

# Capstone Project-Retail Analysis



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Project Overview

Customer Analysis

Sales Analysis

Product Analysis

Demographical Analysis

The Project Overview for the Retail Analysis is a comprehensive and insightful analysis done to analyze various aspects of the retail business. It focuses on four key areas: Sales Analysis, Product Analysis, Customer Analysis, and Demographic Analysis.

The Customer Analysis section provides insights into customer behavior and preferences. It includes metrics like customer demographics, purchase frequency, and customer Loyalty. By segmenting customers based on buying patterns, retailers can tailor marketing campaigns and enhance customer retention strategies.

The Sales Analysis section of the Retail Analysis provides a detailed overview of the retail business's sales performance. It includes key metrics such as total revenue, sales trends over time, and sales by product categories. Users can drill down into sales data to identify top-selling products, best-performing regions, and peak sales periods.

The Product Analysis section focuses on understanding product performance and trends. It showcases product sales, inventory levels, and customer feedback for each product category. This analysis enables retailers to make data-driven decisions about product assortment, pricing, and marketing strategies.

This section focuses on understanding the customer demographics. It presents visualizations of customer age groups, gender distribution, and geographic locations. Retailers can use this information to identify target demographics, customize marketing messages, and expand into new markets based on customer profiles.



### **Objective:**

The objective of this project is to develop a Power BI dashboard using the Retail Database and also do Exploratory Data Analysis (EDA) that provides comprehensive insights into the retail business's performance. The dashboard and EDA aim to facilitate data-driven decision-making, optimize sales strategies, and enhance customer experiences.



### **Scope**

The analysis will focus on four key areas: Sales Analysis, Product Analysis, Customer Analysis, and Demographic Analysis. It will cover sales trends, product performance, customer behaviour, and customer demographics to offer a comprehensive understanding of the retail business.



### **Goal**

The primary goal of the Project is to empower retail stakeholders with actionable insights. The dashboard and EDA will help identify top-selling products, peak sales periods, customer preferences, and target demographics. It will enable retailers to make informed decisions to boost sales, optimize inventory, and tailor marketing strategies.







### **Insights & Recommendations**

**The Power BI dashboard and EDA will provide valuable insights into sales performance, product trends, customer behaviour, and demographic patterns. It will identify high-performing products, low-performing items, customer preferences, and opportunities for customer engagement and retention.**



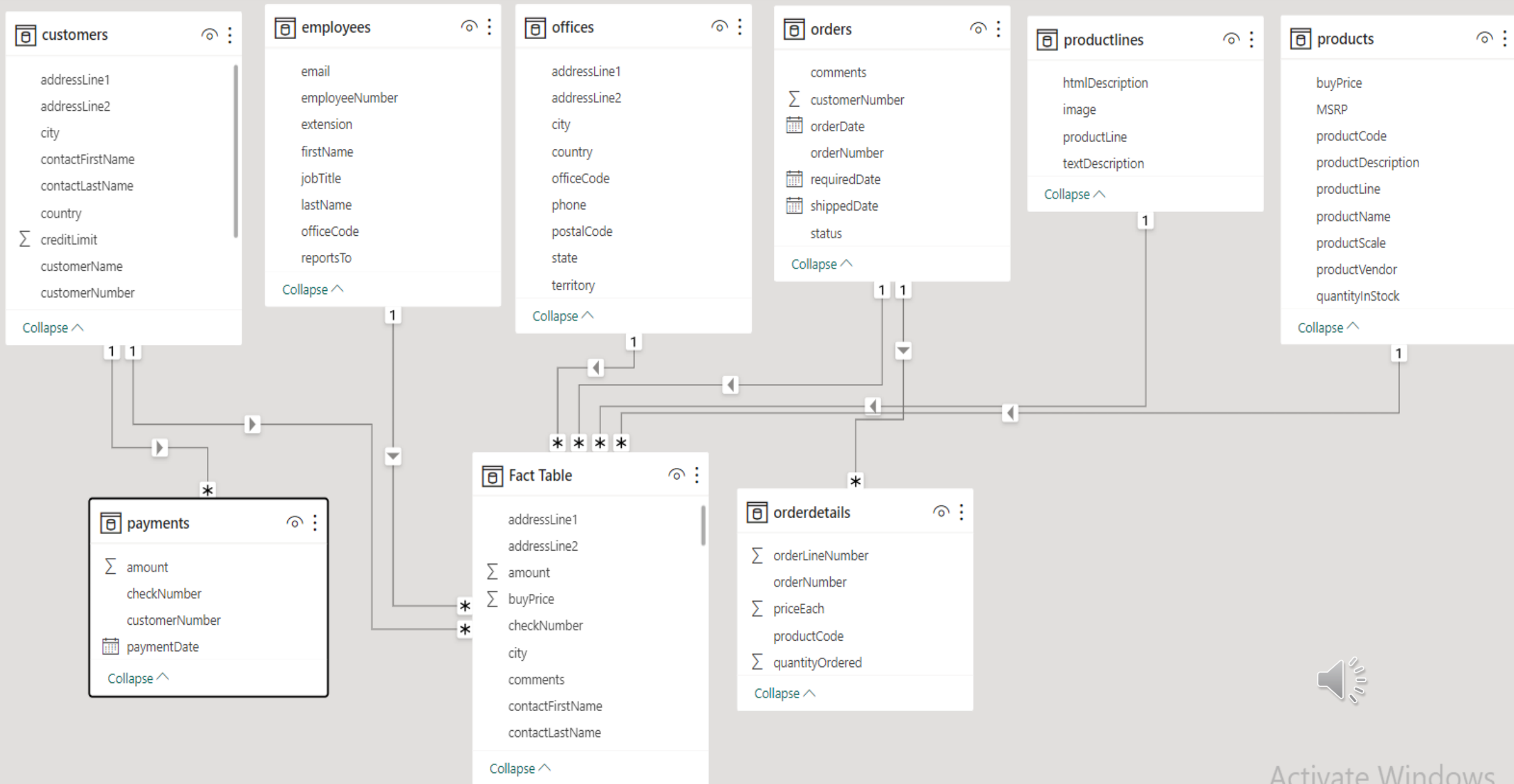
### **Report & Presentation:**


**The report will describe the key insights derived from the dashboard's analysis and outline the actionable recommendations for business improvement. The presentation will showcase the dashboard's visualizations, the significance of the findings, and how stakeholders can utilize the dashboard for effective decision-making.**

**The Power BI dashboard, along with the report and presentation, will serve as a powerful tool for retail stakeholders, providing a deeper understanding of sales, products, customers, and demographics. It will enable retailers to optimize their business strategies, enhance customer satisfaction, and achieve business growth and success in the competitive retail market.**



# ER DIAGRAM

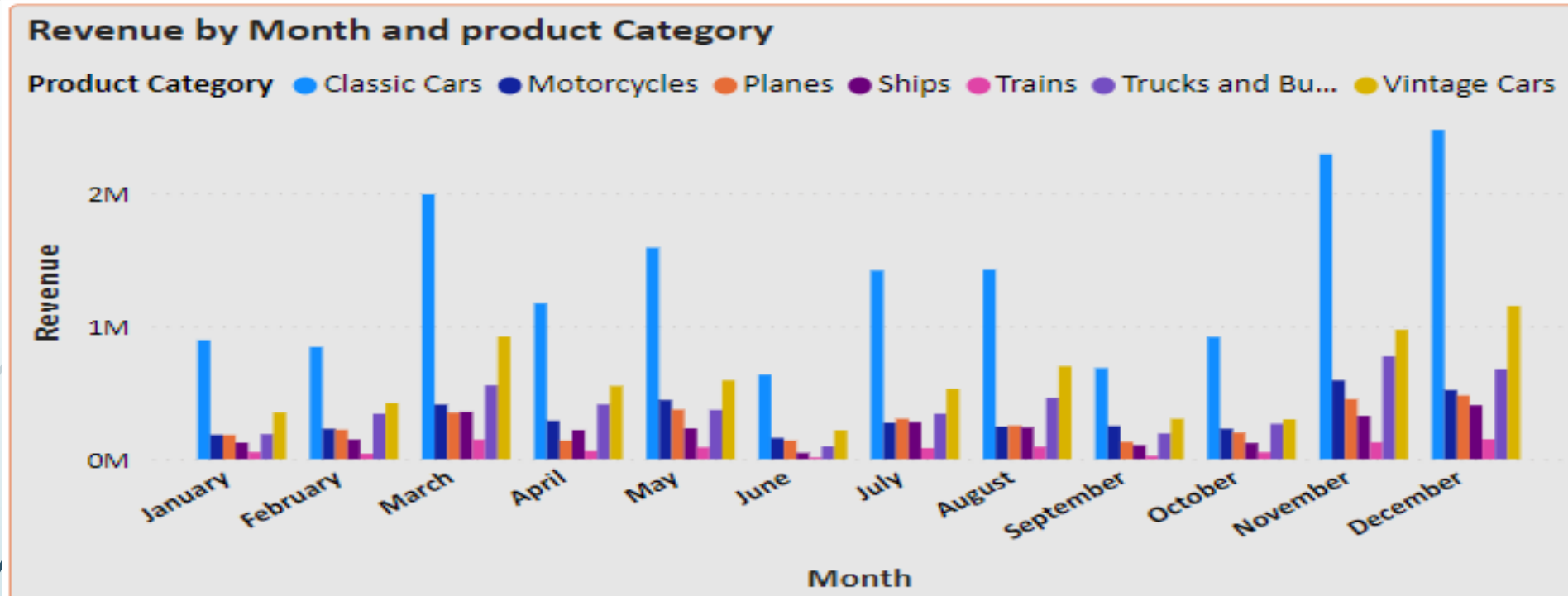




# **Power BI Problem Statements**

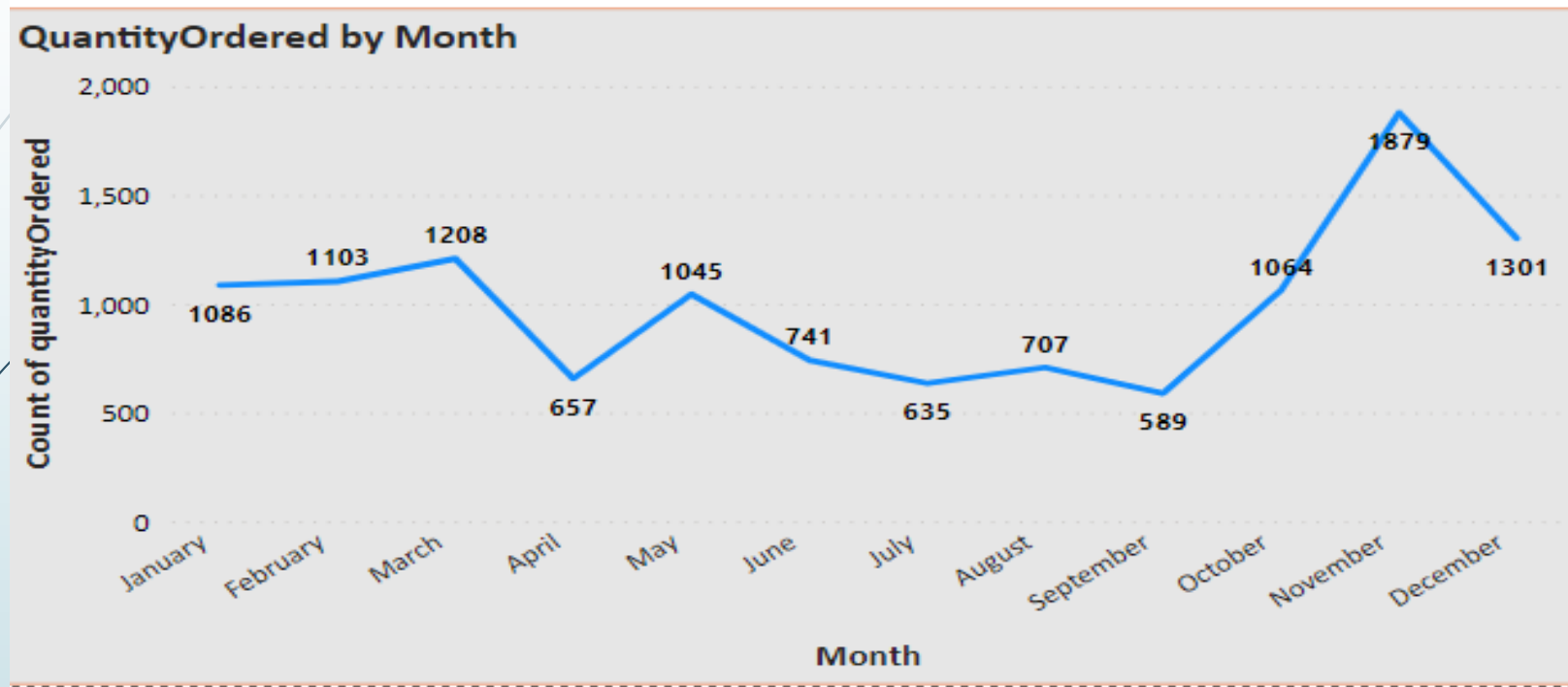


How does monthly revenue vary across different product categories? (Visual: Monthly revenue by product category)



- From this analysis I have noticed that revenue of different category varied in different months differently. We can see that category Classic cars have highest revenue across all the months in last year and category Trains have low revenue. And all other products have a decent performance according to revenue.
- I will suggest to focus more on low performing Product category regarding marketing it to improve its sales and to look into reasons for its low performance and suggest solutions to change its marketing strategies and plans.

