

MRA PROJECT

PART A

FASNA
02/06/2024

TABLEAU PUBLIC LINK FOR EDA WORK

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1-Problem statement

An automobile parts manufacturing company has collected data on transactions for 3 years. They do not have any in-house data science team, thus they have hired you as their consultant. Your job is to use your data science skills to find the underlying buying patterns of the customers, provide the company with suitable insights about their customers, and recommend customized marketing strategies for different segments of customers.

2-Summary OF Data

- Dataset: The dataset consists of 20 columns and 2747 rows.
- Time Frame: Data from the past 3 years.
- Data Quality: No missing values or duplicate values. Some columns have a few outliers.
- The EDA and insights reveal a comprehensive understanding of the data, emphasizing significant sales trends and patterns.

- RFM analysis segmented the customers into four categories based on their purchasing behavior, and tailored marketing strategies have been suggested for each segment.
- The presentation wraps up with recommendations for the company to strengthen customer relationships and foster business growth.

3 - Data Dictionary

Column Name	Description
ORDERNUMBER	This column represents the unique identification number assigned to each order.
QUANTITYORDERED	It indicates the number of items ordered in each order.
PRICEEACH	This column specifies the price of each item in the order.
ORDERLINENUMBER	It represents the line number of each item within an order.
SALES	This column denotes the total sales amount for each order, which is calculated by multiplying the quantity ordered by the price of each item.
ORDERDATE	It denotes the date on which the order was placed.
DAYS_SINCE_LASTORDER	This column represents the number of days that have passed since the last order for each customer. It can be used to analyze customer purchasing patterns.
STATUS	It indicates the status of the order, such as "Shipped," "In Process," "Cancelled," "Disputed," "On Hold," " or "Resolved"
PRODUCTLINE	This column specifies the product line categories to which each item belongs.

MSRP	It stands for Manufacturer's Suggested Retail Price and represents the suggested selling price for each item.
PRODUCTCODE	This column represents the unique code assigned to each product.
CUSTOMERNAME	It denotes the name of the customer who placed the order.
PHONE	This column contains the contact phone number for the customer.
ADDRESSLINE1	It represents the first line of the customer's address.
CITY	This column specifies the city where the customer is located.
POSTALCODE	It denotes the postal code or ZIP code associated with the customer's address.
COUNTRY	This column indicates the country where the customer is located.
CONTACTLASTNAME	It represents the last name of the contact person associated with the customer.
CONTACTFIRSTNAME	This column denotes the first name of the contact person associated with the customer.
DEALSIZE	It indicates the size of the deal or order, which are the categories "Small," "Medium," or "Large."

Table-1-Data Dictionary

4-Statistical summary

	count	mean	std	min	25%	50%	75%	max
ORDER NUMBER	2747.0	10259.761558	91.877521	10100.00	10181.000	10264.00	10334.500	10425.00
QUANTITY ORDERED	2747.0	35.103021	9.762135	6.00	27.000	35.00	43.000	97.00
PRICE EACH	2747.0	101.098951	42.042548	26.88	68.745	95.55	127.100	252.87
ORDER LINE	2747.0	6.491081	4.230544	1.00	3.000	6.00	9.000	18.00
SALES	2747.0	3553.047583	1838.953901	482.13	2204.350	3184.80	4503.095	14082.80
DAYS_SINCE_LASTORDER	2747.0	1757.085912	819.280576	42.00	1077.000	1761.00	2436.500	3562.00
MSRP	2747.0	100.691664	40.114802	33.00	68.000	99.00	124.000	214.00

Table-2-Statistical summary

5-Descriptions about Data

Average Items Ordered per Sales Order:

Average: 35

Standard Deviation: 9.76

Interpretation: On average, each sales order contains approximately 35 items, with a relatively low variation around this mean.

Average Price of Each Item:

Average: \$101.09

Standard Deviation: \$42.04

Interpretation: The typical price for each item sold is around \$101.09, with some variability in prices across different items.

Average Sales Amount per Order:

Average: \$3553.05

Standard Deviation: \$1838.95

Interpretation: The average sales revenue generated per order is approximately \$3553.05, with a considerable variation around this mean, indicating differing order sizes and pricing structures.

Average Time Since Last Order:

Average: 1757.09 days

Standard Deviation: 819.28 days

Interpretation: Customers, on average, make a new order after approximately 1757.09 days, with some variability in the frequency of orders among customers.

Summary Statistics Assessment:

Interpretation: The summary statistics do not reveal any significant anomalies or irregularities in the data. The averages and standard deviations seem reasonable and align with expectations for sales order data, suggesting that the dataset is consistent and reliable for analysis.

