Analysis Report: MRA PART(A)

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Part A: Agenda & Executive Summary

This report aims to provide insights into the buying patterns of customers for an automobile parts manufacturing company based on three years of transactional data. It includes exploratory analysis, customer segmentation using RFM analysis, and recommendations for customized marketing strategies.

Problem Statement

The automobile parts manufacturing company lacks an in-house data science team and seeks to understand customer buying patterns to enhance marketing strategies and drive sales growth.

About Data

Information: The dataset contains transactional data spanning three years, including order details, customer information, product details, and sales information.

#	Column	Non-Null Count	Dtype
0	ORDERNUMBER	2747	int64
1	QUANTITYORDERED	2747	int64
2	PRICEEACH	2747	float64
3	ORDERLINENUMBER	2747	int64
4	SALES	2747	float64
5	ORDERDATE	2747	int64
6	DAYS_SINCE_LASTORDER	2747	int64
7	STATUS	2747	object

#	Column	Non-Null Count	Dtype
8	PRODUCTLINE	2747	object
9	MSRP	2747	int64
10	PRODUCTCODE	2747	object
11	CUSTOMERNAME	2747	object
12	PHONE	2747	object
13	ADDRESSLINE1	2747	object
14	CITY	2747	object
15	POSTALCODE	2747	object
16	COUNTRY	2747	object
17	CONTACTLASTNAME	2747	object
18	CONTACTFIRSTNAME	2747	object
19	DEALSIZE	2747	object

Shape: The dataset comprises multiple columns capturing various aspects of each transaction.Dataset Shape: (2747, 20) This indicates that the dataset contains 2747 rows and 20 columns.

Summary Stats: Initial exploration reveals key summary statistics such as total sales, average order quantity, and average price per item.

	ORDERNUMBER	QUANTITYORDERED	PRICEEACH	ORDERLINENUMBER	SALES	ORDERDATE	DAYS_SINCE_LASTORDER	MSRP
count	2747.000000	2747.000000	2747.000000	2747.000000	2747.000000	2747.000000	2747.000000	2747.000000
mean	10259.761558	35.103021	101.098951	6.491081	3553.047583	43598.914088	1757.085912	100.691664
std	91.877521	9.762135	42.042548	4.230544	1838.953901	230.231295	819.280576	40.114802
min	10100.000000	6.000000	26.880000	1.000000	482.130000	43106.000000	42.000000	33.000000
25%	10181.000000	27.000000	68.745000	3.000000	2204.350000	43412.000000	1077.000000	68.000000
50%	10264.000000	35.000000	95.550000	6.000000	3184.800000	43640.000000	1761.000000	99.000000
75%	10334.500000	43.000000	127.100000	9.000000	4503.095000	43786.000000	2436.500000	124.000000
max	10425.000000	97.000000	252.870000	18.000000	14082.800000	43982.000000	3562.000000	214.000000

Assumptions: We assume the data is representative of the company's transactions and does not contain significant anomalies.

Exploratory Analysis and Inferences

We conducted univariate, bivariate, and multivariate analysis to understand customer behavior and sales trends.

Univariate Analysis

We analysed individual variables such as sales, quantity ordered, and price per item to identify trends and outliers.

Bivariate Analysis

We examined relationships between pairs of variables, such as sales and product line, to uncover correlations and patterns.