What is the trend in customer order volume over the past year?  
(Visual: Monthly order volume trend)

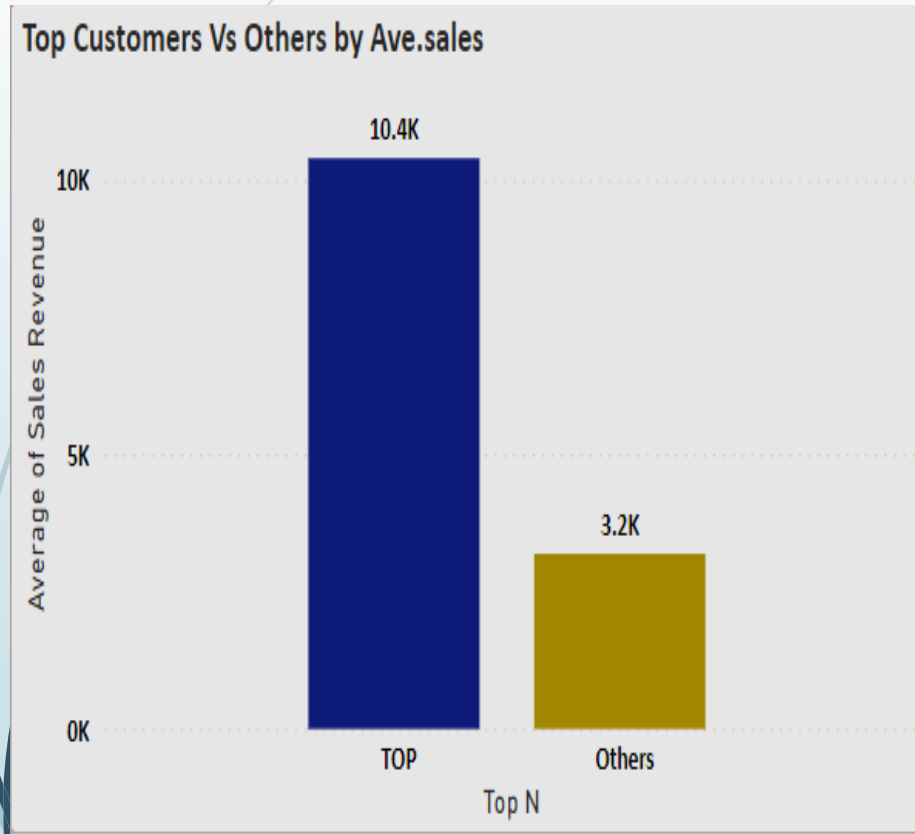


- ☐ From the above trend we can know that maximum orders were placed in the month of November. Based on the analyzed trend retailer can take decision on what marketing strategy they have to implement to enhance more sales in other time of the year.
- ☐ I have tried to analyze time in the line graph it is best for yearly analysis of trends.





How does the sales performance of top customers compare to the rest?  
(Visual: Sales contribution by top customers vs. others)

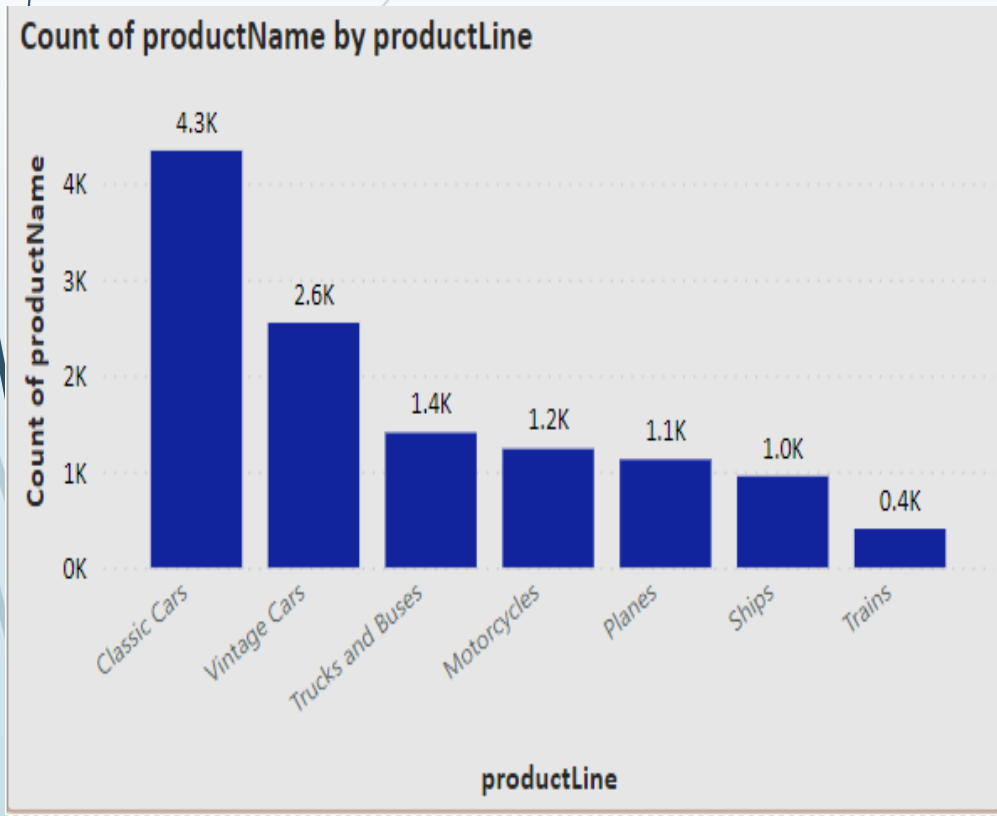


- In the graph I have taken variables like **Sales Revenue** and a **conditional column** that I have created based on a condition to know top sales customer and others, by putting a condition on sales revenue, where top and others are filtered.
- In this problem while solving I took **Avg.sales** because we can't take count of sales while comparison.
- **Analysis:** By the graph we can say Top customers have given good amount of sales revenue to the company compared to others.

Here I suggest retailers to focus more on top customer, because they are giving good business to retailers and considered as High Value Customers(HVC).



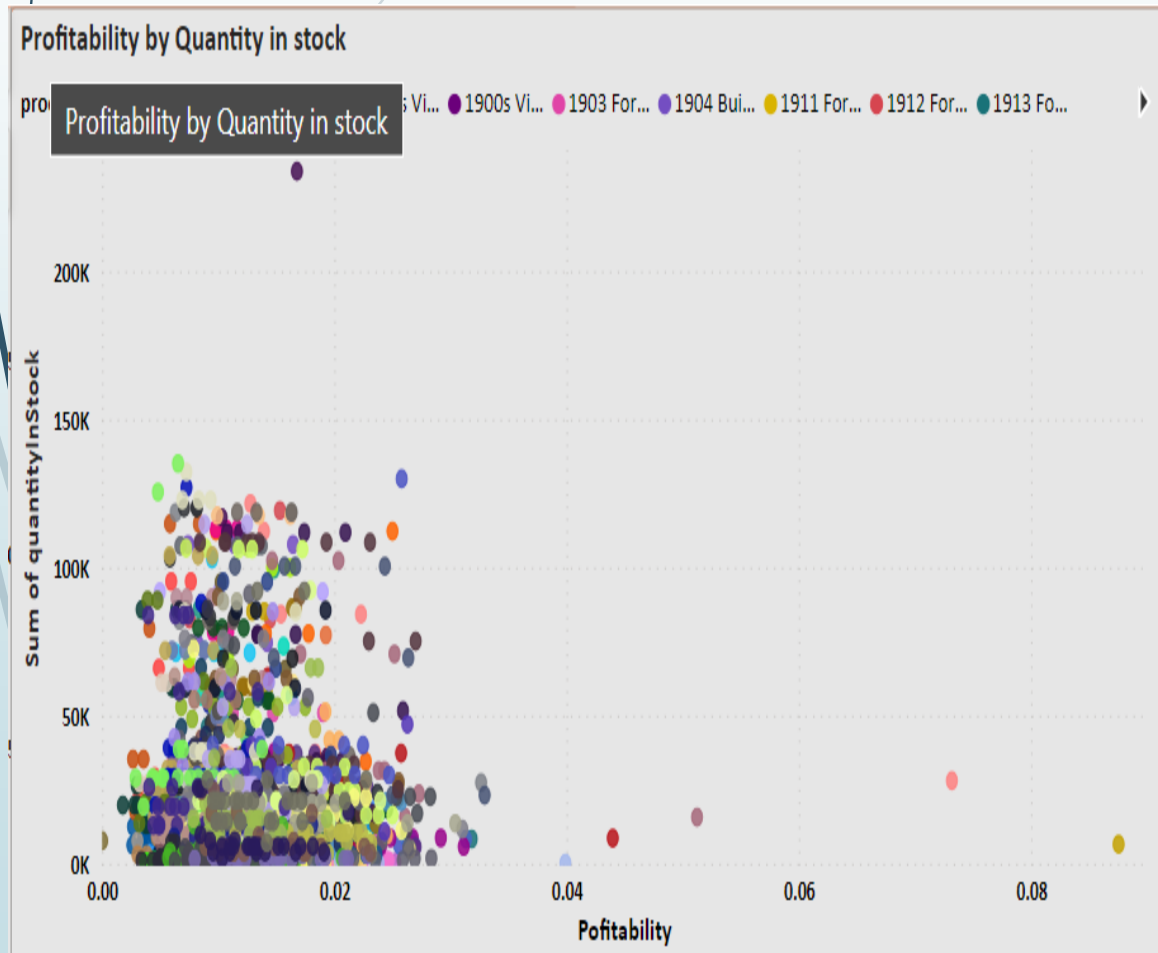
What is the distribution of product sales across different product lines? (Visual: Product sales by product line)



- **Analysis:** In this graph I have analyzed number of products in different category, from this graph we can notice that classic cars have highest sales compared to all other product categories. We can also see that Vintage cars have 2<sup>nd</sup> spot in the sales.
- **Note:** Here I have used count function to count no. of cars sold.
- The products in Product line- Classic cars is highest of all followed by Vintage Cars and the low Product line is of Trains.
- Retailers can have easy view of the products sold in different product category or product Line.

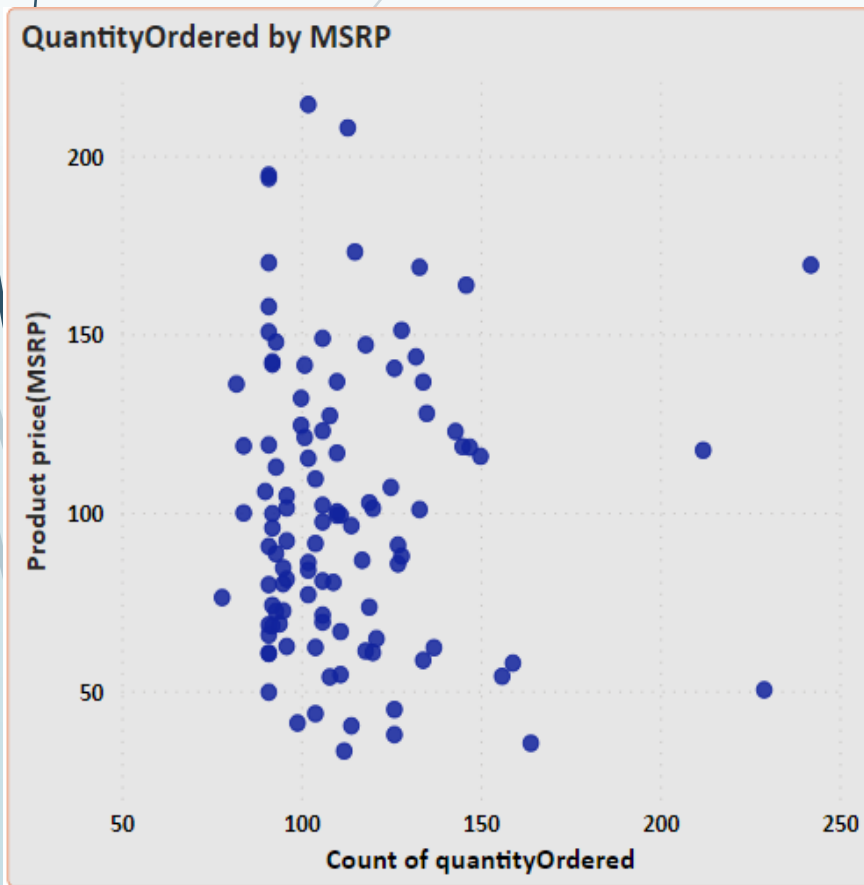


How does the profitability of different products compare based on their quantity in stock? (Visual: Profitability vs. quantity in stock)



- **Analysis:** In the above problem we need to know profitability for that we need Profit to calculate, which is also not given but we can calculate profit by Revenue and cost which we have already calculated.
- So, **Profit = Revenue - Cost of Goods.**
- After calculating Profit, we can calculate **Profitability** by formula **Profit/Revenue.**
- From the graph we can notice that Profitability for the quantity which is in stock is on the lower side only. So, can suggest to the company to clear the stock as soon possible because if we keep stock with low profitability it will depreciate with time. So can clear stock by giving discounts and focus more on other lines.