6-EDA & Insights

Uni variate Analysis

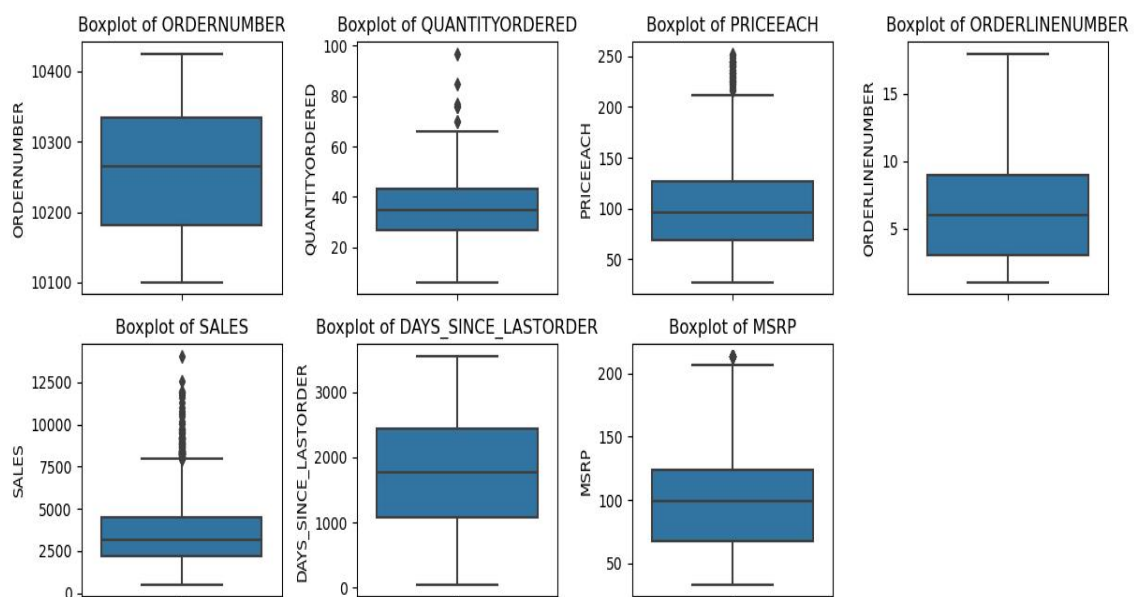


Figure-1-Boxplot

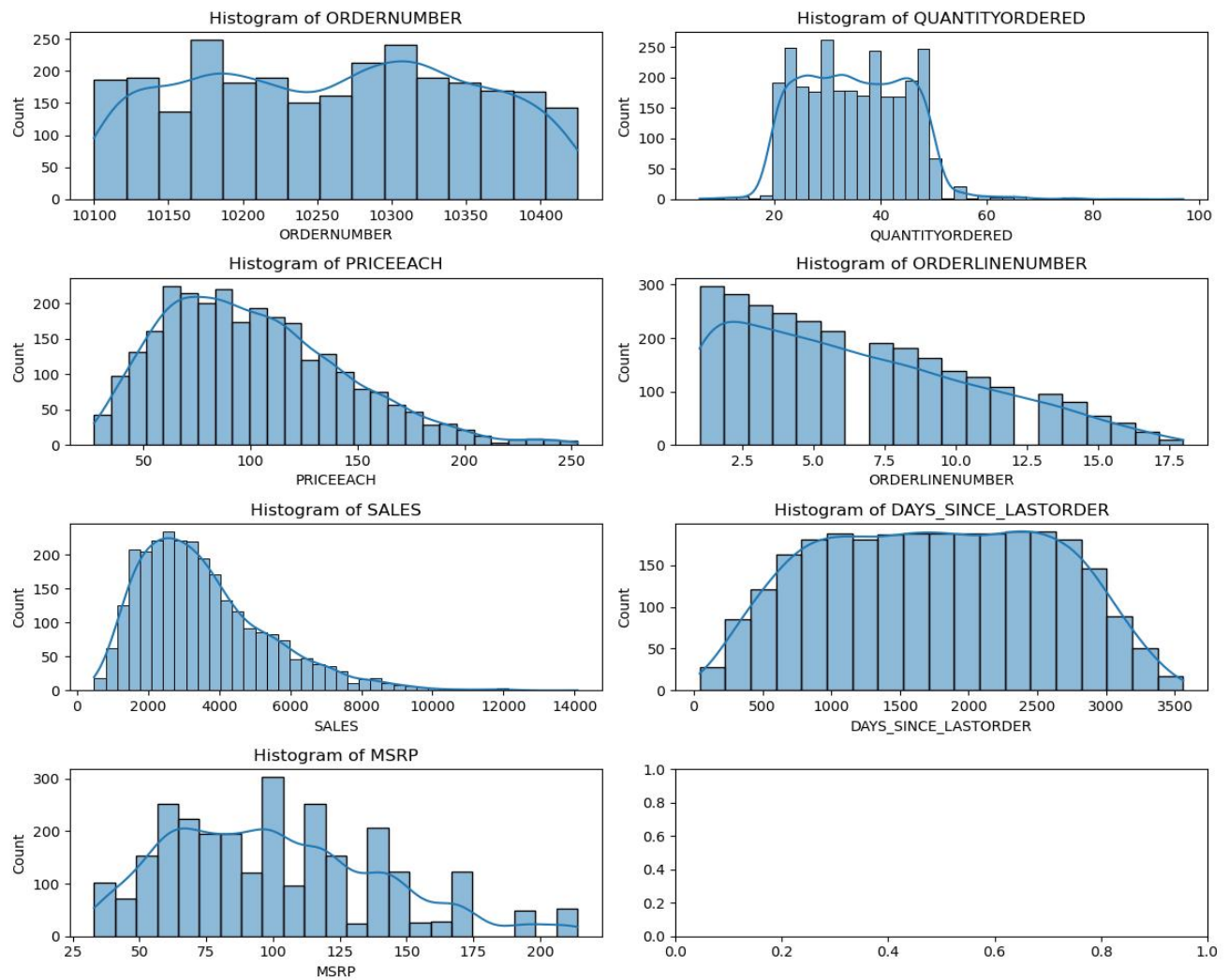


Figure-2-Histogram

- The sales data is skewed to the left.
There are many outliers in the sales data.
Most of the sales amounts are between \$1,500 and \$3,500.
- Outliers are present in the MRSP data.
The MRSP data is skewed to the left.
- Outliers are present in the data of Quantity Ordered.
- Outliers are present in the price data.