bivariate analysis
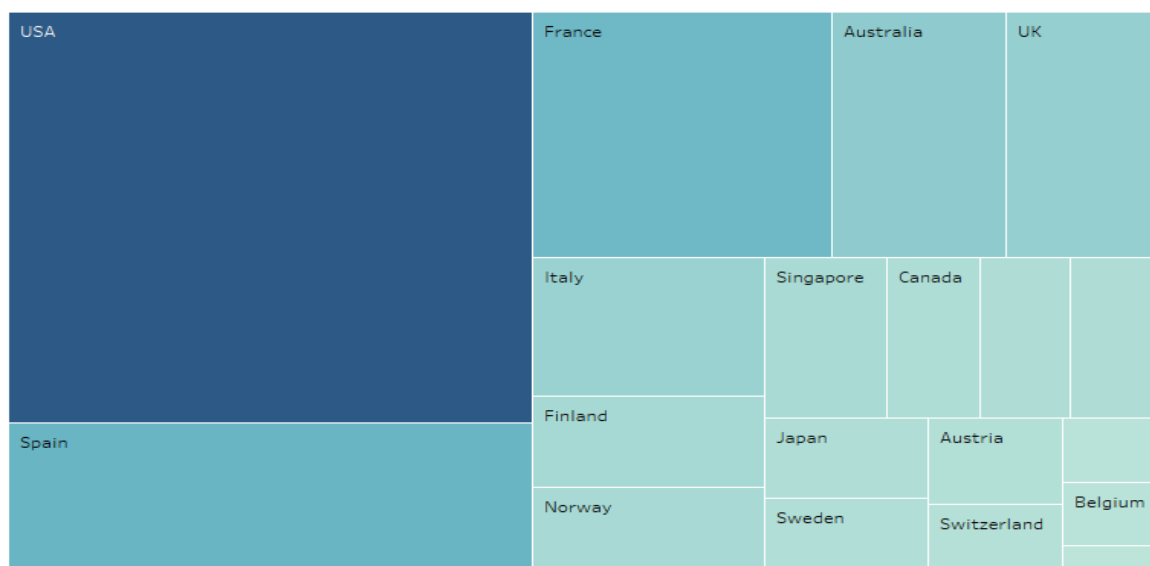
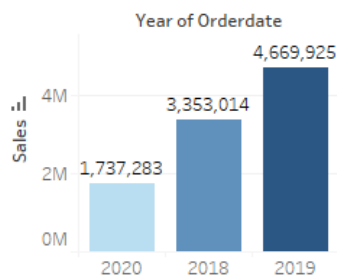# Multivariate Analysis

We explored interactions between multiple variables to gain deeper insights into customer segments and product preferences.

year wise sale

Year of Orderdate

quarter wise

Quarter of Orderdate
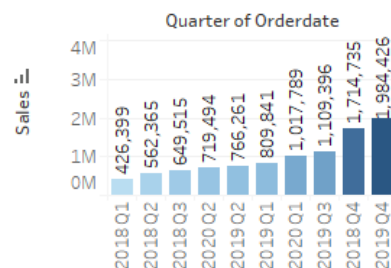
month wise

Month of Orderdate
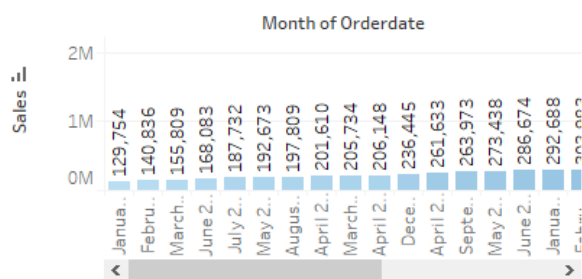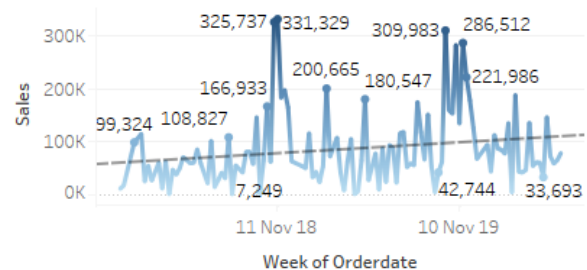
week wise

Weekly Trends in Sales

We analyzed sales trends on a weekly basis to identify patterns and seasonality.