How does product pricing impact sales volume? (Visual: Product price vs. sales volume)

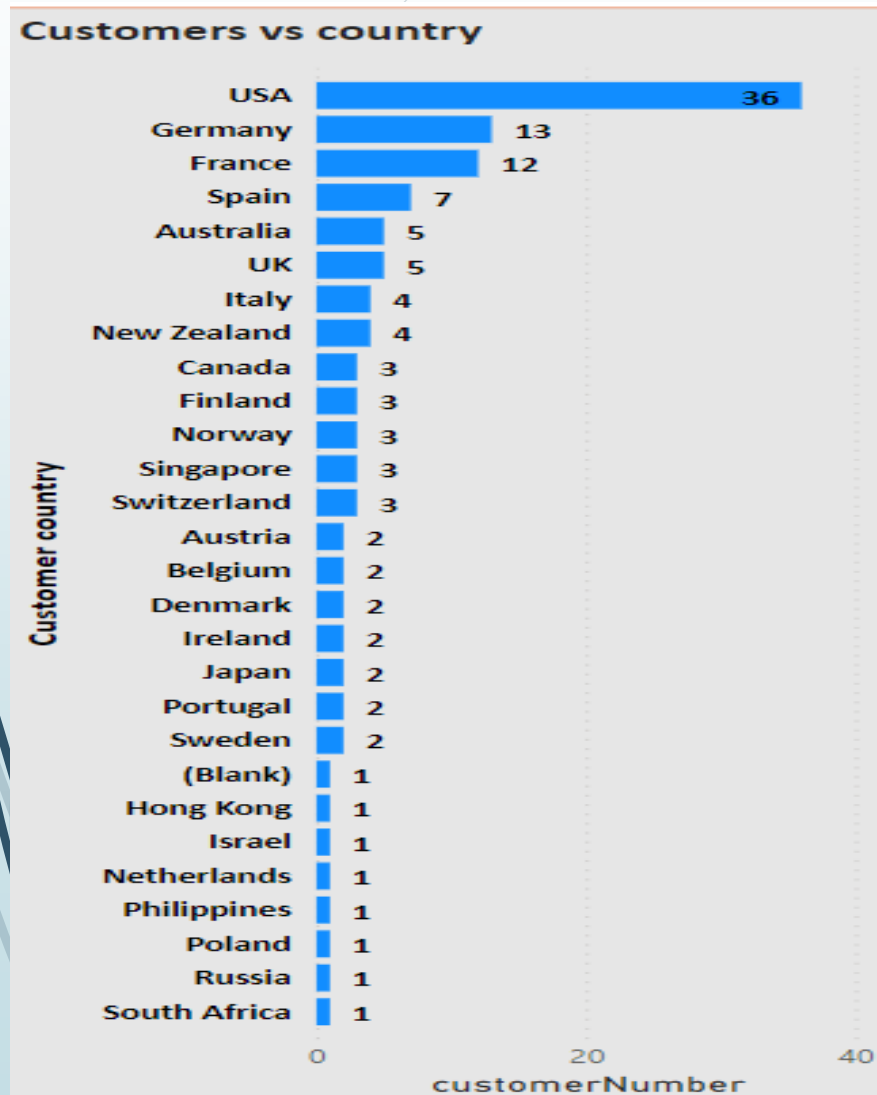


- In this graph I tried to visualize the correlation between Quantity ordered by MSRP (Maximum suggested Retail Price).
- **Analysis:** I have done this because in Automobile data I am dealing the product will be sold at MSRP so, by taking relation between these two variables I can know the price impact on sales. Here after plotting the graph, I can analyze that price of the product impacted sales to some extent but not much, to be precise pricing has impact on sales of product.
- In the graph I took order quantity as count to know no. of quantity ordered based on pricing.
- The key insight I found from this graph is that the sales are impacted due to price of the product, the products are ordered more of less price.



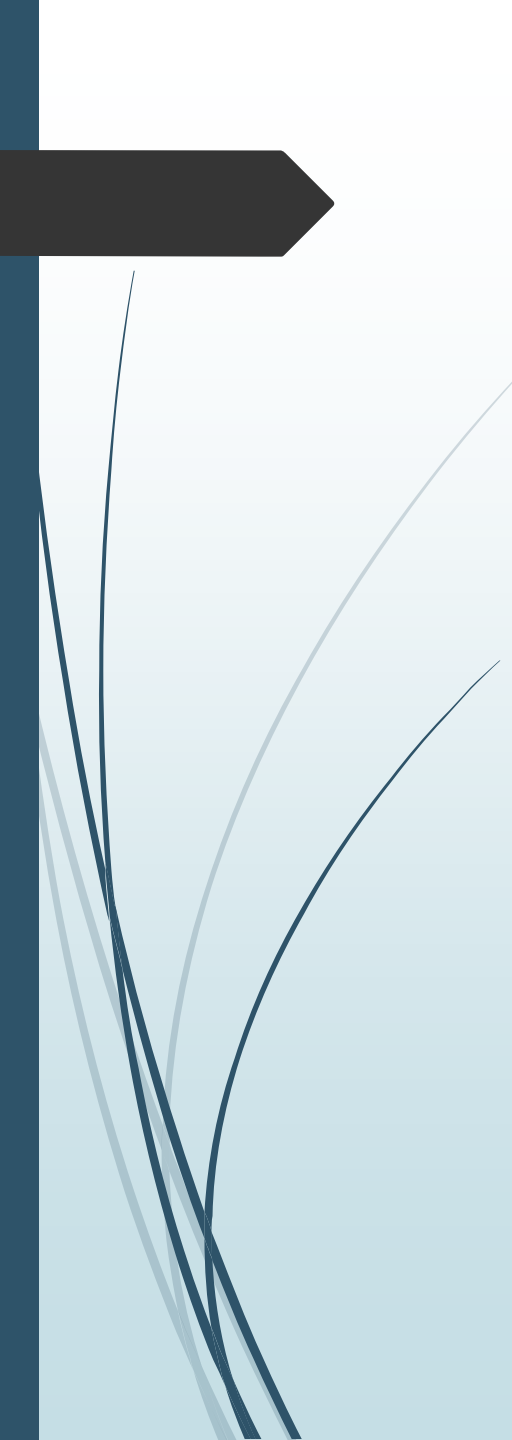


What is the distribution of customers across different demographic segments? (Visual: Customer segmentation by demographics)



- In this graph I took region as country of customer because in data we have two countries given one is customer country and other is employee.
- So, I took customer country and took Customer number as Distinct count function to know customer uniquely.
- From the above graph we can say most of the customers are from US followed by Germany, France.
- From this analysis retailers can optimize their marketing campaigns and design their product portfolio.
- They can target customers based on location and price sensitivity of them.

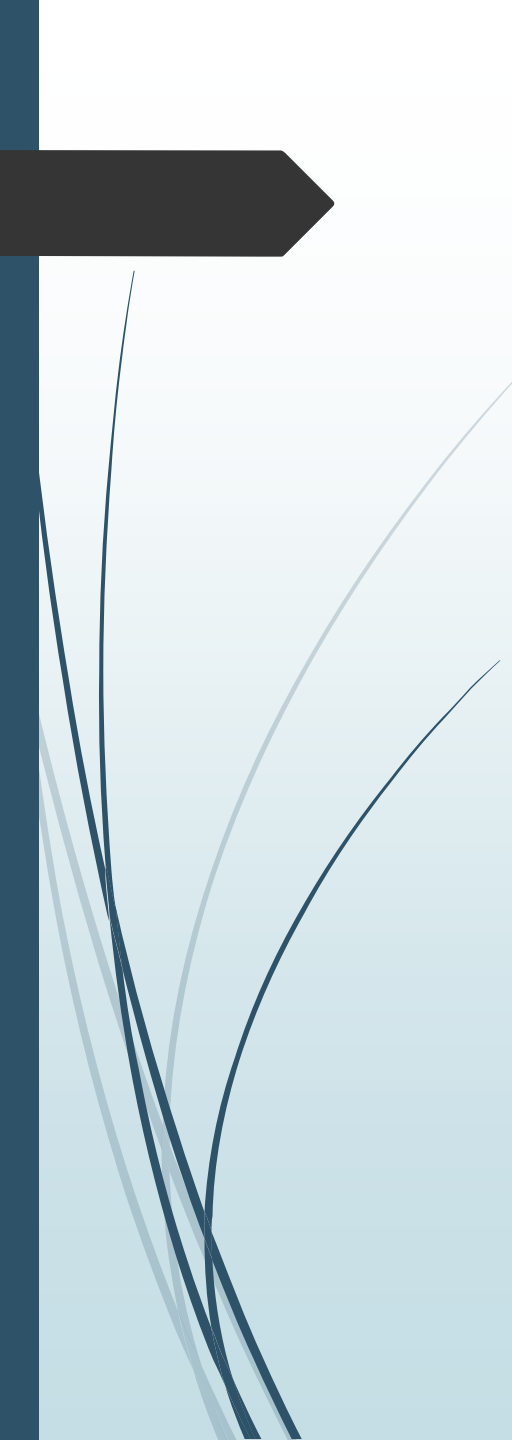




## How does customer lifetime value vary for different customer acquisition channels? (Visual: CLTV by acquisition channel)

- For his problem statement we required both categorical and numeric data, In our data we cant fine relevant data for the problem statement, so we cant find relation between two.
- If the data is given, we can analyse business value given by particular customer through acquisition channel and we could analyse different acquisition channel revenue as well
- Customer lifetime value is a metric used in marketing and business to estimate the total revenue a company can expect to earn from a customer over the duration of their relationship.
- Retailers can use CLV to make informed decisions about how much they are willing to spend on customer acquisition, marketing campaigns, and customer retention efforts.



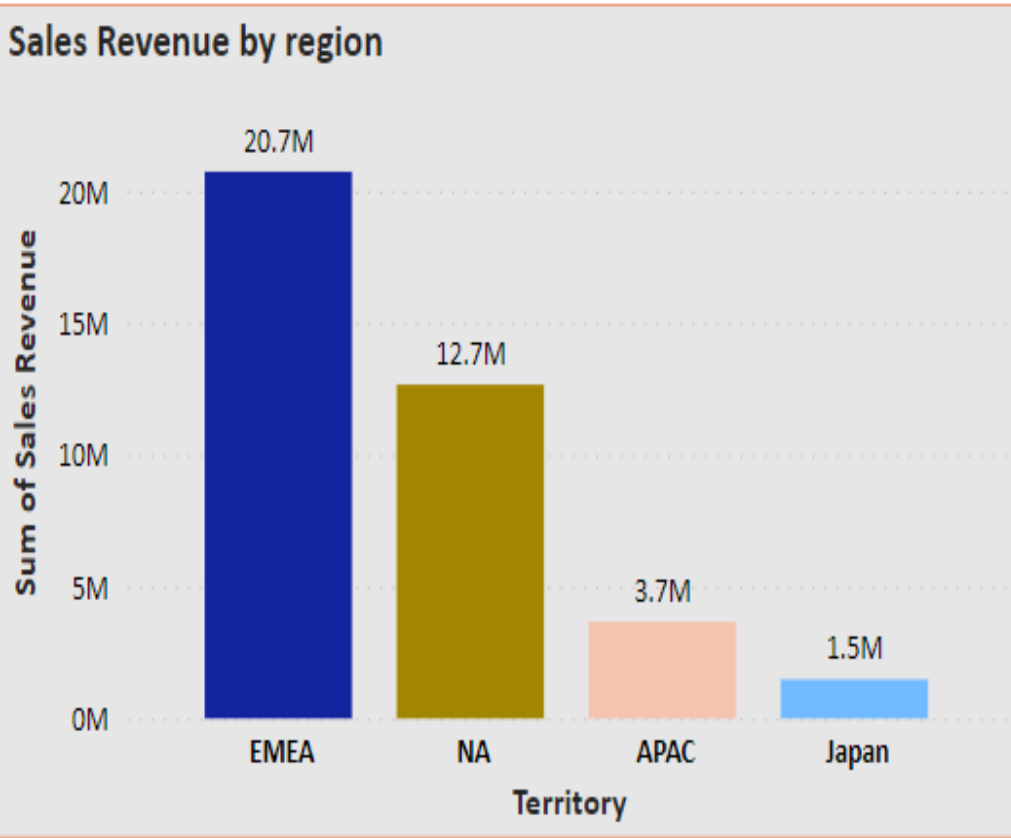


## What is the correlation between customer age and purchase frequency? (Visual: Customer age vs. purchase frequency)

- Here from the above statement, we can understand that we need to find Customer age and their purchase behavior.
- From the data given to us from the company we can't find Age or any data related to calculating age, so we can't calculate age of a customer from provided data.
- Purchase frequency can be calculated from customer and their order quantity. It is nothing but how often customer bought an item.
- So, by this we can say that we can find purchase frequency but not age due to this reason we cannot find correlation between them.
- If that would have been given, we could have found different age groups and we could have done much more detailed analysis of data based on age like age group and region, Age and Category of products.



What are the top regions in terms of sales revenue? (Visual: Sales revenue by region)

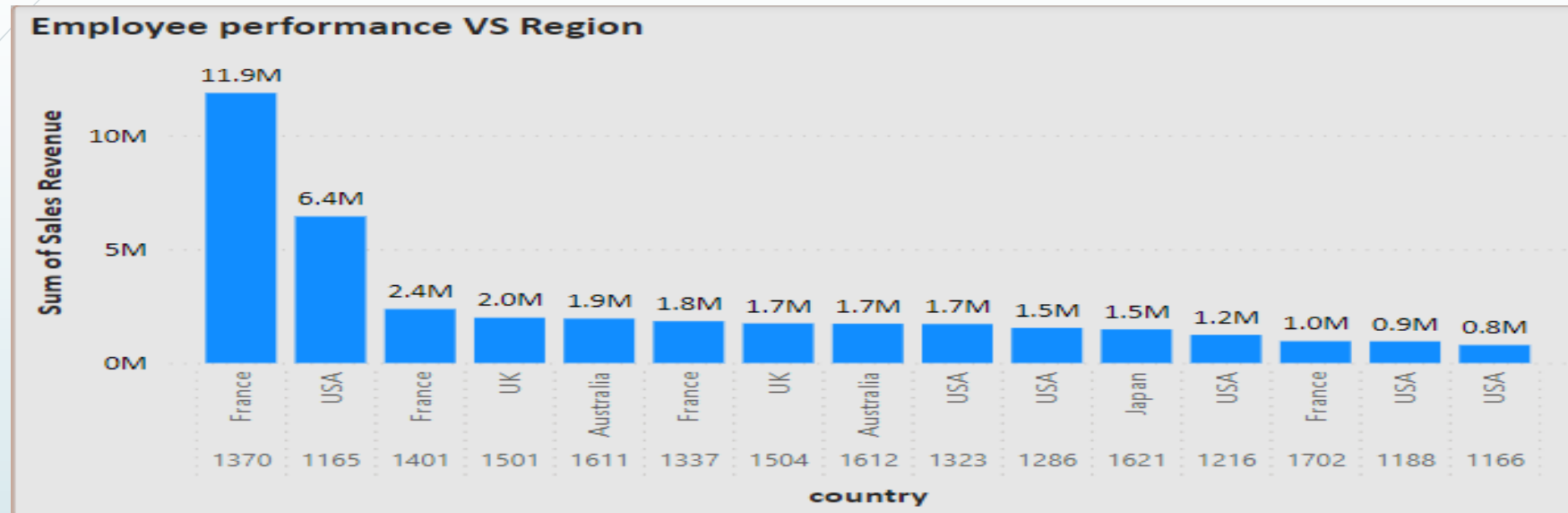


- In the above graph I have analyzed Sales revenue in different region. In some problems I have taken country as region but in this I have taken territory as region because it will explain revenue of different regions in simple manner. Here territory is Asia pacific Region, North American Region, EMEA, Japan.
- **Analysis:** In the graph I have taken Sum of sales to know cumulative sales revenue in different region and from here we can say that European and Middle East countries have the highest sales revenue compared to others and we can suggest company to launch new models of vehicles in **EMEA** region because they have the high number of **Early Adopters**.
- The insight here is top regions need to be focused and see what factors worked in that region and try implementing in low sales region as well.