Bi variate analysis

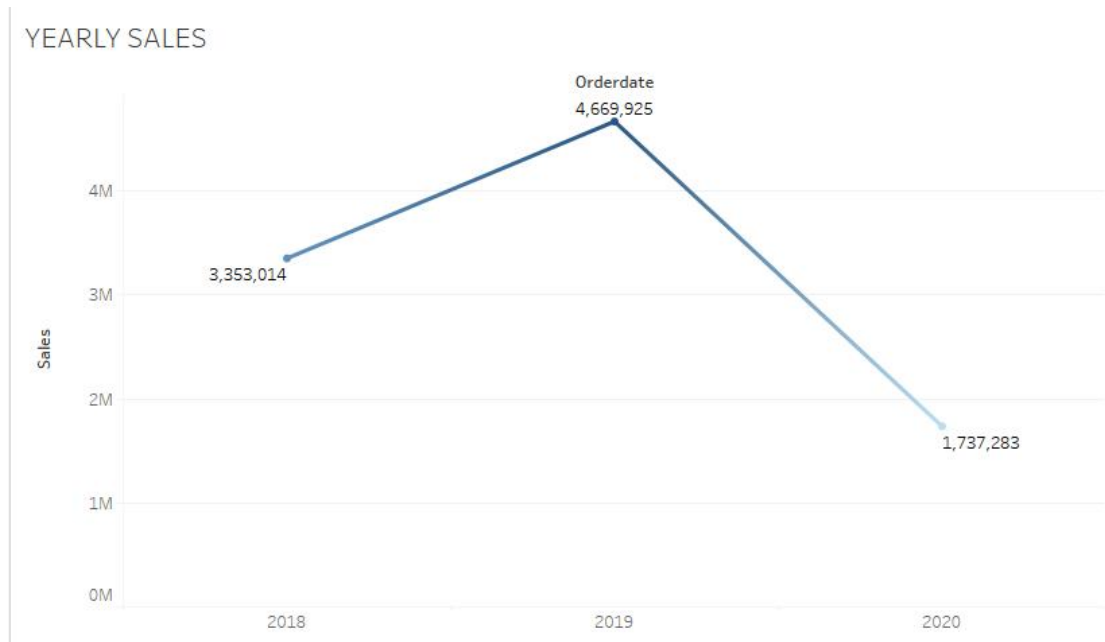


FIGURE-3-YEARLY SALES

- There is a noticeable dip in the yearly sales
- Collect detailed sales data over multiple years to identify trends.

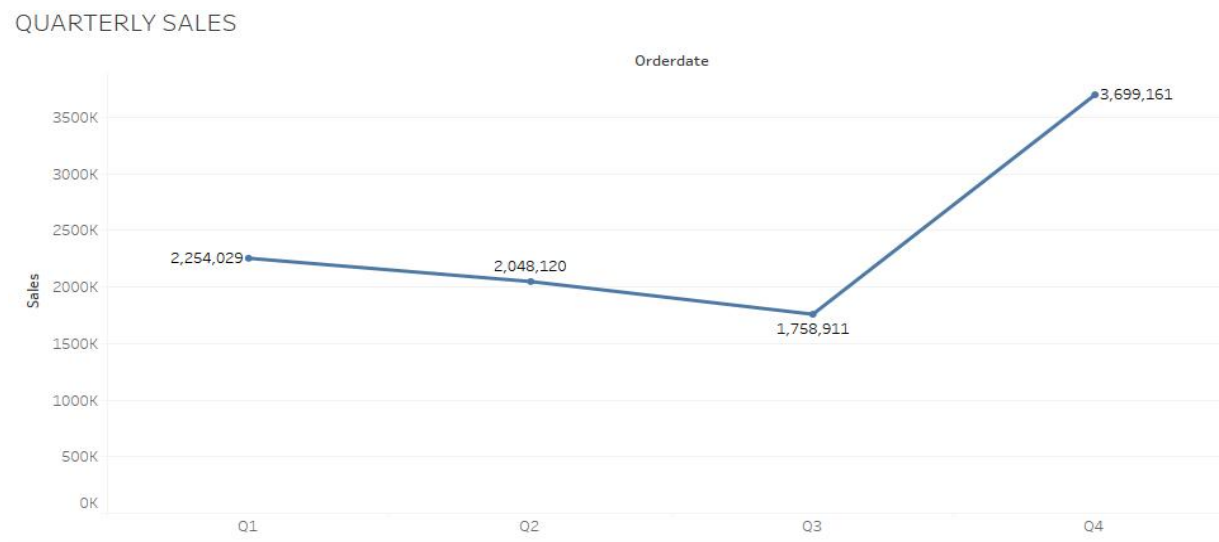


FIGURE-4-QUARTERLY SALES

- Sales are significantly higher in Q4 compared to other quarters.

MONTHLY SALES

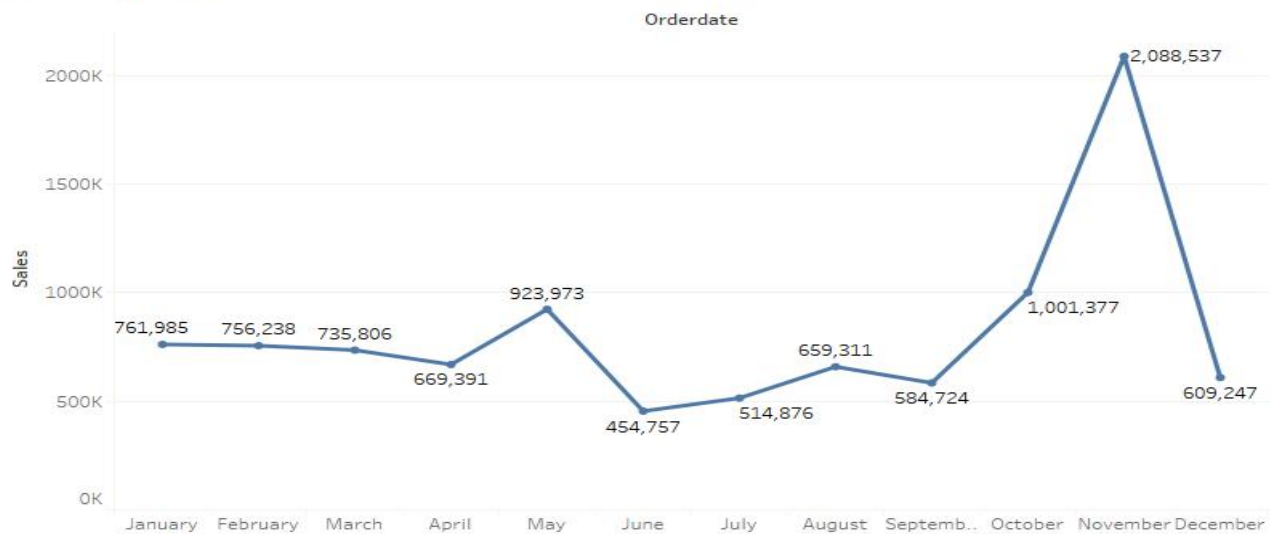


FIGURE-5-MONTHLY SALES

- The highest sales occur in the 11th month.
- The lowest sales occur in the 6th month.
- Sales are consistent in the first four months of the year