week wise
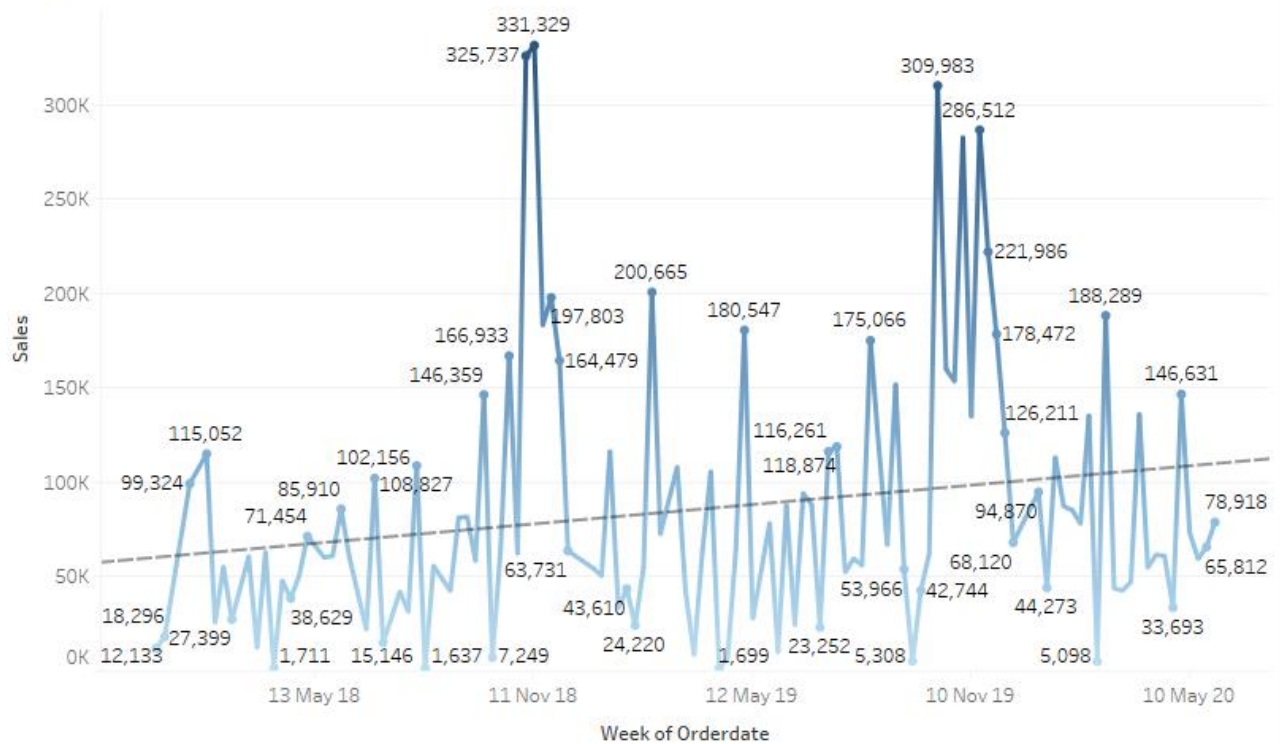
Monthly Trends in Sales

We examined sales trends on a monthly basis to detect any long-term trends or fluctuations.

month wise
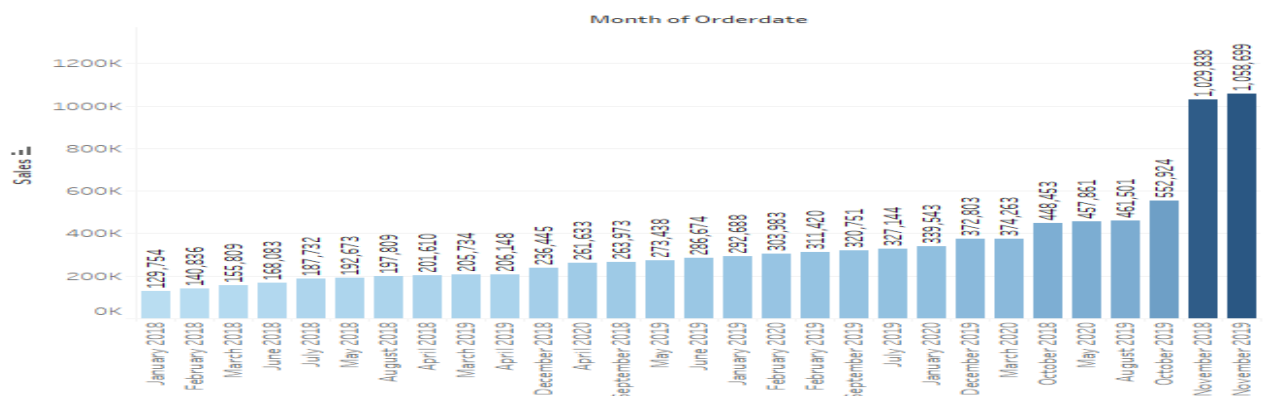
Quarterly Trends in Sales

We investigated sales trends on a quarterly basis to assess performance over larger time intervals.