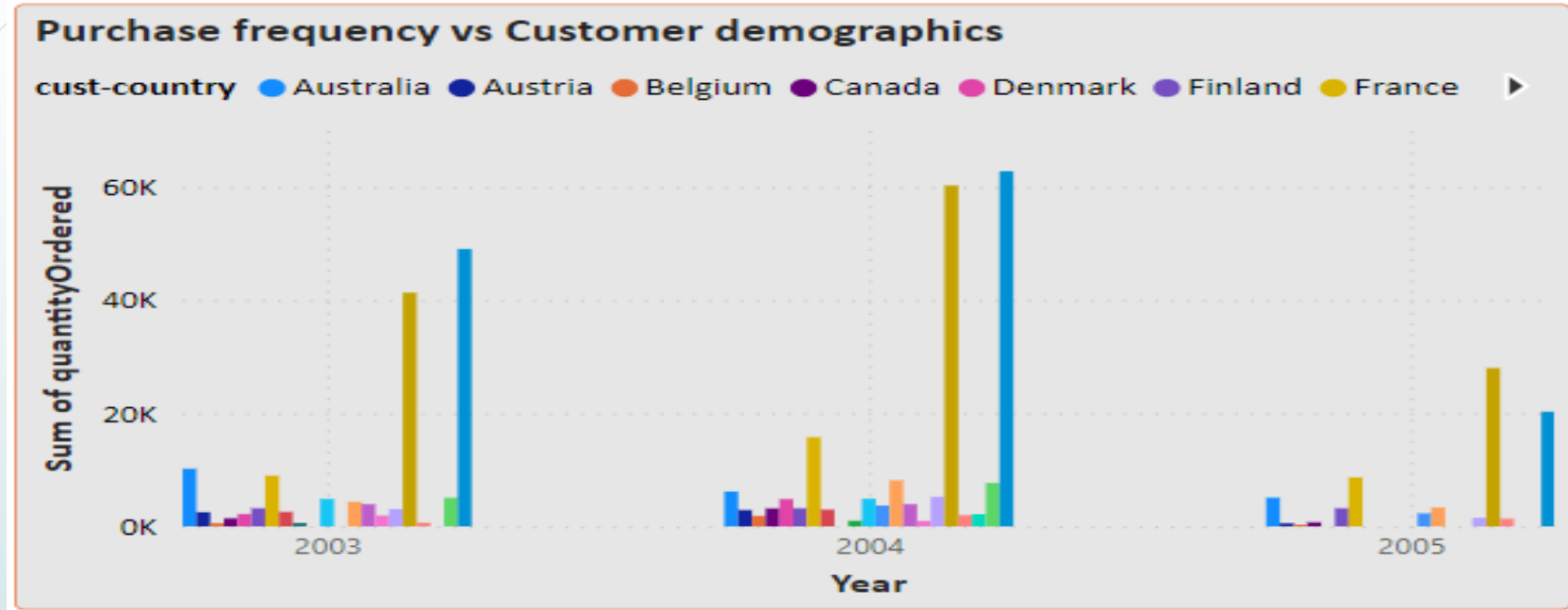


How does the performance of sales employees vary across different regions? (Visual: Employee performance by region)




- In the above graph I have taken variables like sales revenue to know the performance of that employee, and I have taken Region as country to elaborate the analysis in an extensive manner and I also have taken Employee Number to know which employee did more sales and from which region.
- From the above visualization we can infer that Employee with **E. No 1370** from France followed by **E. no 1165** from **USA** did good number of sales. We can get insights that employees from European region did good in sales than other regions.

What is the correlation between customer demographics and purchase frequency? (Visual: Customer demographics vs. purchase frequency)



**Analysis:** In data there are two countries given one is Employee country and other is Customer country, but we need to analyze Customer order frequency I took customer country. I have taken Payment year as Date that is when the order is done right after payment.

► So, by taking all three variables Payment year, Quantity and Customer country I have analyzed the frequency of purchases made by different customers. From the above graph we can say that the purchase frequency of **USA, Spain** is more compared to other countries. We can suggest to company to focus on the other countries with low purchase frequency to improve their marketing strategies and ad campaigns and regarding pricing and discount provided to boost sales.

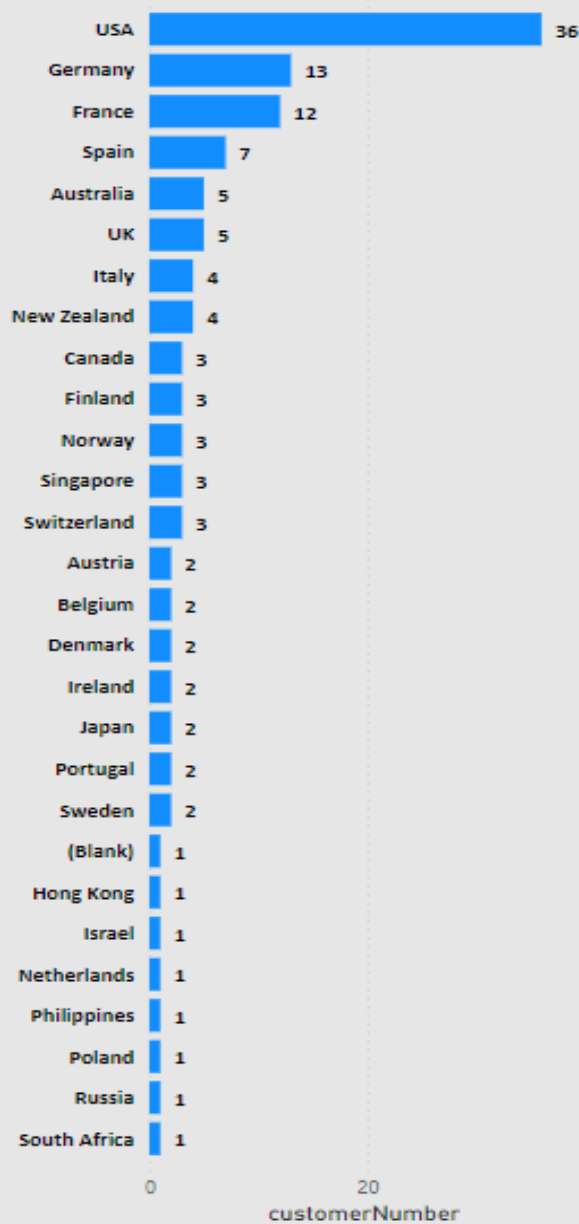


**After analyzing every Problem statement separately I have created dashboards by combining problem statements solving same domain problem. By this dashboards a retailer will get holistic view of his business and solution for smooth operation of his retail store.**