DAY SALES

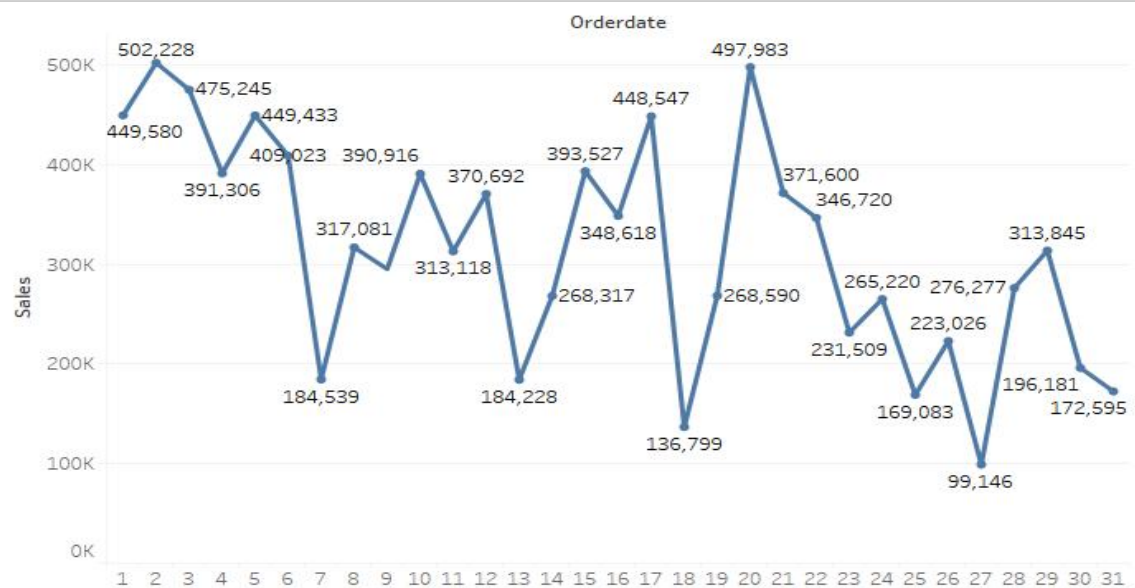


FIGURE-6-DAY SALES

- Sales are higher in the initial days of the month compared to the end days.

Weekday Sales

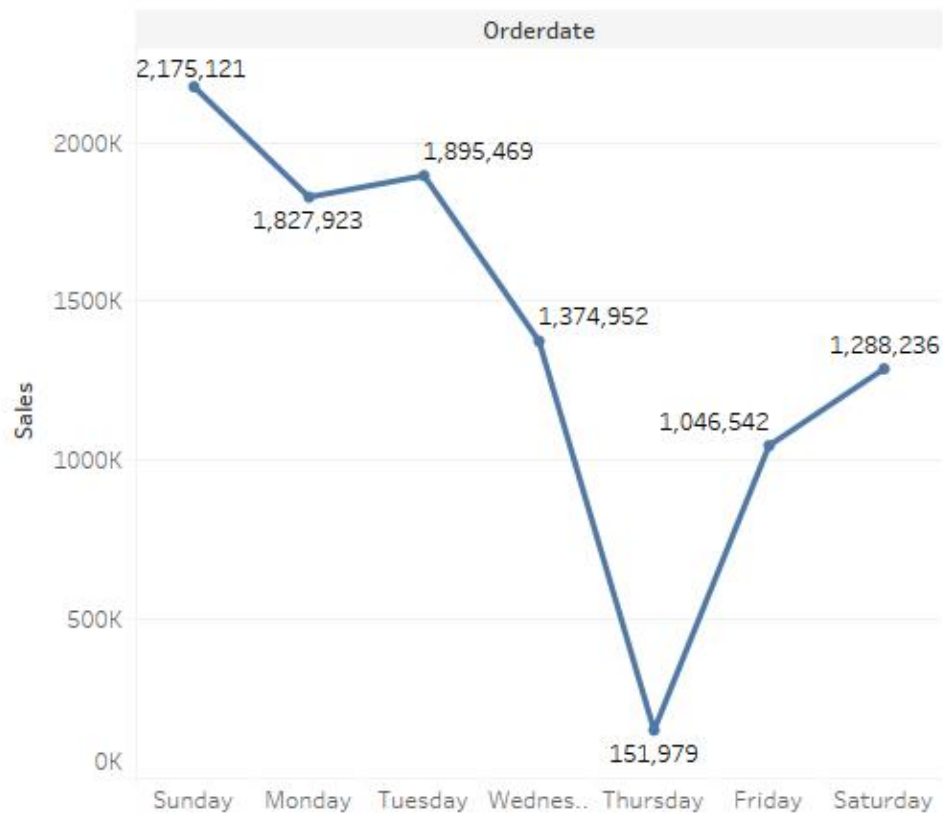


FIGURE-7-WEEK DAY SALES

- Thursday consistently has the lowest sales, while Sunday consistently has the highest sales.
- Sales increase from Friday to Sunday and decrease from Monday to Thursday