quarter wise

Quarter of Orderdate
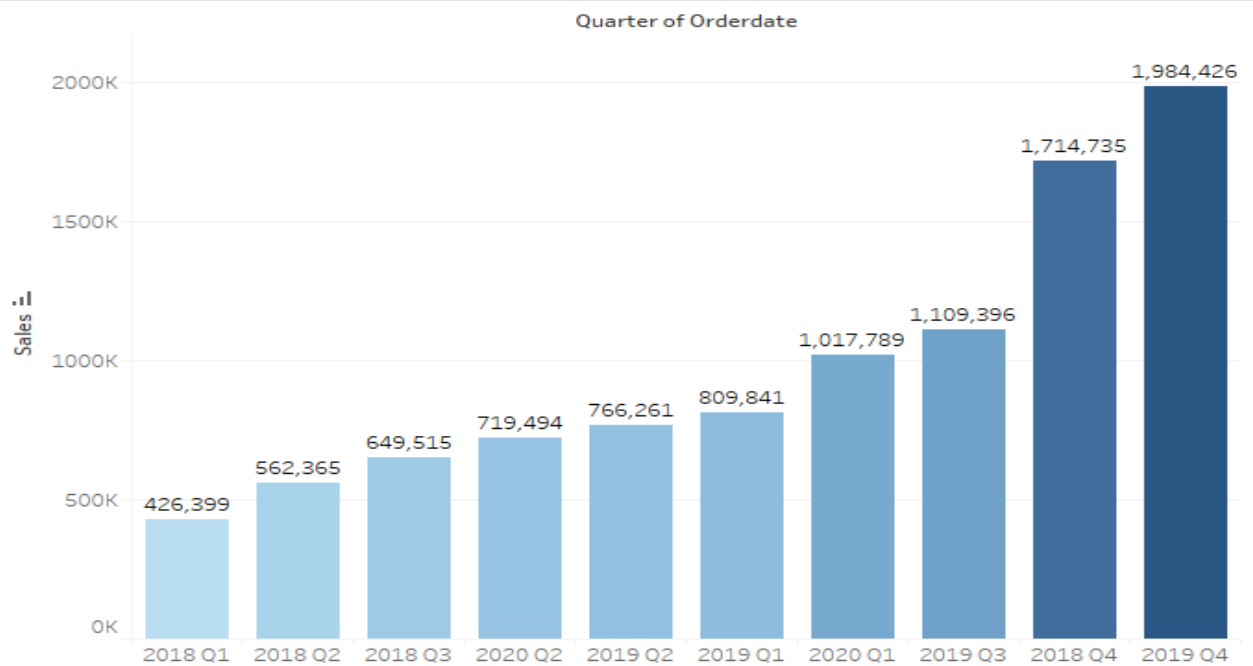
Yearly Trends in Sales

We analyzed sales trends annually to identify growth or decline over the three-year period.

year wise sale
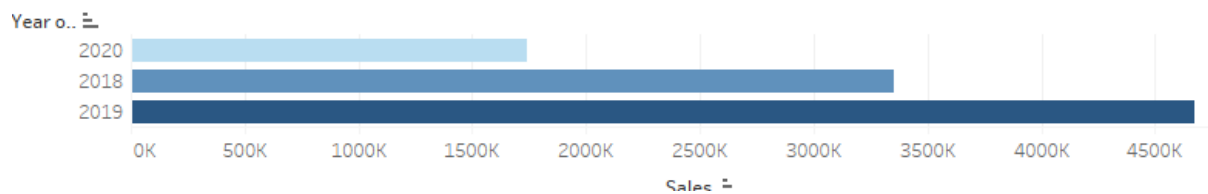
Sales Across Different Categories