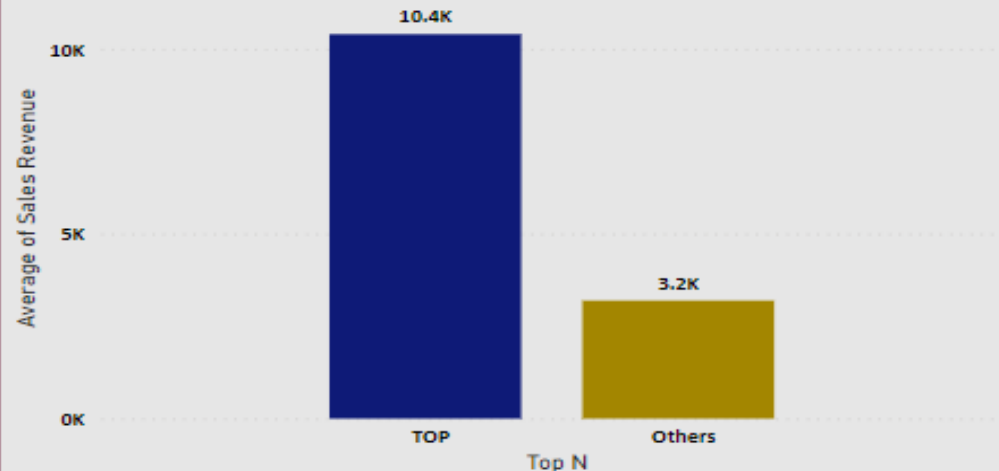


# Customer Analysis

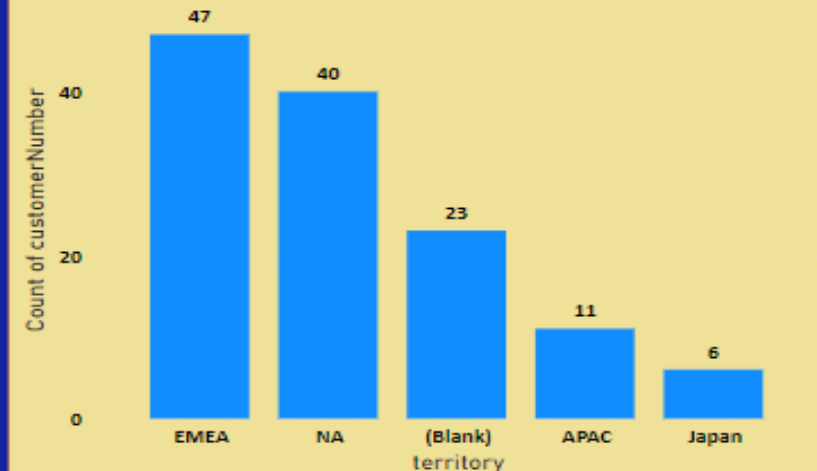
Customers vs country



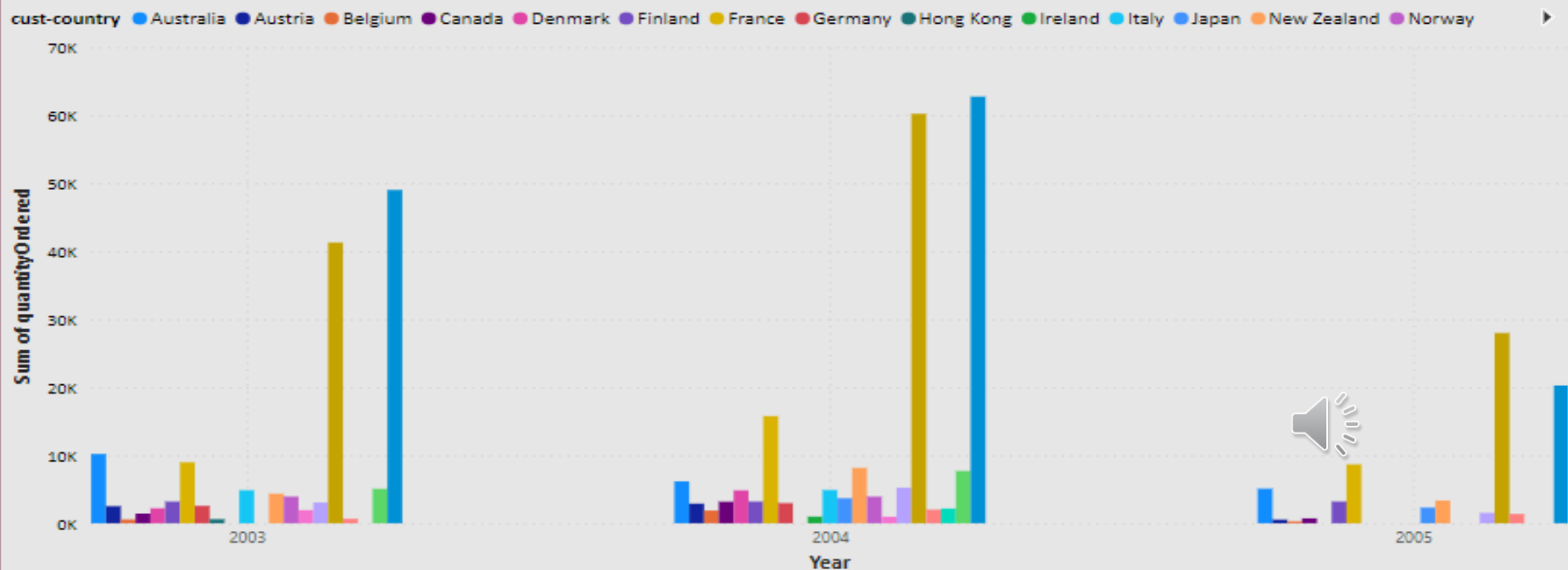
Top Customers Vs Others by Ave.sales



Customers by productLine



Purchase frequency vs Customer demographics

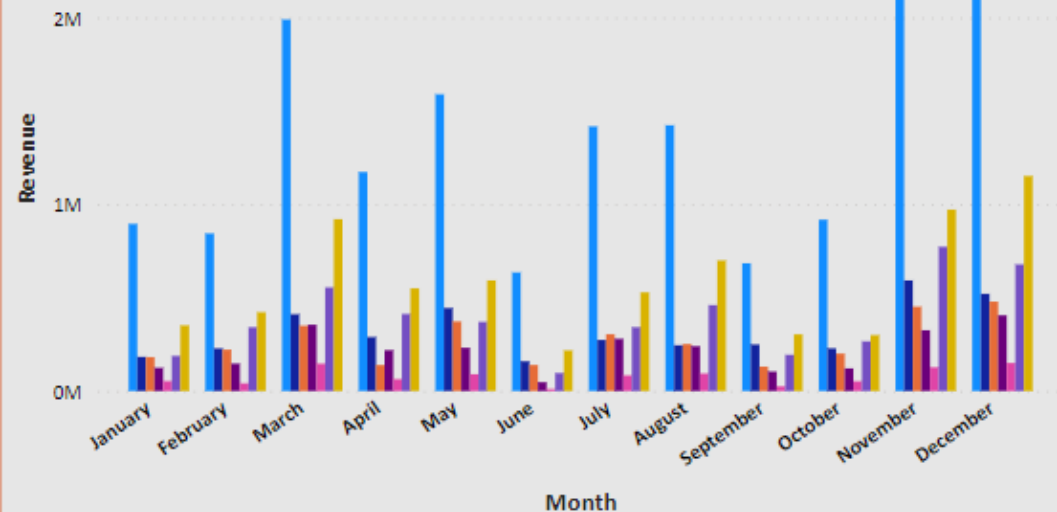




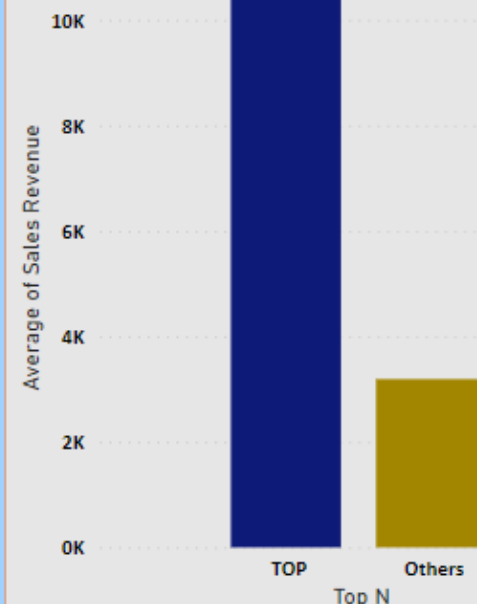
# Sales Analysis

## Revenue by Month and product Category

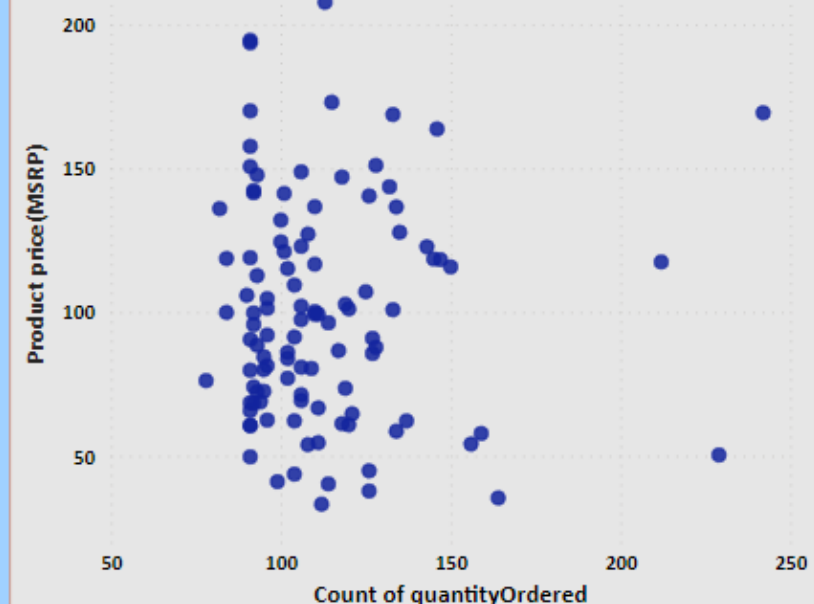
Product Category ● Classic Cars ● Motorcycles ● Planes ● Ships ● Trains ● Trucks and Bu... ● Vintage Cars



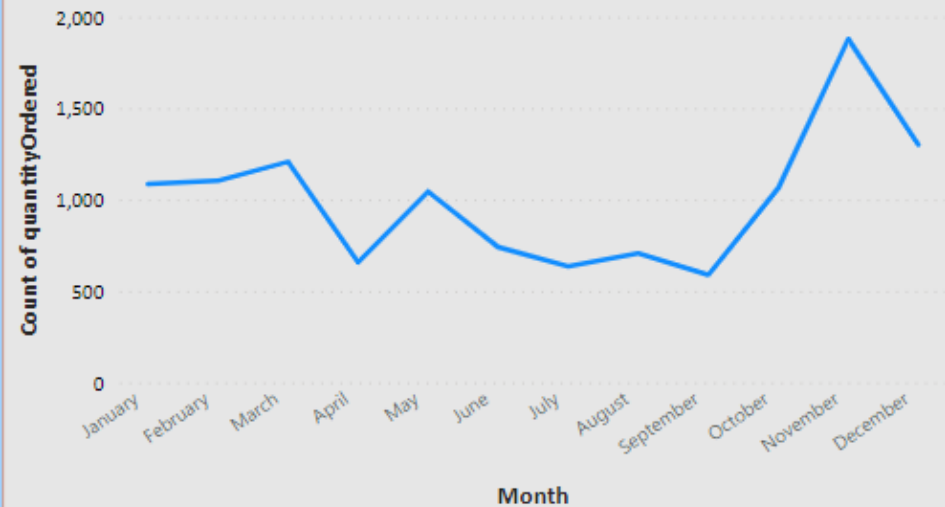
## Top N Vs Others by Ave.sales



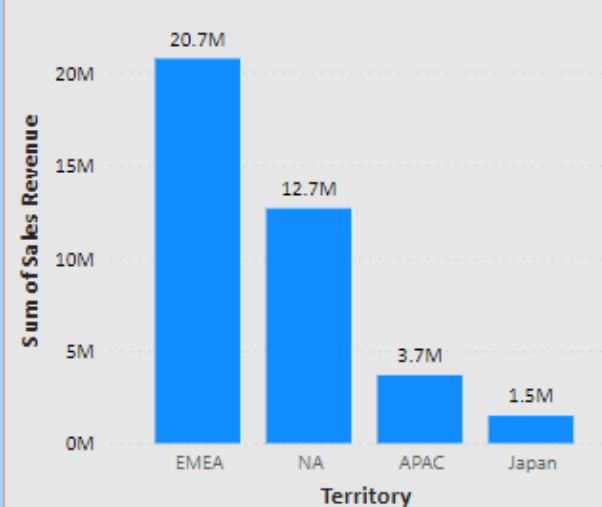
## QuantityOrdered by MSRP



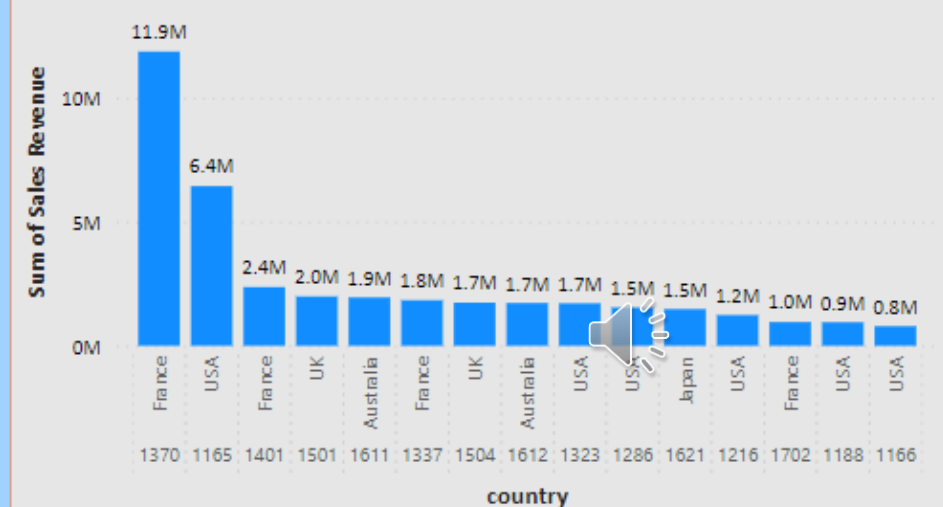
## QuantityOrdered by Month



## Sales Revenue by region



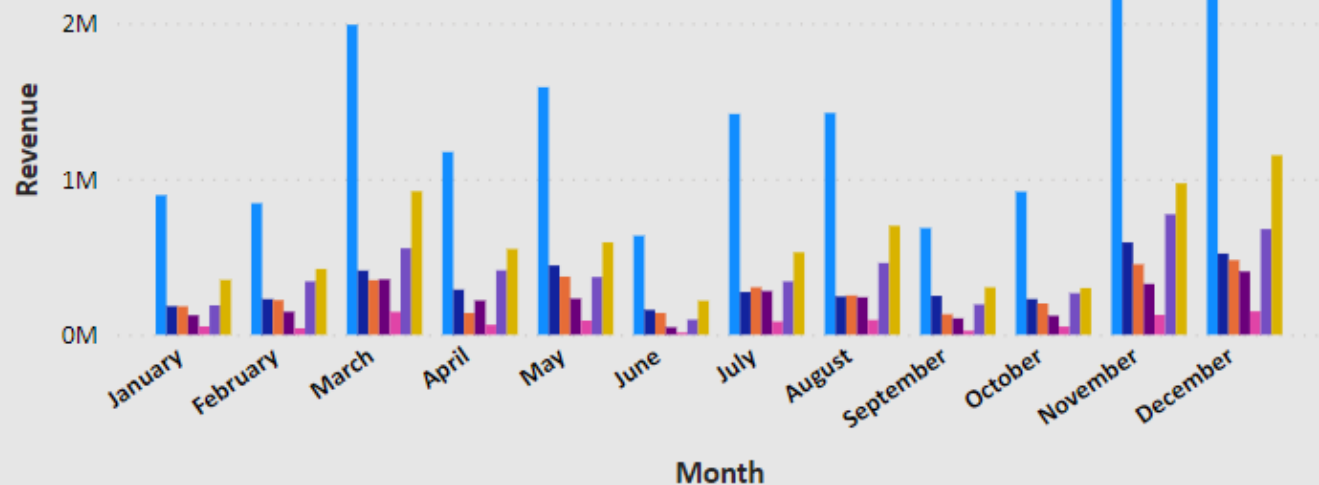
## Employee performance VS Region



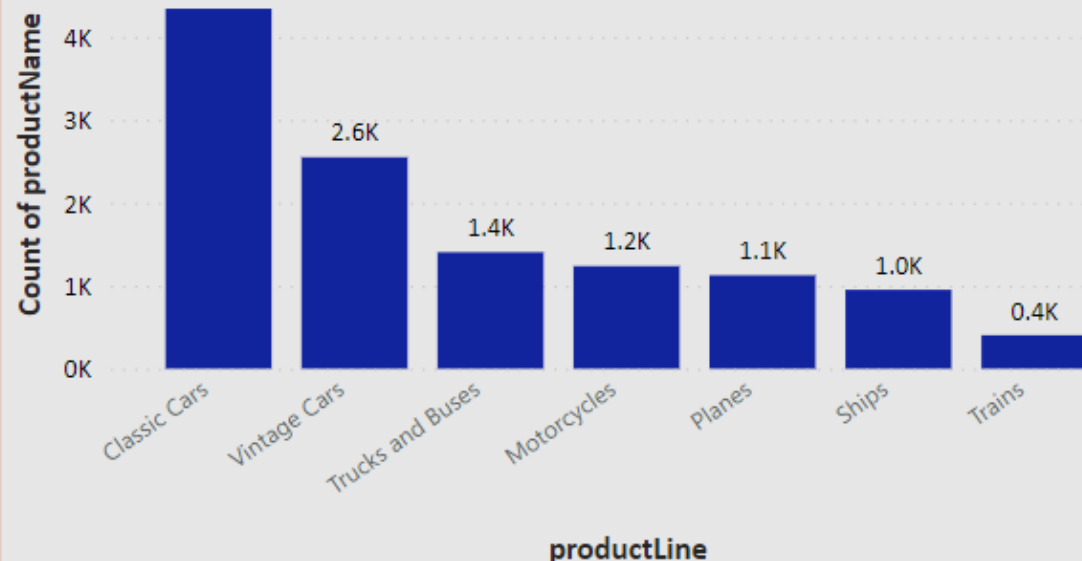
# Product Analysis

## Revenue by Month and product Category

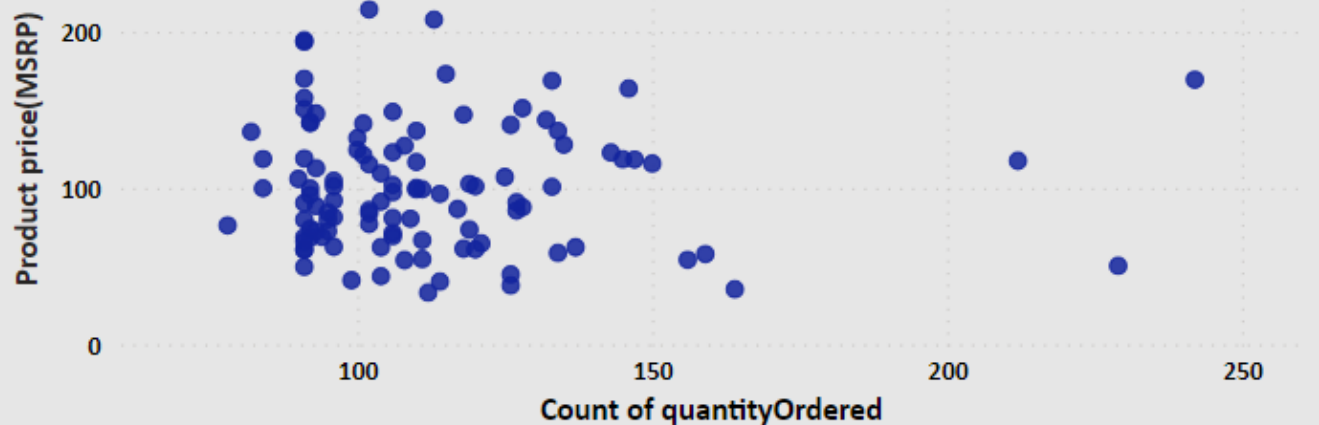
Product Category   Classic Cars   Motorcycles   Planes   Ships   Trains   Trucks and Bu...   Vintage Cars