multivariate analysis

COUNTRY,STATUS,SALES

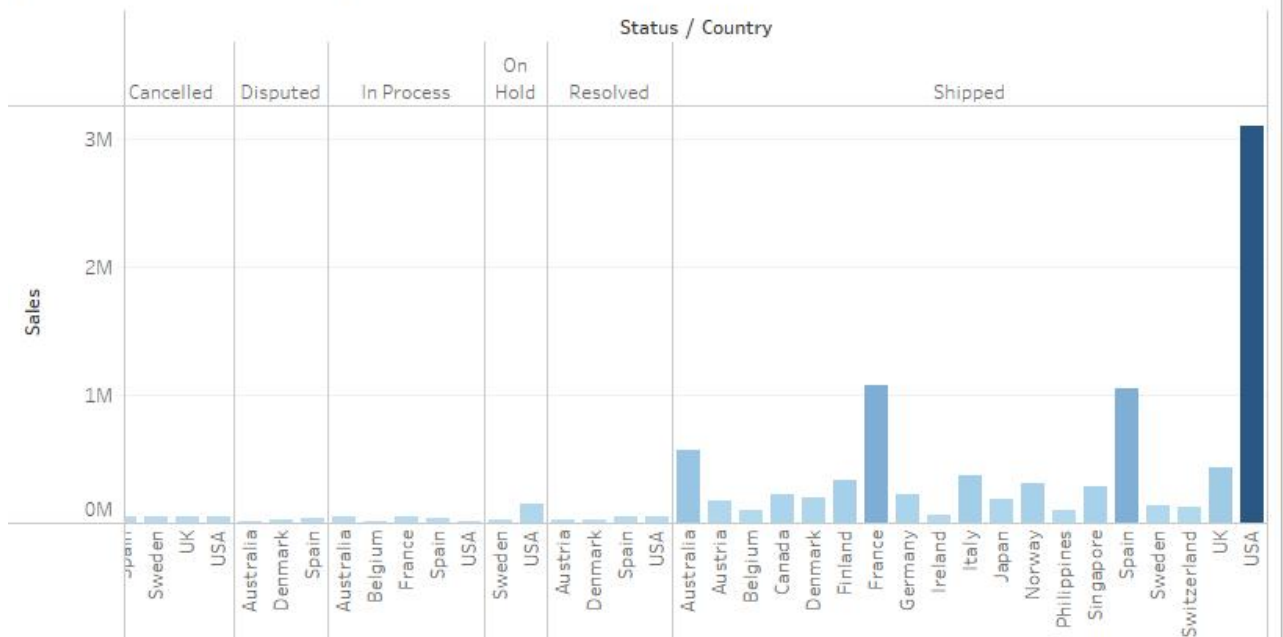


FIGURE-8-COUNTRY,STATUS,SALES

- The majority of orders that are shipped belong to the USA, followed by France.
- The UK, USA, Spain, and Sweden have approximately the same number of canceled orders.
- Spain has the highest number of disputes.
- There seems to be a significant number of orders on hold for the USA.

SHIPPED,SALES,COUNTRY

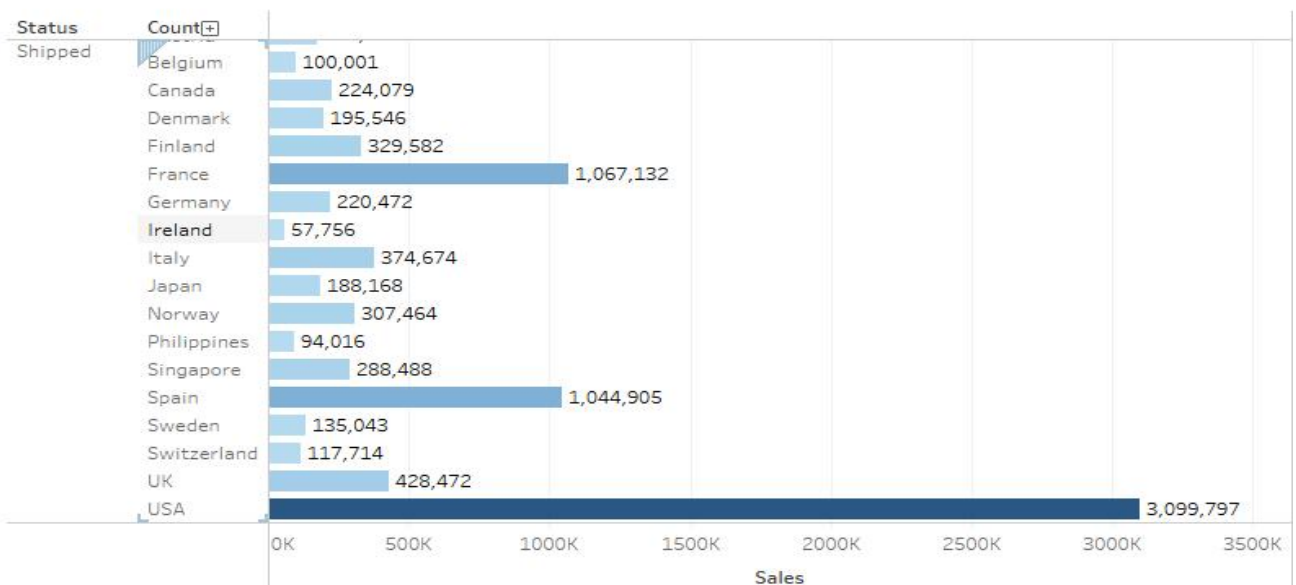


FIGURE-9-SHIPPED,SALES,COUNTRY

- The USA has the highest number of shipped orders.

- Spain and France have approximately the same number of shipped orders.
- Ireland has the least number of shipped orders.