We examined sales performance across different product categories to identify top-selling items and opportunities for marketing strategies.
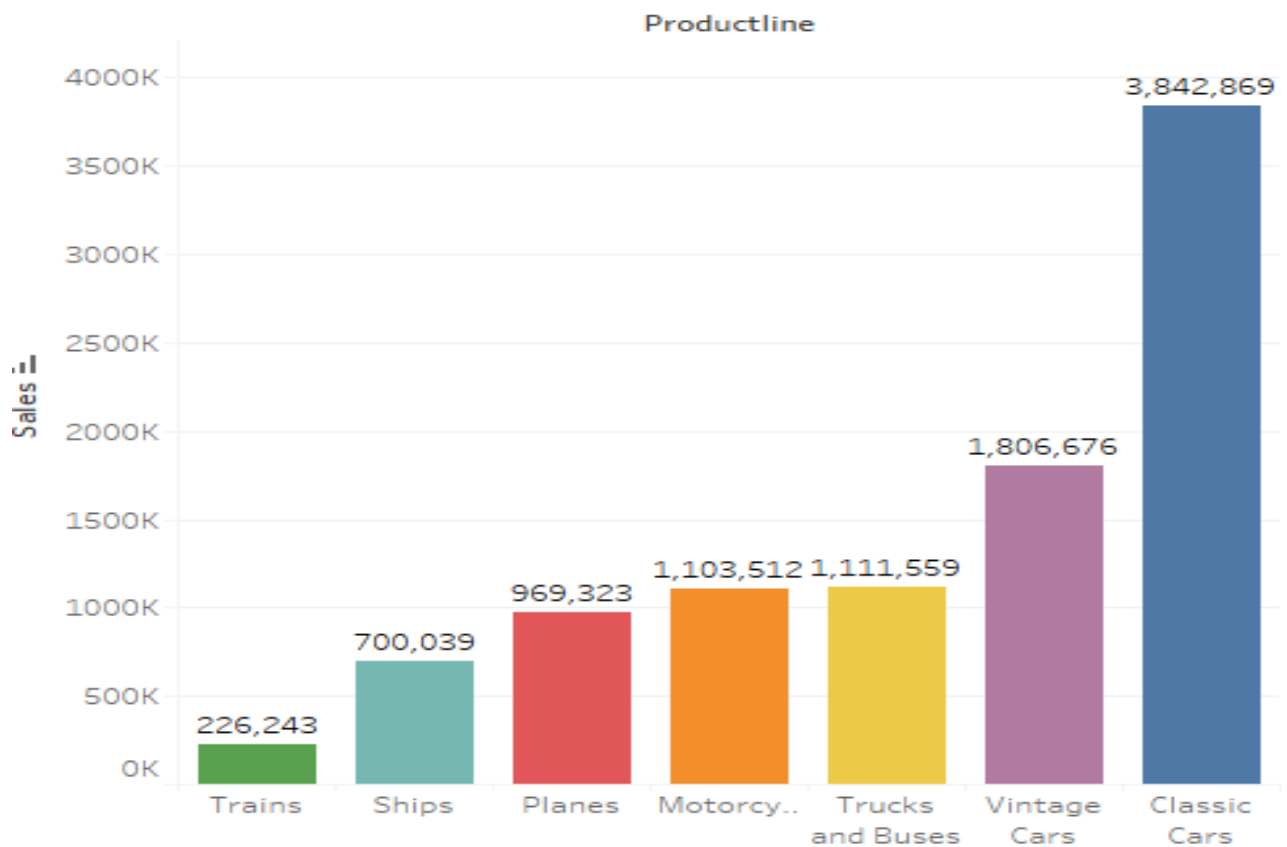
Customer Segmentation using RFM Analysis

We used RFM analysis to segment customers based on recency, frequency, and monetary value of their transactions.

What is RFM?

RFM stands for Recency, Frequency, and Monetary Value. It is a method used for analyzing customer value based on their transaction history.

Parameters Used and Assumptions Made

We used the following parameters: recency (days since last order), frequency (number of orders), and monetary value (total sales amount).

Showcase of KNIME Workflow Image

Excel Reader

Node 1

Math Formula

MONETARY

GroupBy

FREQUENCY

Auto-Binner

Node 5

Cell Replacer (deprecated)

Node 6

Cell Replacer (deprecated)

Node 8

Cell Replacer (deprecated)