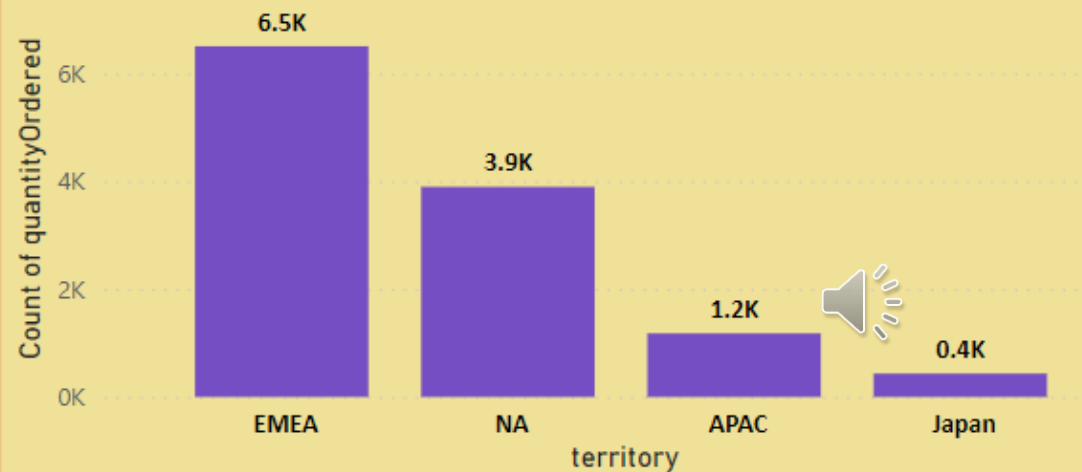
## Count of productName by productLine



## QuantityOrdered by MSRP

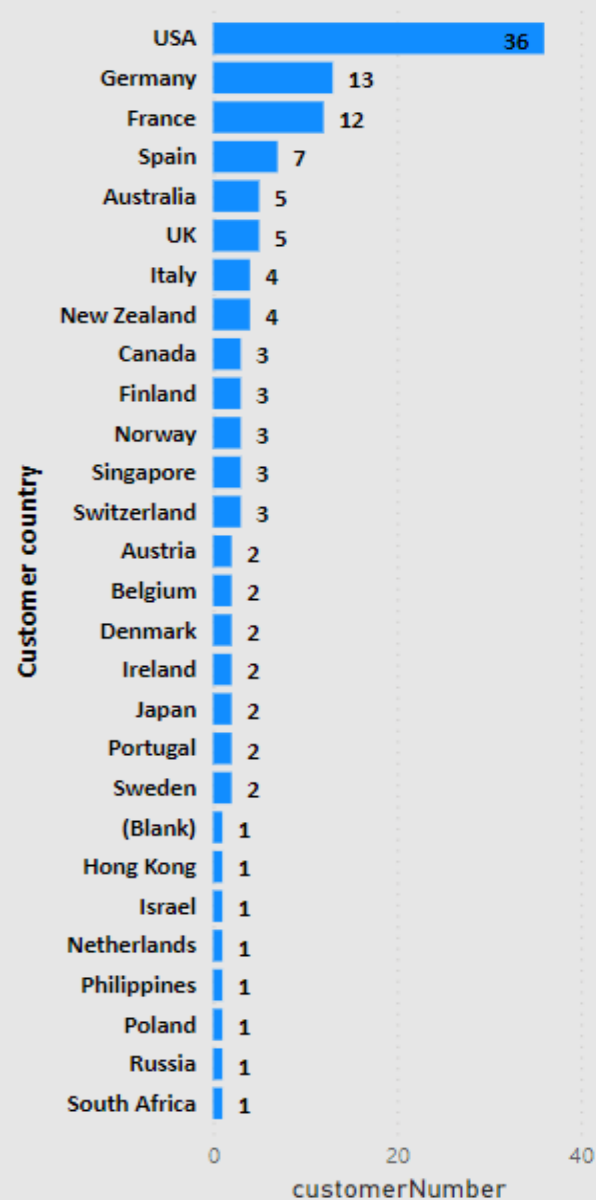


## Product Quantity ordered by territory

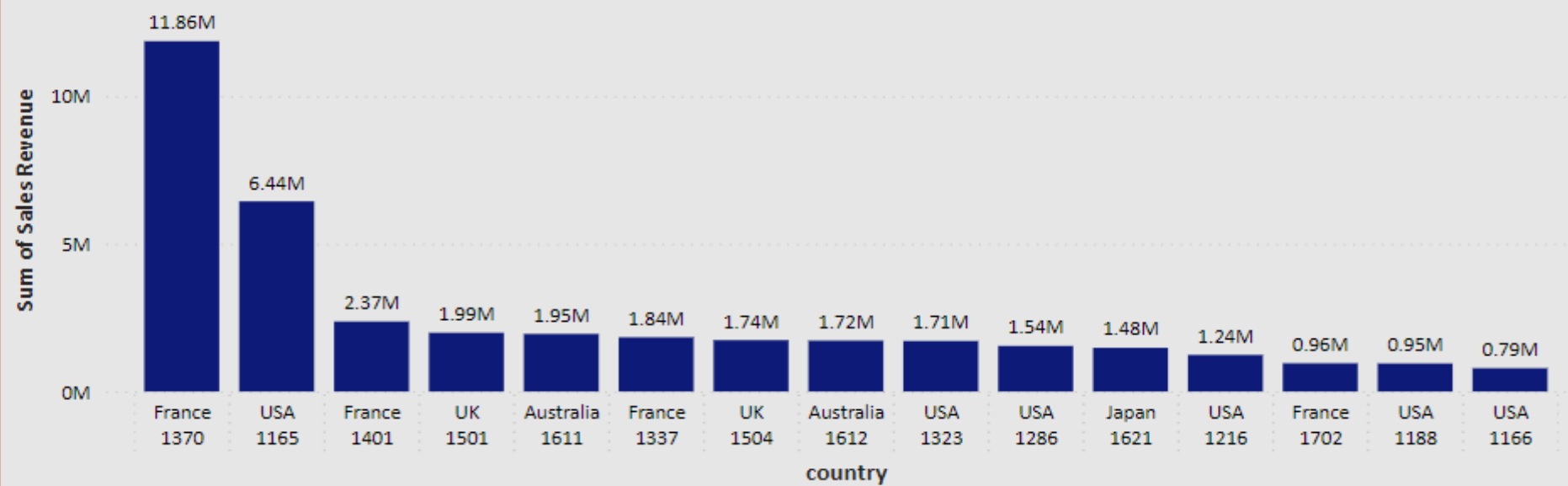


# Demographic Analysis

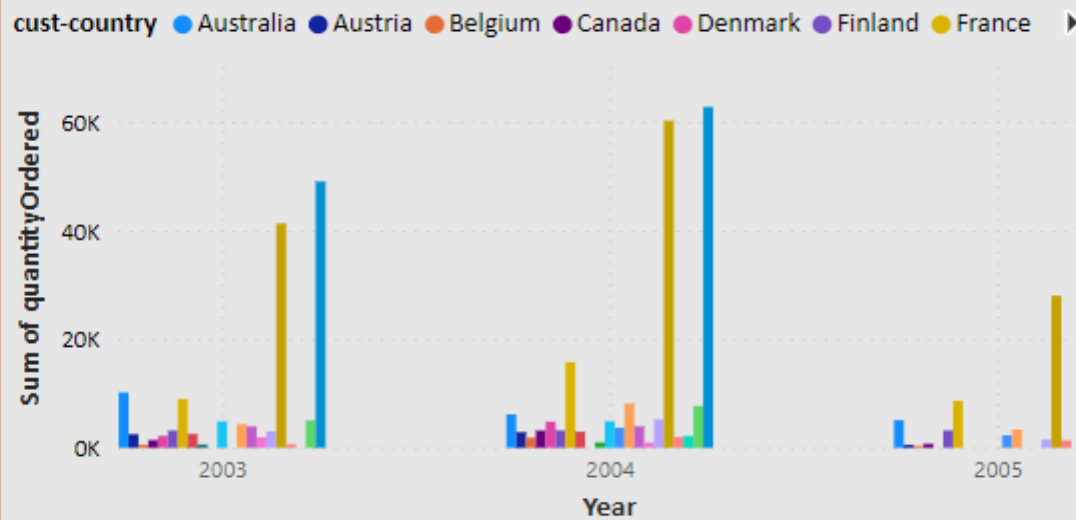
Customers vs country



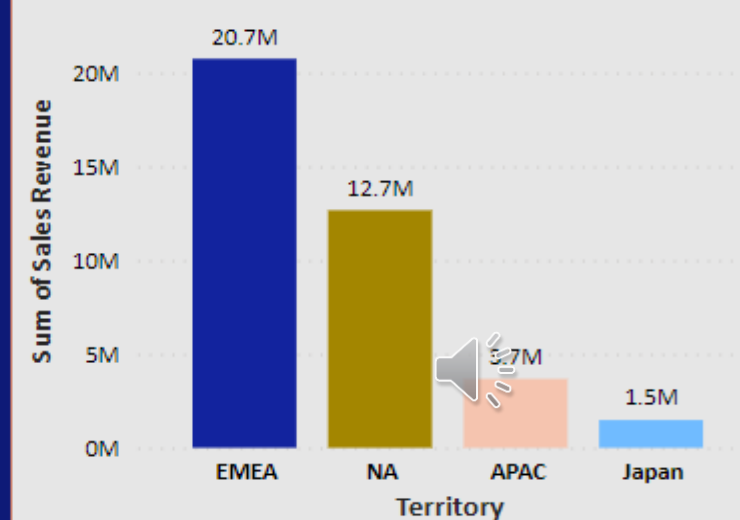
Employee performance VS Region



Purchase frequency vs Customer demographics



Sales Revenue by region



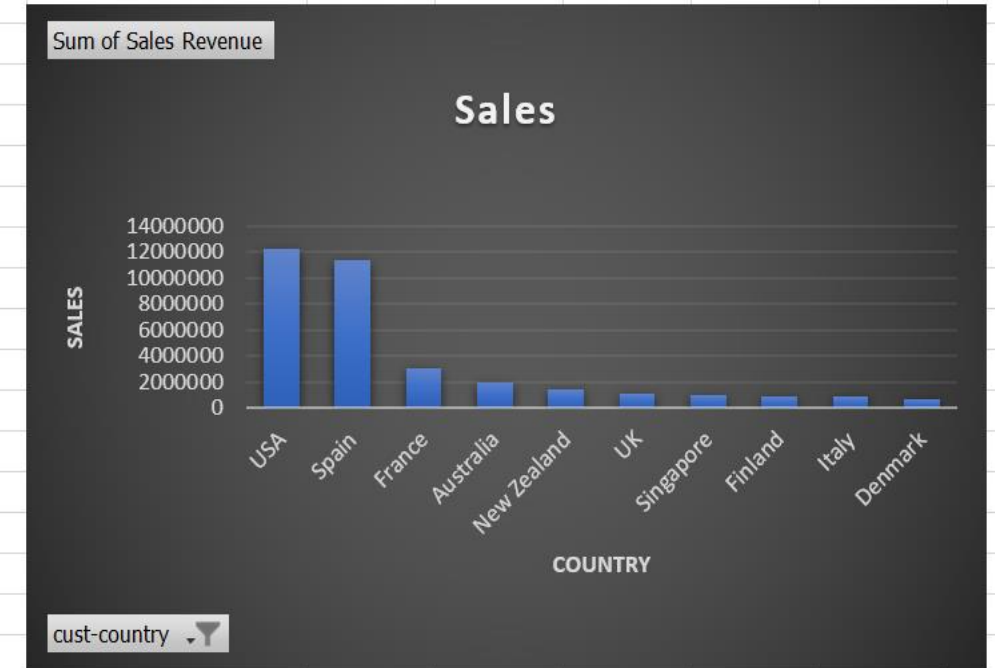


# EDA Problem Statements

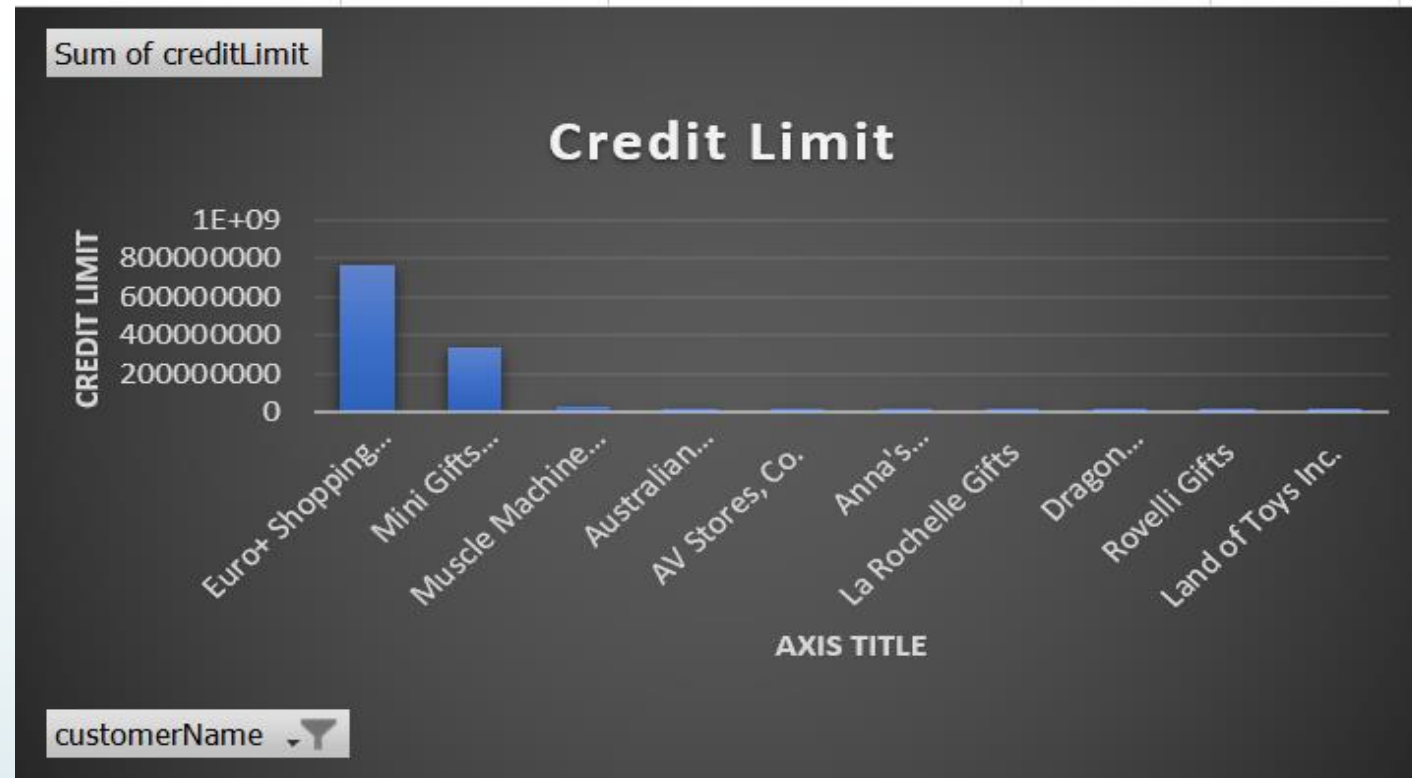




## Which factors contribute to the highest sales in a particular region?



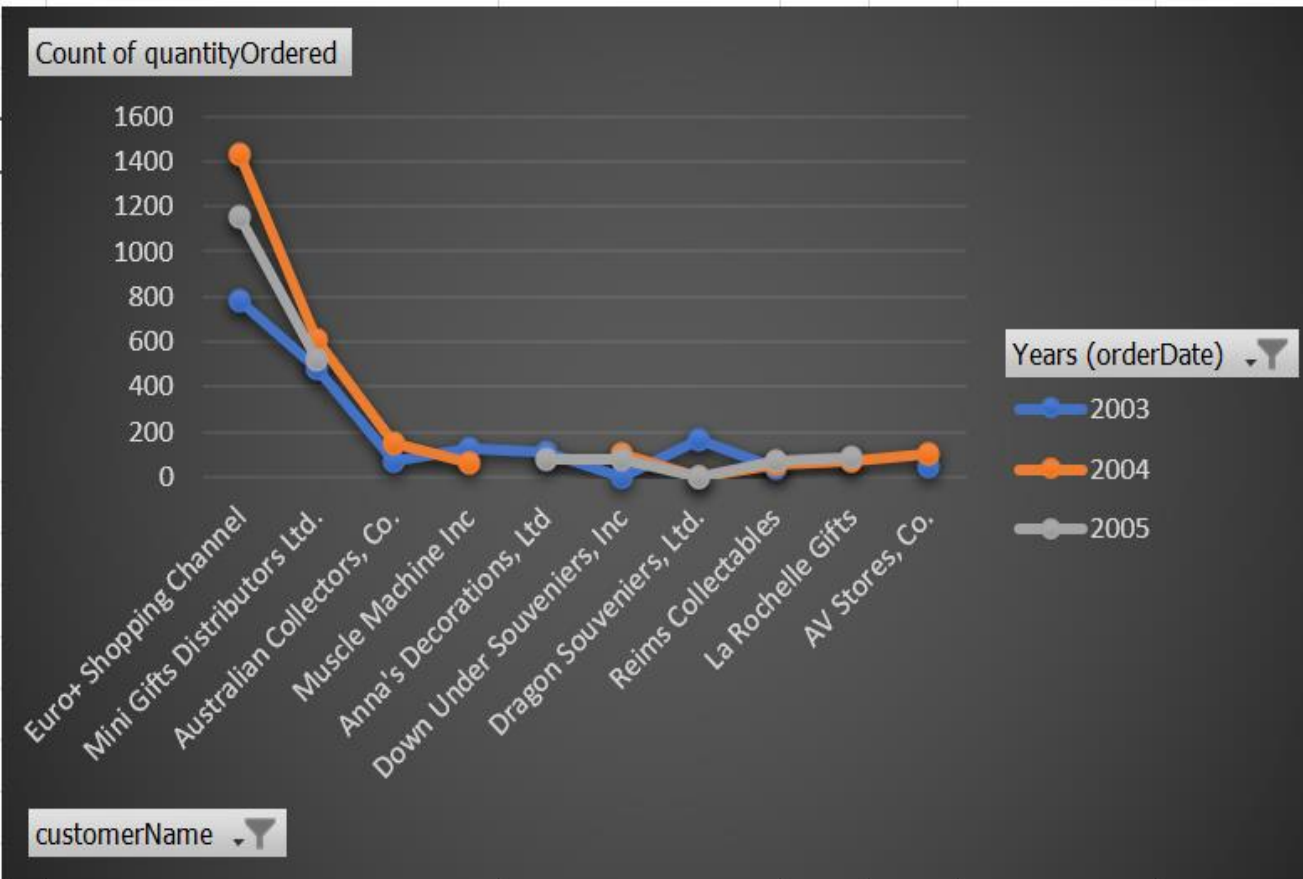
- **Explanation:** In the problem statement we need to analyze growth factors of sales in a region.
- I have gone through the data set given for analysis and have analyzed some factors based on available data. I have analyzed customer of a region because they are one of the factors for sales growth and also analyzed the sales done by them in that region. The data given is not sufficient to analyze all the remaining factors above like marketing, Promotion and Price.
- **Analysis:** From the analyzed data I will suggest to improve more sales in regions like **Singapore, Finland and Denmark** by launching marketing campaign and giving more offers to attract more customers, because if we see customers are also very less in these regions. So, by marketing and discounts we can improve customer base in a region who will become loyal customers.



- Here I have analyzed on credit limit also to know sales because it is one of the factors that influence sales growth and a customer can buy on credit which improves sales of a region.
- Customers present in regions **like USA, Spain** are giving high sales for us and we can launch new products as well because customers from this region are **Early adaptors** for our company.
- **Early Adaptors are loyal customers who buys our product immediate launch of our product in to market.**
- From the above Problem statement retailer will get the solution regarding different factors affect his sales in a region and align his strategies and marketing campaign to boost his sales.