Product&status

Productline	Status					
	Cancelled	Disputed	In Process	On Hold	Resolved	Shipped
Classic Cars	30.46%	36.02%	39.91%	27.40%	17.12%	40.19%
Motorcycles		44.07%		2.79%		11.83%
Planes	18.22%	5.32%		19.40%	22.91%	9.54%
Ships	29.14%	4.25%		13.22%	26.45%	6.40%
Trains	2.61%			3.25%		2.39%
Trucks and Buses			29.73%	11.28%	13.58%	11.40%
Vintage Cars	19.57%	10.34%	30.36%	22.66%	19.94%	18.26%

FIGURE-10-PRODUCT&STATUS

Parts of classic cars have the highest percentage of sales
 Parts of motorcycles are the most disputed category.
 Train parts have the least number of sales.

SALES&CUSTOMERS

Customername	
Euro Shopping Channel	912,294
Mini Gifts Distributors Ltd.	654,858
Australian Collectors, Co.	200,995
Muscle Machine Inc	197,737
La Rochelle Gifts	180,125
Dragon Souveniers, Ltd.	172,990
Land of Toys Inc.	164,069
The Sharp Gifts Warehouse	160,010
AV Stores, Co.	157,808
Anna's Decorations, Ltd	153,996
Souveniers And Things Co.	151,571
Salzburg Collectables	149,799
Danish Wholesale Imports	145,042
Saveley & Henriot, Co.	142,874
L'ordine Souveniers	142,601
Rovelli Gifts	137,956
Reims Collectables	135,043

FIGURE-11-SALES&CUSTOMERS

PRODUCTLINE&DEAL SIZE

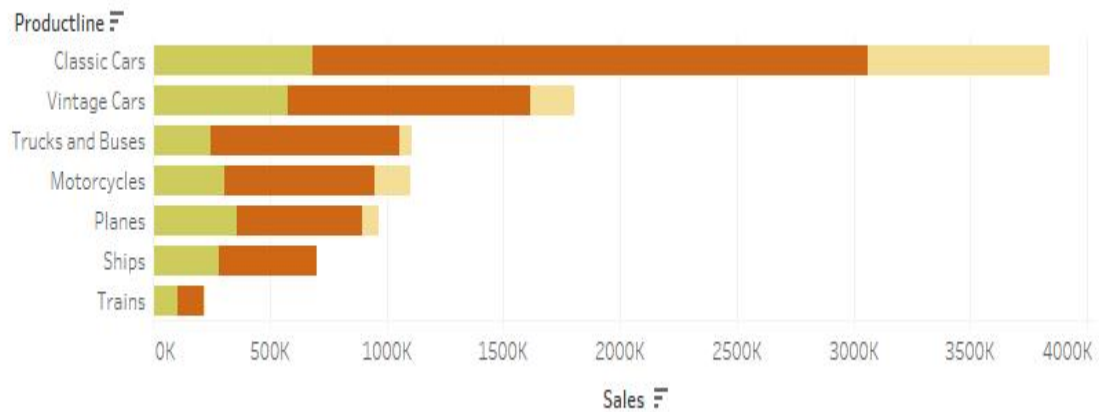


FIGURE-12-PRODUCTLINE&DEAL SIZE

-
- Classic cars have the highest number of sales.
- Trains have the least number of sales.
- Medium deal sizes are the most common.
- Sales of trucks and buses and motorcycle parts are approximately the same.
- Large deal sizes are the least common.

COUNTRY SALES&PRODUCT

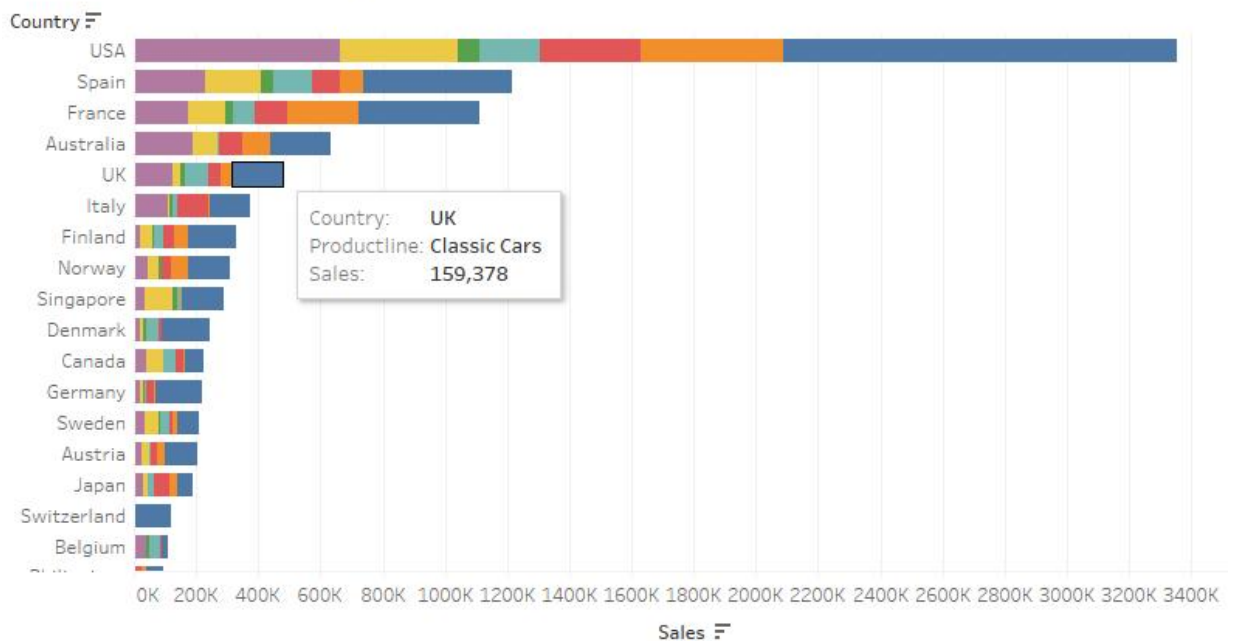


FIGURE-13-COUNTRY SALES &PRODUCT

- Ireland has the least sales volume
- The USA has the highest sales volume.
- Switzerland exclusively deals with classic car parts

STATUS,DEAL SIZE,SALE

Dealsize	Status					
	Cancelled	Disputed	In Process	On Hold	Resolved	Shipped
Large		42,747	27,152	42,941	8,885	1,137,231
Medium	137,575	22,165	83,787	106,342	103,967	5,477,396
Small	56,912	7,301	33,791	29,697	37,867	2,404,467

FIGURE-14-STATUS,DEAL SIZE,SALE

- No orders of the large deal type are canceled
- Most shipped parts belong to the medium deal size type.