Node 9

Excel Writer

Node 10

Table Creator

Node 7
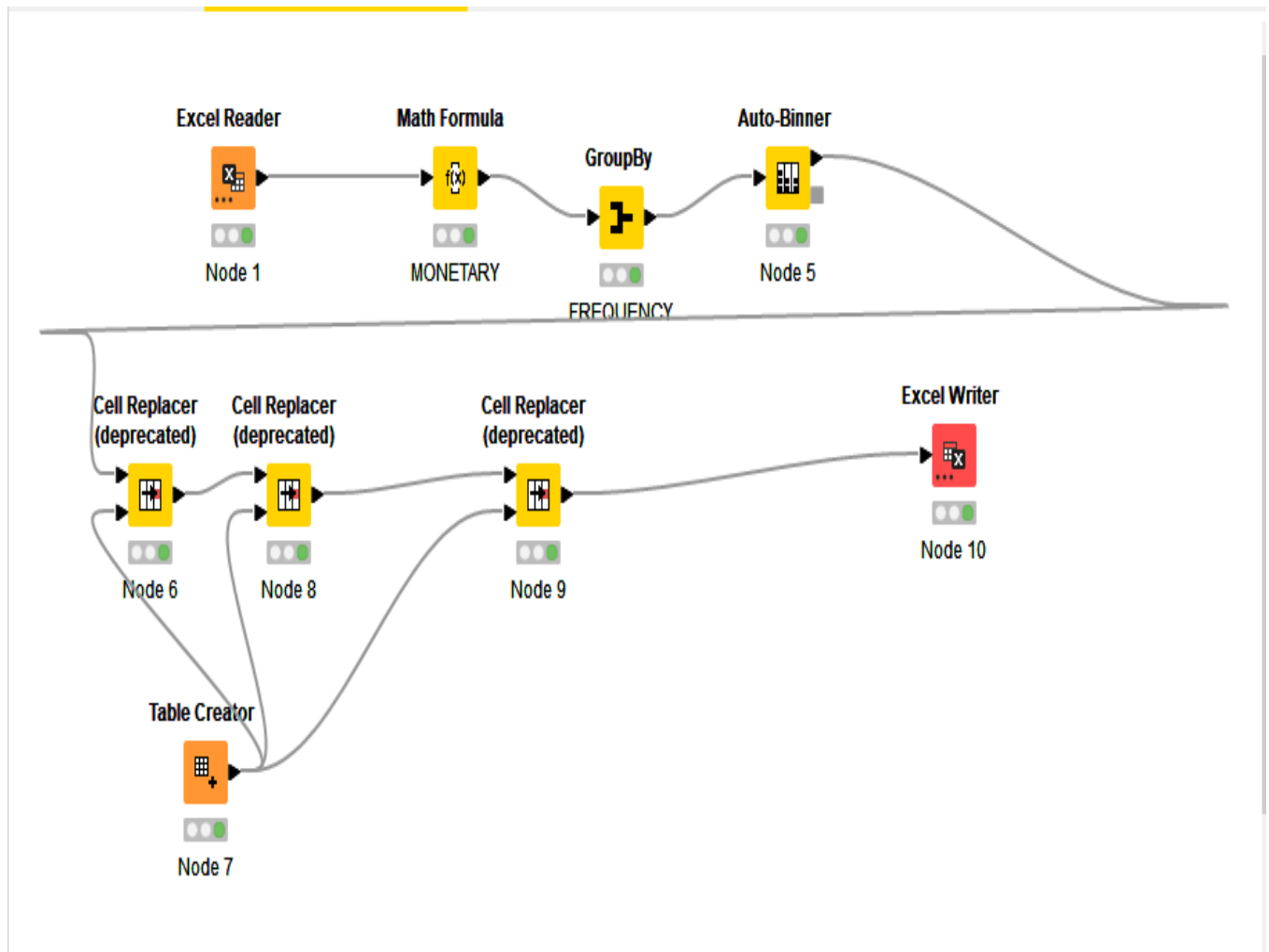
Results in the Output Table Head

CUSTOM	ORDERN	QUANTIT	PRICEEA	ORDERL	SALES	DAYS_S	STATUS	PRODUC	MSRP	PRODUC	PHONE	ADDRES	CITY	POSTAL	COUNTR	CONTAC	CONTAC	DEALSIZ	MONETA	ORDERNUMB	MONETARY	RECENCY_HI	MONETARY_HML	FREQUENCY_HML
AV Store	51	34.863	91.085	9.0196	3094.3	1803.8	Shipped	Classic C	92.843	S12_110E	(171) 555	Fauntlerc	Manches	EC2 5NT	51	Ashworth	Victoria	Medium	157808	Bin 4	Bin 4	Very Low	High	High
Alpha Co	20	34.35	101.16	4.95	3524.4	2236.2	Shipped	Classic C	97.15	S10_475	61.77.65	1 rue Alsa	Toulouse	31000	20	Roulet	Annette	Medium	70488	Bin 1	Bin 1	High	Very Low	Very Low
Amica Mc	26	32.423	110.85	7.6154	3619.9	1318.6	Shipped	Classic C	107.65	S10_194	011-4988	Via Mont	Torino	10100	26	Accorti	Paolo	Large	94117	Bin 2	Bin 3	Low	Moderate	Low
Anna's D	46	31.935	106.42	6.4348	3347.7	1463.6	Shipped	Classic C	104.72	S10_194	02 9936	201 Miller	North Syc	2060	46	O'Hara	Anna	Small	153996	Bin 4	Bin 4	Very Low	High	High
Atelier gr	7	38.571	92.239	2	3454.3	1424.4	Shipped	Motorcyc	95.571	S10_201	40.32.25	54, rue R	Nantes	44000	7	Schmitt	Carine	Medium	24180	Bin 1	Bin 1	High	Very Low	Very Low
Australiai	23	30.652	90.042	6.6957	2808.3	1689.7	Shipped	Vintage C	88.13	S18_134	61-9-384	7 Allen St	Glen Wav	3150	23	Connery	Sean	Medium	64591	Bin 2	Bin 1	High	Very Low	Low
Australiai	55	35.018	104.59	7.0364	3654.5	1638.8	Shipped	Motorcyc	103.53	S10_167	03 9520	636 St Ki	Melbourr	3004	55	Ferguson	Peter	Medium	200995	Bin 4	Bin 4	Very Low	High	High
Australiai	15	36.333	110.55	3.0667	3964.6	1349.1	Shipped	Classic C	111.53	S10_194	61-7-384	31 Dunca	South Bri	4101	15	Calaghar	Tony	Large	53469	Bin 1	Bin 1	High	Very Low	Very Low
Auto Ass	18	35.389	99.488	8.5556	3601.9	1266.3	Shipped	Classic C	100.39	S10_194	30.59.85	67, aven	Versaille	78000	18	Tonini	Daniel	Large	64834	Bin 1	Bin 1	High	Very Low	Very Low
Auto Can	27	37.074	94.255	6.3333	3450.8	1763.4	Shipped	Motorcyc	94.852	S10_167	(1) 47.55	25, rue L	Paris	75016	27	Perrier	Dominiqu	Medium	93171	Bin 3	Bin 3	Low	Moderate	Moderate
Auto-Mo	8	35.875	92.8	2	3309.9	2281.8	Shipped	Ships	87.375	S18_302	6175558	16780 Pc	Brickhav	58339	8	Taylor	Leslie	Medium	26479	Bin 1	Bin 1	High	Very Low	Very Low
Baane M	32	33.813	108.57	6.3438	3643.7	1805.8	Shipped	Motorcyc	107.47	S10_167	07-98 95	Erling Sk	Stavern	4110	32	Bergulfse	Jonas	Medium	116539	Bin 3	Bin 3	Low	Moderate	Moderate
Bavarian	14	28.643	84.289	7.5	2499.6	2239.4	Shipped	Planes	82.714	S18_166	+49 89 6	Hansastr	Munich	80686	14	Donnerm	Michael	Medium	34994	Bin 1	Bin 1	High	Very Low	Very Low
Blauer Se	22	36.864	108.03	3.8636	3871.4	1697.3	Shipped	Classic C	105.82	S12_109	+49 69 6	Lyonerst	Frankfurt	60528	22	Keitel	Roland	Medium	85172	Bin 2	Bin 2	Moderate	Low	Low
Boards &	3	34	89.807	1.3333	3043.1	1968.7	Shipped	Classic C	92.333	S12_338	3105552	4097 Do	Glendale	92561	3	Young	Leslie	Medium	9129.4	Bin 1	Bin 1	High	Very Low	Very Low
CAF Impc	13	36	104.96	5.3077	3818.6	2273	Shipped	Classic C	106.92	S12_110E	+34 913 7	Merchan	Madrid	28023	13	Fernande	Jesus	Large	43642	Bin 1	Bin 1	High	Very Low	Very Low