## How can customer purchasing patterns be influenced to increase average order value?




- Customer purchase patterns are trends of how a customer do shopping. Customer purchase patterns can be influenced by different marketing strategies in Retail industry like,
  1. Rewards & Loyalty Points
  2. Free shipping on minimum orders.
  3. Discounts
- Analysis:** In the analysis I have done I have analyzed customer purchase pattern based on the quantity they ordered and in which year. So, from this analysis I can suggest **Euro+shopping channel** has maximum orders and is a loyal customer to retailer and above strategies can be implemented to make him do more shopping.
- Customers like **Dragon Souvenir, Riem Collectables, La Rochelle Gifts and AV Stores.co** have very low order quantity I will suggest retailer to give more discount to them to increase their average order value.

What are the key drivers of sales growth, and how can they be leveraged for future success?



- The key attributes of sales are like Customer, Price, Financial stability and strategic Location. I have explained about them briefly in documentation
- **Analysis:** In the analysis I have done research on sales of customers in different region of the retail present, from this I have known the sales based on customers and region.
- I have done analysis on key attributes like Price, Customer and Location in the problem and I will suggest retailer to implement new marketing campaigns to create awareness in low sales areas to improve sales of different products.
- In the above data I can say different customers have highest sales in different region, so different marketing strategies should be implemented.





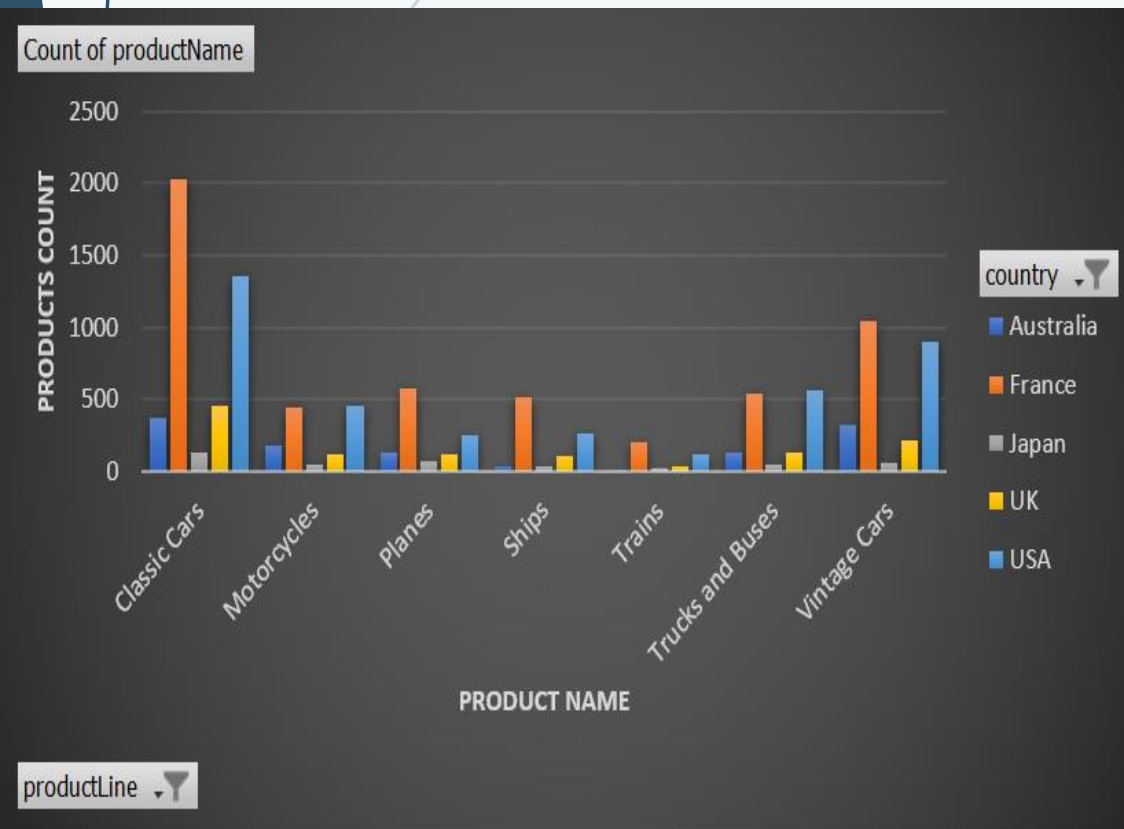
## Which product features or attributes are most appealing to customers?

- Product features are noting but its physical size, shape, orientation and design to anlyse this problem we don't have enough data with us.
- **Explanation:** After thorough understanding of the data, I have seen the Data provided is Insufficient to solve this problem statement.
- To solve this problem, we need product features like size, design, quality and functionality none of them are given.