PRODUCT_SALES

Classic Cars avg Price of Each: 115.20 Sales : 3,842,869	Motorcycles avg Price of Each: 99.77 Sales : 1,103,512	Trucks and Buses avg Price of Each: 104.34 Sales : 1,111,559
	Planes avg Price of Each: 90.52 Sales : 969,323	Ships avg Price of Each: 88.17 Sales : 700,039
Vintage Cars avg Price of Each: 90.01 Sales : 1,806,676		Trains avg Price of Each: 84.11

FIGURE-15-PRODUCT_SALES

Sales Insights

Annual Sales Trend:

- Yearly sales have dipped overall.

Quarterly Sales Pattern:

Quarter 4 experiences higher sales compared to other quarters.

Monthly Sales Consistency:

Sales are consistent in the first four months of the year.

Daily Sales Pattern:

Thursday records the lowest sales.

Sunday records the highest sales.

Sales trend upward from Friday to Sunday.

Sales trend downward from Monday to Thursday.

Monthly Sales Cycle:

Higher sales are observed at the beginning of the month compared to the end.

Orders on Hold:

Most orders on hold are from the USA.

Some orders on hold are from Sweden.

Canceled Orders:

Spain, USA, UK, and Sweden have approximately the same number of canceled orders.

Disputes:

Spain has the highest number of disputes.

Most disputes are resolved.

Product Category Sales:

Classic car parts have the highest percentage of sales.

Recommendations

Boosting Yearly Sales:

Investigate the causes of the overall dip in yearly sales and address potential issues such as market trends, competition, and customer preferences.

Consider promotional campaigns or discounts in lower-performing quarters to balance the annual sales.

Leveraging Q4 Sales:

Capitalize on the higher sales in Quarter 4 by launching targeted marketing campaigns and stocking up on high-demand products. Analyze the factors contributing to higher Q4 sales and try to replicate those strategies in other quarters.

Enhancing Weekday Sales:

Implement mid-week promotions or special offers to boost sales on low-performing days like Thursday.

Promote weekend deals from Friday to Sunday to maximize the existing upward sales trend.

Monthly Sales Strategy:

Introduce early-month incentives and end-of-month clearances to maintain a steady sales flow throughout the month.

Analyze purchasing behavior to tailor marketing strategies accordingly.

Managing Orders on Hold:

Address the reasons behind the high number of orders on hold in the USA and Sweden to improve order fulfillment rates.

Implement efficient communication and follow-up procedures to reduce hold times.

Reducing Canceled Orders:

Investigate the common reasons for order cancellations in Spain, USA, UK, and Sweden, and implement corrective measures.

Enhance the customer experience by ensuring accurate product descriptions, timely delivery, and excellent customer service.

Resolving Disputes:

Focus on reducing the number of disputes in Spain by improving product quality, delivery, and customer support.

Ensure a robust dispute resolution process to maintain customer satisfaction.

Promoting High-Selling Products:

Focus marketing efforts on classic car parts, given their highest sales percentage.

Explore opportunities to expand the product line or offer bundled deals to increase sales further.

