=6 MG1 Percent 37 87 17 63 23 28 21.23 Aissing = 5	Cumulative Frequency 88949 130356 185029 234896	Percent 37.87 65.50 78.77	Commodity Material Functional Equiv. Multi Source Material Sole Source Material	Frequen 889 414 546 498 Frequen SALI	107 117 22 27 Missin	Cumulat Frequent Freq	uency 88949 30356 85029 34896	Percent 37.87 55.50 78.77 100.00
Commodity Material Functional Equiv, Multi Source Materia	Frequency 88949 41407 64673 49867 Frequency &	er=6 MG1 Percent 37 87 17 63 23 28 21.23 Alissing = 5 NAME Cun	Comulative Frequency 88949 130356 185029 234896 66	Percent 37.87 55.50 78.77 100.00	Commodity Material Functional Equiv. Multi Source Material Sole Source Material	Frequency Frequency	49 3: 07 1: 73 2: 67 2 cy Missin	Cumularia Frequera 8 2	uency 88949 30356 86029 34896 Nive Curr ncy I	Percent 37.87 55 50 78 77 100.00
Commodity Material Functional Equiv, Multi Source Materia Sole Source Material	Clust MTL Frequency 88949 41407 64673 49867 Frequency & LEVEL1	er=6 MG1 Percent 37 87 17 63 23 28 21.23 Alissing = 5 NAME Cun	Comulative Frequency 88949 130356 185029 234896	Percent 37.87 55.50 78.77 100.00 mulative Percent	Commodity Material Functional Equiv. Multi Source Material Sole Source Material SALESCHANNEL F	Frequency 2997	2 (49 3) (49 3) (49 3) (49 3) (49 3) (49 4)	Cumular Frequent Freq	uency 88949 30356 86029 34896 Nive Curr ncy I	Percent 37.87 55.50 78.77 100.00 nulative Percent 1.28
Commodity Material Functional Equiv, Multi Source Material Sole Source Material	Frequency 88949 41407 64673 49867 Frequency & LEVEL1 equency Per 78877	er=6 MG1 Percent 37 87 17 63 23 28 21.23 Missing = 5 NAME Cun Cun Cun Sign = 5	Comulative Frequency 88949 130356 185029 234896 66 nulative Curuency 78877	Percent 37.87 55.50 78.77 100.00 mulative Percent 33.57	Commodity Material Functional Equiv. Multi Source Material Sole Source Material SALESCHANNEL F	Frequent 414 546 498 Frequency 2997 231965	2 (49 3) (49 3) (49 3) (49 3) (49 3) (49 4)	Cumular Frequer 8 2 2 2 234	uency 88949 30356 86029 34896 Nive Curr ncy I	Percent 37.87 55.50 78.77 100.00 nulative Percent 1.28
Commodity Material Functional Equiv, Multi Source Materia Sole Source Material LEVEL1_NAME Fre	Frequency 86949 41407 64673 49867 Frequency 8 LEVEL1 equency Per 78877	er=6 MG1 Percent 37 87 17 63 23 28 21.23 Alissing = 5 NAME Cun Cun Cent Free	Comutative Frequency 88949 130356 186029 234896 66	Percent 37.87 55.50 78.77 100.00 mulative Percent	Commodity Material Functional Equiv. Multi Source Material Sole Source Material SALESCHANNEL F Direct Resale	Frequent 414 546 Frequency 2997 231955	cy Percent 12 98.7	Cumu 7 87 7 83 1 3 28 1 1.23 2 2 2 2 2 2 2 4 6 6 6 6 7 6 7 8 7 6 7 6 7 6 7 6 7 6 7 6	88949 30356 86029 34896 34896 2002 2002 2002 2003 2003 2003 2003 200	Percent 37.87 55.50 78.77 100.00 mulative Percent 1.28 100.00
Commodity Material Functional Equiv, Multi Source Materia Sole Source Material LEVEL1_NAME Fre AMERICAS ASIA	Clust MTL Frequency 88949 41407 64673 49867 Frequency & LEVEL1 equency Per 78877 39091	er=6 MG1 Percent 37 87 17 63 23 28 21.23 Alissing = 5 NAME Cun cent Fre 33.57	Comutative Frequency 88949 130356 185029 234896 66 nutlative Cuequency 78877	Percent 37.67 55.50 78.77 100.00 mulative Percent 33.57 50.21	Commodity Material Functional Equiv. Multi Source Material Sole Source Material SALESCHANNEL F Direct Resale ACCOUNTCATEGORY	Frequent SALI Frequency 2997 231955 ACCOU	ccy Percent 12 98.7 NTCATEC	Cumu Frequent	88949 30356 86029 34896 34896 34896 552 552 652 653 653 653 653 653 653 653 653 653 653	Percent 37.87 55.50 78.77 100.00 mutative Percent 1.28 100.00
Commodity Material Functional Equiv, Multi Source Material Sole Source Material LEVEL1_NAME Fre AMERICAS ASIA EUROPE	Clust MTL Frequency 88949 41407 64673 49867 Frequency & LEVEL1 equency Per 78877 39091	er=6 MG1 Percent 37.87 17.63 23.28 21.23 Alissing = 5 NAME Cun cent Fre 33.57 16.64	Comutative Frequency 88949 130356 185029 234896 66 nullative Cuequency 78877 117968 206538	Percent 37.67 55.50 78.77 100.00 mulative Percent 33.57 60.21 87.91	Commodity Material Functional Equiv. Multi Source Material Sole Source Material SALESCHANNEL F Direct Resale ACCOUNTCATEGORY	Frequent SALI Frequency 2997 231965 ACCOU	ccy Percent 12 98.7 NTCATE CCY Percent 12 98.7	Cumu 7 87 7 63 1 1.23 2 1.23 2 1.23 2 1.24 Cumulat 1 Freque: 8 2 2 234 GORY Cumu ent Freque 0.78	1839 uency 88949 30356 85029 834896 85029 85029 8502 8502 8502 8502 8502 8502 8502 8502	Percent 37.87 55.50 78.77 100.00 mulative Percent 1.28 100.00