Cambridg	11	32.455	101.33	3.2727	3287.6	1788.2	Shipped	Classic C	97.364	S10_194	6175555	4658 Bac	Cambridg	51247	11	Tseng	Kyung	Medium	36164	Bin 1	Bin 1	High	Very Low	Very Low
Canadiar	22	31.955	105.34	6	3420	1620	Shipped	Classic C	106.41	S10_194	(604) 555	1900 Oak	Vancouv	V3F 2K1	22	Tannamu	Yoshi	Large	75239	Bin 2	Bin 2	Moderate	Low	Low
Classic G	21	31.81	103.32	5.8571	3214.6	1668.1	Shipped	Classic C	102.48	S10_194	2155554	782 First	Philadelp	71270	21	Cervante	Francisco	Medium	67507	Bin 2	Bin 1	High	Very Low	Low
Classic L	20	36	109.8	4.05	3889.8	1931.6	Shipped	Classic C	106.65	S10_194	2155558	5905 Por	NYC	10022	20	Hernand	Maria	Medium	77795	Bin 1	Bin 2	Moderate	Low	Very Low
Clover Co	16	30.625	112.87	4.5625	3609.8	1939.1	Shipped	Classic C	106.88	S12_110E	+353 186	25 Maide	Dublin	2	16	Cassidy	Dean	Large	57756	Bin 1	Bin 1	High	Very Low	Very Low
Collectab	25	38.16	91.535	7.96	3493.6	2182.1	Shipped	Classic C	93.12	S10_475	7605558	361 Furth	San Dieg	91217	25	Thompso	Valarie	Medium	87489	Bin 2	Bin 2	Moderate	Low	Low
Collectab	24	33.125	97.237	4.875	3399.1	1546.1	Shipped	Classic C	99.458	S10_194	6175558	7825 Do	Brickhav	58339	24	Nelson	Allen	Medium	81578	Bin 2	Bin 2	Moderate	Low	Very Low
Corrida A	32	36.344	105.18	6.7813	3769.2	1761.2	Shipped	Classic C	102.63	S10_194	(91) 555 2	C/ Araqui	Madrid	28023	32	Sommer	Martjn	Large	120615	Bin 3	Bin 4	Very Low	High	Moderate
Cruz & Sc	26	36.962	96.08	6.4231	3616	2080	Shipped	Classic C	97.962	S12_109	+63 2 55	15 McCal	Makati Ci	1227 MM	26	Cruz	Arnold	Medium	94016	Bin 2	Bin 3	Low	Moderate	Low
Daedalus	20	34.95	95.474	6.3	3452.6	1875.6	Shipped	Motorcyc	94.5	S10_167	20.16.15	184, cha	Lille	59000	20	Rance	Martine	Small	69052	Bin 1	Bin 1	High	Very Low	Very Low
Danish W	36	36.528	108.04	5.5833	4028.9	1924.8	Shipped	Classic C	106.42	S10_475	31 12 355	Vinb'tet	Kobenha	1734	36	Petersen	Jytte	Large	145042	Bin 4	Bin 4	Very Low	High	High
Diecast C	31	35.839	108.57	5.6129	3939.9	1378.6	Shipped	Motorcyc	106.58	S10_167	2155551	7586 Por	Allentow	70267	31	Yu	Kyung	Medium	122138	Bin 3	Bin 4	Very Low	High	Moderate
Diecast C	18	38.611	101.78	7.7222	3936.7	1836.1	Shipped	Classic C	103.72	S10_496	6175552	6251 Ingl	Boston	51003	18	Franco	Valarie	Medium	70860	Bin 1	Bin 2	Moderate	Low	Very Low
Double D	12	29.75	99.108	4.25	3001.6	2014.6	Shipped	Classic C	93.25	S10_475	(171) 555	120 Hanc	London	WA1 1DP	12	Hardy	Thomas	Medium	36019	Bin 1	Bin 1	High	Very Low	Very Low
Dragon S	43	35.442	113.11	7.3721	4023	1840.5	Shipped	Classic C	113.44	S10_194	+65 221 7	Bronz So	Singapor	79903	43	Natividac	Eric	Large	172990	Bin 4	Bin 4	Very Low	High	High
Enaco Di	23	38.348	88.783	6.1739	3409.2	2483.9	Shipped	Classic C	87.087	S10_475	(93) 203	Rambla c	Barcelon	8022	23	Saavedr	Eduardo	Medium	78412	Bin 2	Bin 2	Moderate	Low	Low
Euro Sho	259	36.012	97.383	6.4247	3522.4	1791.1	Disputed	Motorcyc	97.015	S10_167	(91) 555 9	C/ Moralz	Madrid	28034	259	Freyre	Diego	Large	912294	Bin 4	Bin 4	Very Low	High	High