7-Customer Segmentation using RFM

KNIME WORK FLOW

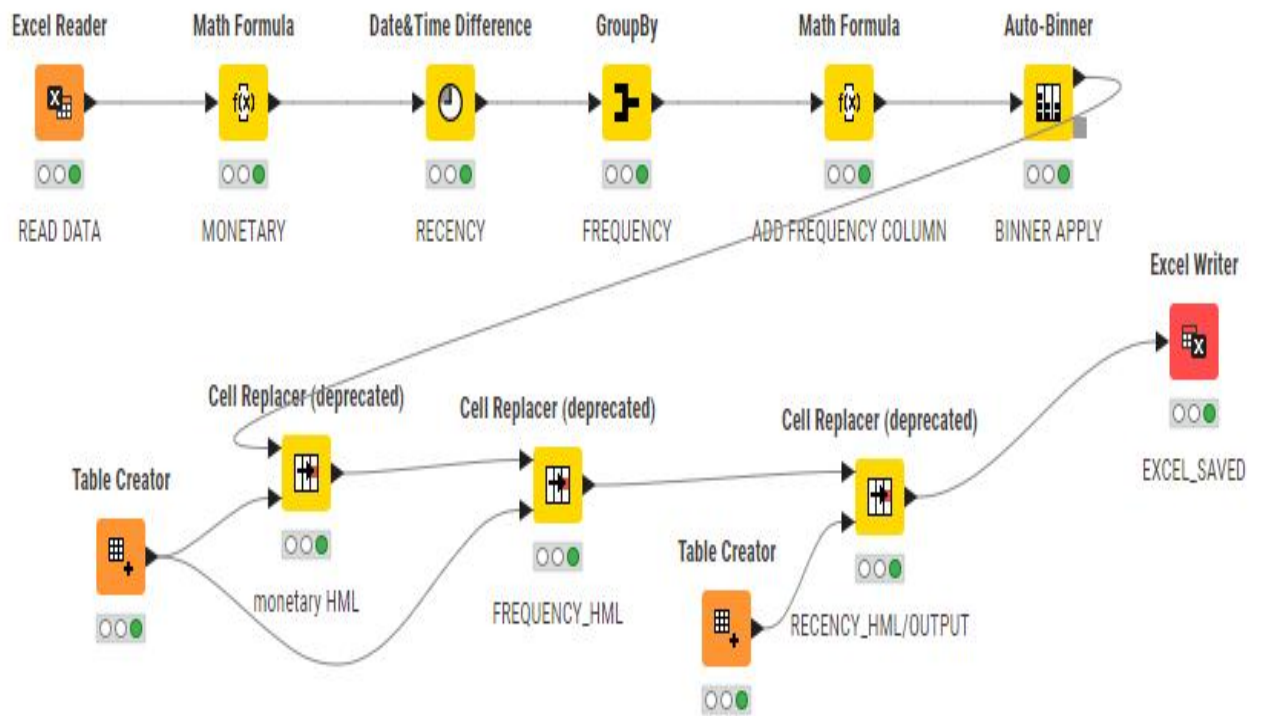


FIGURE-16- KNIME WORKFLOW

FEW ROWS OF OUTPUT

	CUSTOMERNAME	ORDERNUMBER	QUANTITYORDERED	PRICEACCH	ORDERLINENUMBER	SALES	ORDERDATE	DAYS_SINCE_LASTORDER	STATUS	PRODUCTLINE	. . .	DEALSIZE	MONETARY	RECENCY	FREQUENCY	MONETARY [Binned]	RECENCY [Binned]	FREQUENCY [Binned]	MONETARY_HML	RECENCY_HML	
0	AV Stores, Co.	51	34.862745	91.084510	51	157807.81	2019-10-14	51	Shipped	Classic Cars	. . .	51	157807.81	1654	51	Bin 3	Bin 2	Bin 3	H	H	M
1	Alpha Cognac	20	34.350000	101.160000	20	7048.4	2018-11-08	20	Shipped	Classic Cars	. . .	20	7048.44	1522	20	Bin 1	Bin 1	Bin 1	L	L	H
2	Amica Models & Co.	26	32.423077	110.852692	26	9411.26	2019-08-17	26	Shipped	Classic Cars	. . .	26	9411.26	1723	26	Bin 2	Bin 3	Bin 2	M	M	L

TABLE-3-FIRST 3 ROWS OF RFM OUTPUT

8-Inferences and Identified Segments

Best Customers

Criteria: High FREQUENCY and MONETARY scores but low RECENCY scores.

	CUSTOMERNAME	MONETARY_HML	FREQUENCY_HML	RECENCY_HML
26	Danish Wholesale Imports	H	H	H
32	Euro Shopping Channel	H	H	H
41	L'ordine Souvenirs	H	H	H
43	La Rochelle Gifts	H	H	H
53	Mini Gifts Distributors Ltd.	H	H	H
63	Reims Collectables	H	H	H
67	Salzburg Collectables	H	H	H
72	Souvenirs And Things Co.	H	H	H
78	The Sharp Gifts Warehouse	H	H	H

TABLE-4-Best Customers

Customers on the Verge of Churning

Criteria: High FREQUENCY and MONETARY scores but low RECENCY scores.

	CUSTOMERNAME	MONETARY_HML	FREQUENCY_HML	RECENCY_HML
2	Amica Models & Co.	M	M	L
21	Collectable Mini Designs Co.	M	M	L
39	Herkku Gifts	M	M	L
47	Marta's Replicas Co.	M	M	L
56	Norway Gifts By Mail, Co.	M	M	L
65	Royal Canadian Collectables, Ltd.	M	M	L
68	Saveley & Henriot, Co.	H	H	L
84	Vida Sport, Ltd	M	M	L

TABLE-5-Customers on the Verge of Churning

Loyal Customers¶

#Criteria: High FREQUENCY scores.

	CUSTOMERNAME	MONETARY_HM L	FREQUENCY_HML	RECENCY_HML
0	AV Stores, Co.	H	H	M
3	Anna's Decorations, Ltd	H	H	M
6	Australian Collectors, Co.	H	H	M
26	Danish Wholesale Imports	H	H	H
30	Dragon Souvenirs, Ltd.	H	H	M
32	Euro Shopping Channel	H	H	H
37	Handji Gifts& Co	M	H	H
41	L'ordine Souvenirs	H	H	H
43	La Rochelle Gifts	H	H	H
44	Land of Toys Inc.	H	H	M
52	Mini Creations Ltd.	M	H	M
53	Mini Gifts Distributors Ltd.	H	H	H
55	Muscle Machine Inc	H	H	M
57	Online Diecast Creations Co.	H	H	M
63	Reims Collectables	H	H	H
64	Rovelli Gifts	H	H	M
67	Salzburg Collectables	H	H	H
68	Saveley & Henriot, Co.	H	H	L
69	Scandinavian Gift Ideas	H	H	M
72	Souvenirs And Things Co.	H	H	H
76	Technics Stores Inc.	H	H	M
78	The Sharp Gifts Warehouse	H	H	H

TABLE-6-Loyal Customers

Lost Customers

Criteria: Low RECENCY,FREQUENCY, and MONETARY scores.

	CUSTOMERNAME	MONETARY_HML	FREQUENCY_HML	RECENCY_HML
8	Auto Assoc. & Cie.	L	L	L
12	Bavarian Collectables Imports, Co.	L	L	L
15	CAF Imports	L	L	L
16	Cambridge Collectables Co.	L	L	L
20	Clover Collections, Co.	L	L	L
25	Daedalus Designs Imports	L	L	L
29	Double Decker Gift Stores, Ltd	L	L	L
40	Iberia Gift Imports, Corp.	L	L	L
58	Online Mini Collectables	L	L	L
59	Osaka Souvenirs Co.	L	L	L
70	Signal Collectibles Ltd.	L	L	L
87	West Coast Collectables Co.	L	L	L

TABLE-7-Lost Customers

[https://public.tableau.com/app/profile/fasna.p/viz/Fasna_MRA_PART_A_24/SALE
SCUSTOMERS](https://public.tableau.com/app/profile/fasna.p/viz/Fasna_MRA_PART_A_24/SALE%20CUSTOMERS)