Commodity Material Functional Equiv, Multi Source Material Sole Source Material LEVEL1_NAME Fre AMERICAS ASIA EUROPE	Clust MTL Frequency 88949 41407 64673 49867 Frequency & LEVEL1 equency Per 78877 39091	er=6 MG1 Percent 37.87 17.63 23.28 21.23 Alissing = 5 NAME Cun cent Fre 33.57 16.64	Comutative Frequency 88949 130356 185029 234896 66 nullative Cuequency 78877 117968 206538	Percent 37.67 55.50 78.77 100.00 mulative Percent 33.57 60.21 87.91	Commodity Material Functional Equiv. Multi Source Material Sole Source Material SALESCHANNEL F Direct Resale ACCOUNTCATEGORY 1	Frequen 885 414 546 498 Frequency 2997 231965 ACCOU Frequen 18 161	cy Perc 49 3: 07 1: 73 2: 67 2 cy Missin SCHAMI Percen 1 2 98.7. NTCATE: cy Perc 39 0:	Cumu Frequent Frequent Frequent Cumulant Cumulan	uency 88949 30356 86029 (34896 34896 1997 997 952 Hative Craency 1839	Percent 37.87 55.50 78.77 100.00 mulative Percent 1.28 100.00 mulative Percent 0.78 7.65
Commodity Material Functional Equiv, Multi Source Material Sole Source Material LEVEL1_NAME Fre AMERICAS ASIA EUROPE	Clust MTL Frequency 88949 41407 64673 49867 Frequency & LEVEL1 equency Per 78877 39091	er=6 MG1 Percent 37.87 17.63 23.28 21.23 Alissing = 5 NAME Cun cent Fre 33.57 16.64	Comutative Frequency 88949 130356 185029 234896 66 nullative Cuequency 78877 117968 206538	Percent 37.67 55.50 78.77 100.00 mulative Percent 33.57 60.21 87.91	Commodity Material Functional Equiv. Multi Source Material Sole Source Material SALESCHANNEL F Direct Resale ACCOUNTCATEGORY 1 2 3	Frequent SAL1 Frequency 2997 231965 ACCOU	cy Percent 2 98.7 NTCATE: Cy Percent 2 98.7 NTCATE: Cy Percent 2 98.7	Cumu 7 87 7 63 1 3 28 1 1.23 2 ng = 56 VEL Cumulant Frequent 8 2 2 234 GORY Cumu cent Frequent 9 3.78 6.86	uency 88949 30356 86029 34896 34896 4696 4696 4696 4696 46369	Percent 37.87 55.50 78.77 100.00 mulative Percent 1.28 100.00 munulative Percent 0.78 7.65 19.74
Commodity Material Functional Equiv, Multi Source Material Sole Source Material LEVEL1_NAME Fre AMERICAS ASIA EUROPE	Clust MTL Frequency 88949 41407 64673 49867 Frequency & LEVEL1 equency Per 78877 39091	er=6 MG1 Percent 37.87 17.63 23.28 21.23 Alissing = 5 NAME Cun cent Fre 33.57 16.64	Comutative Frequency 88949 130356 185029 234896 66 nullative Cuequency 78877 117968 206538	Percent 37.67 55.50 78.77 100.00 mulative Percent 33.57 60.21 87.91	Commodity Material Functional Equiv. Multi Source Material Sole Source Material SALESCHANNEL F Direct Resale ACCOUNTCATEGORY 1 2 3 4	Frequency 2997 231965 ACCOU Frequency 18 161 284	2 Percent 2 Perc	Cumular Frequence 8 2 2 234 GORY Cumular Frequence Frequence Frequence 8 2 2 34 COMPANDE COMPAND COMPANDE COMPAND COMPAND COMPAND COMPAND COMPAND	1839 17963 46369 55656	Percent 37.87 55.50 78.77 100.00 mulative Percent 1.28 100.00 munulative Percent 0.78 7.65 19.74 23.69
Commodity Material Functional Equiv, Multi Source Material Sole Source Material LEVEL1_NAME Fre AMERICAS ASIA EUROPE	Clust MTL Frequency 88949 41407 64673 49867 Frequency & LEVEL1 equency Per 78877 39091	er=6 MG1 Percent 37.87 17.63 23.28 21.23 Alissing = 5 NAME Cun cent Fre 33.57 16.64	Comutative Frequency 88949 130356 185029 234896 66 nullative Cuequency 78877 117968 206538	Percent 37.67 55.50 78.77 100.00 mulative Percent 33.57 60.21 87.91	Commodity Material Functional Equiv. Multi Source Material Sole Source Material SALESCHANNEL F Direct Resale ACCOUNTCATEGORY 1 2 3	Frequency 2997 231965 ACCOU Frequency 18 161 284	Percent 12 98.7 NTCATE OF 12 12 12 12 12 12 12 12 12 12 12 12 12	Cumular Frequence Representation Frequence Rep	uency 88949 30356 86029 34896 34896 4696 4696 4696 4696 46369	Percent 37.87 55.50 78.77 100.00 mulative Percent 1.28 100.00 munulative Percent 0.78 7.65 19.74