Inferences from RFM Analysis and Identified Segments

Based on RFM analysis, we identified segments of customers with different characteristics and behaviors.

Best Customers (Top 10)

TOP 10 CUSTOMER

Customername	
Mini Caravy	4,233.6
La Corne D'abondance, Co.	4,226.2
Royale Belge	4,180.0
Muscle Machine Inc	4,119.5
Gift Depot Inc.	4,075.8
UK Collectables, Ltd.	4,069.3
Super Scale Inc.	4,674.8
Danish Wholesale Imports	4,028.9
Dragon Souveniers, Ltd.	4,023.0
The Sharp Gifts Warehouse	4,000.3

Lost Customers (Top 10)

LOST COSTUMER

Customername	Frequenc.. Very Low
Alpha Cognac	Abc
Atelier graphique	Abc
Australian Gift Network, ..	Abc
Auto Assoc. & Cie.	Abc
Auto-Moto Classics Inc.	Abc
Bavarian Collectables Imp..	Abc
Boards & Toys Co.	Abc
CAF Imports	Abc
Cambridge Collectables Co.	Abc
Classic Legends Inc.	Abc

Loyal Customers (Top 10)

LOYEL COSTUMER

Customername	Recency .. High
Alpha Cognac	Abc
Atelier graphique	Abc
Australian Collectables, L..	Abc
Australian Gift Network, ..	Abc
Auto Assoc. & Cie.	Abc
Auto-Moto Classics Inc.	Abc
Bavarian Collectables Imp..	Abc
Boards & Toys Co.	Abc
CAF Imports	Abc
Cambridge Collectables Co.	Abc