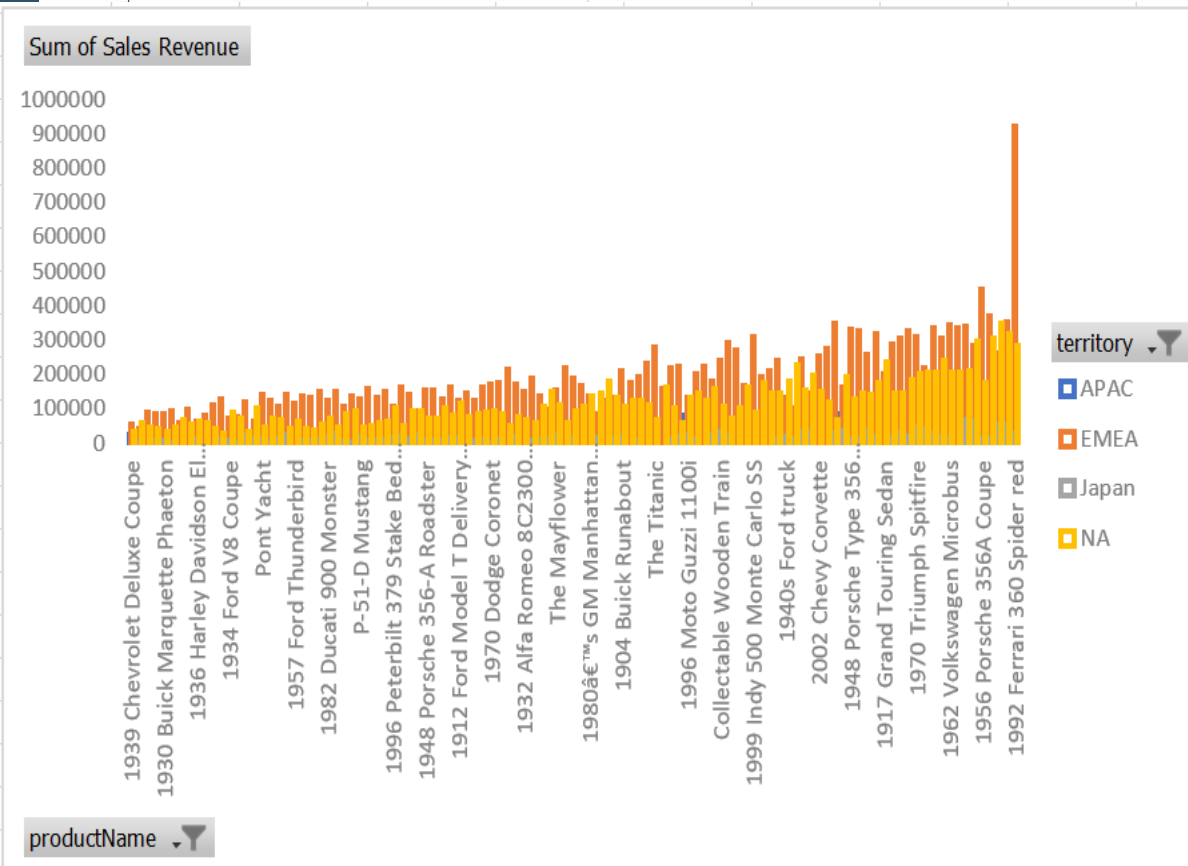


How can the product mix be optimized to cater to changing market demands?



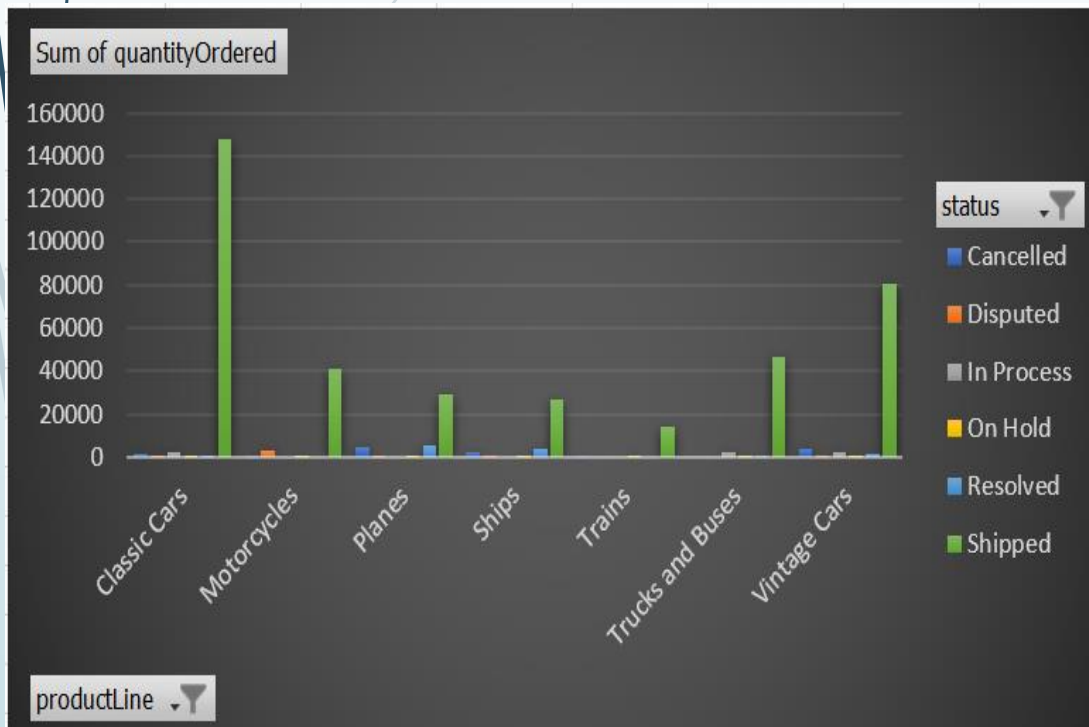
- **Product Mix:** Product mix is a term used to define the **Product Lines** and **Products** under that Product line (Product Category) offered by a company in a market.
- Product Mix can be changed according to market situation, like if a product in particular Product Line is not doing good sales in that market it will be stopped in that market and vice-verse.
- **Analysis:** Here in the dataset Product line and products both are given in different markets to analyze Product mix optimization. I have analyzed product Lines and Products in different markets and have seen different product lines are performing differently in markets.
- **Classic Cars and Motor Cycles** are more in **France and other markets except Japan**. So, to optimize Product mix I suggest retailers to discontinue Classic cars and Motor cycles in Japan.
- Like this we can do in all markets to optimize the Product Mix.

Are there any specific market segments where a particular product is underperforming, and how can it be improved?



- The underperforming product or asset is a product which is performing poor in sales in a company and should be improved to stabilize the company.
- **Analysis:** In the given data I have analyzed low performing products based on sales in different region and by that I have known different product is performing low in different region. I have taken sum of sales and analyzed different product low performance in different region. In APAC region **1962 City of Detroit Street car** is low performing product in terms of sales, followed by **1958 Chevy Corvette Limited Edition** and **1982 Lamborghini Diablo**. In EMEA region **1936 Mercedes 500k Roadster** and **Chevrolet Deluxe Coupe** are the low performing products.
- In Japan the low performing products are **1936 Mercedes Benz 500k Roadster** and **1982 Ducati 996R**.
- In North America low performing products are **Horch 930V Limousine** and **Vintage Bi-Plane** are the low performing products in terms of sales.
- By all this we can conclude that different region has different low sales products, so we can suggest different marketing strategies for different regions for their sales growth.

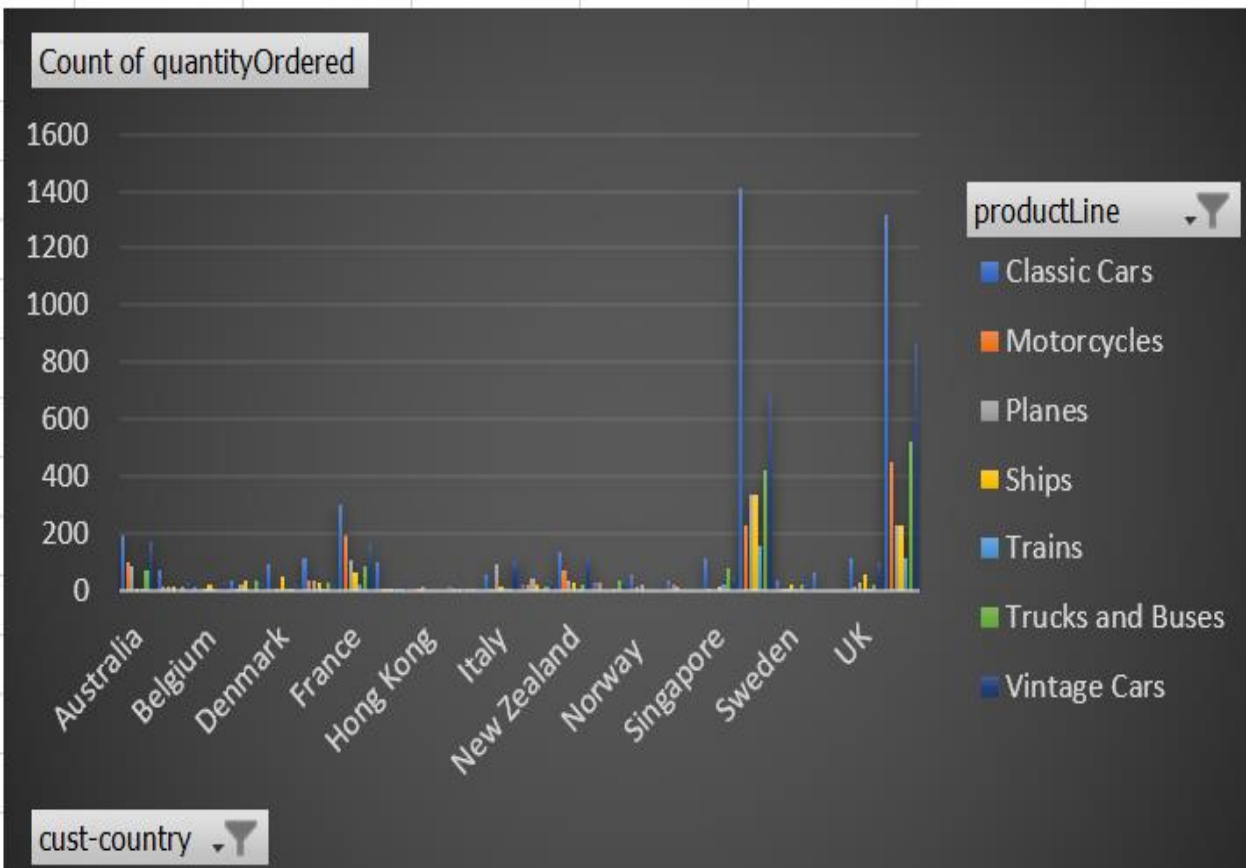
## What are the main factors that influence customer loyalty and repeat purchases?



- Customer Loyalty is a term used to describe customer trust on a product of a particular company. If a customer buys a product and satisfied with it, he will do repeated purchases and his loyalty towards the company increases.
- Factors of customer Loyalty are
- Customer satisfaction, Hassle free buying and delivery, Availability of the product, Special treatment from retailer when ever done shopping.
- Analysis:** To analyze the data we need all the above attributes, but I have only Order Status by which I have analyzed the customer satisfaction. If a customer is satisfied with the order, he will give more business to company.
- After analysis I have known that **In-process, On-Hold, Resolved and Shipped** are having good numbers compared to **Cancelled and Disputed**. So, from analysis I can say there are more satisfied and loyal customer to give good sales numbers.
- But I suggest retailer to look and resolve that cancelled and Disputed customers issues that they too become loyal customers.

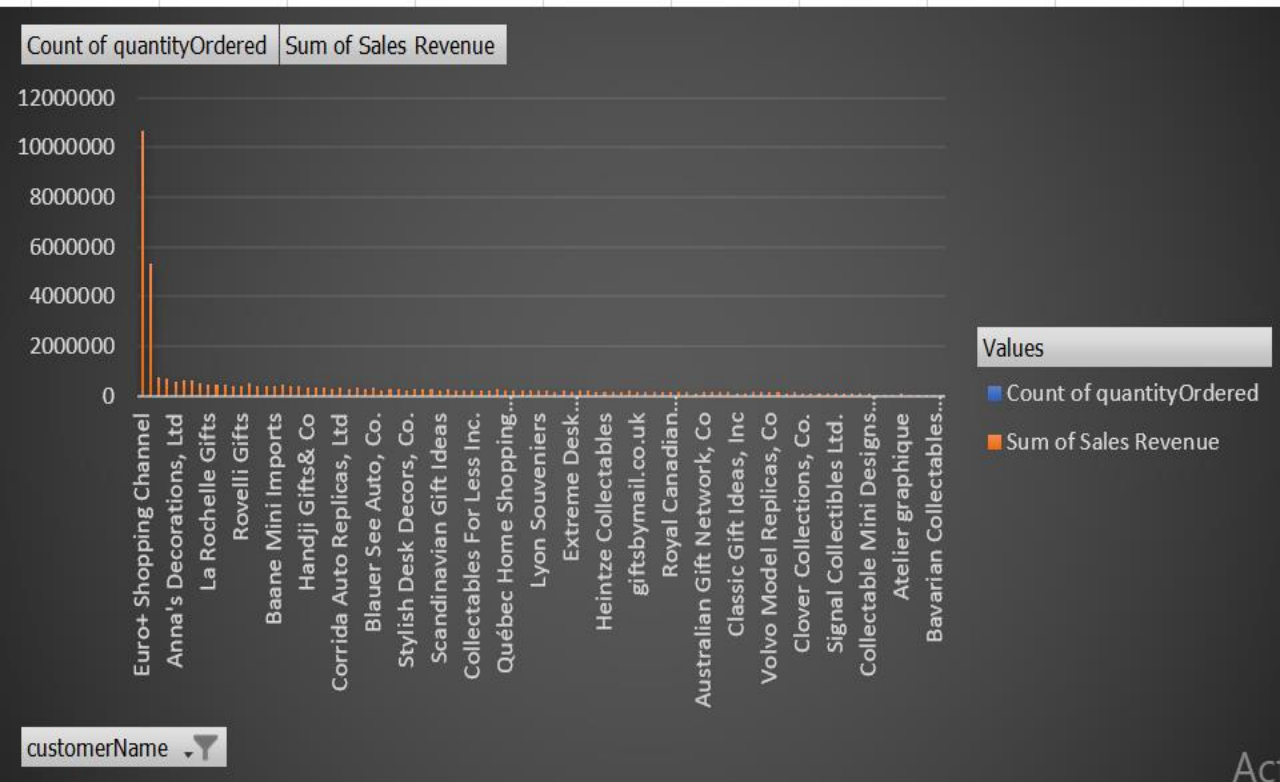


How do customer preferences differ based on geographic location, and how can marketing campaigns be customized accordingly?



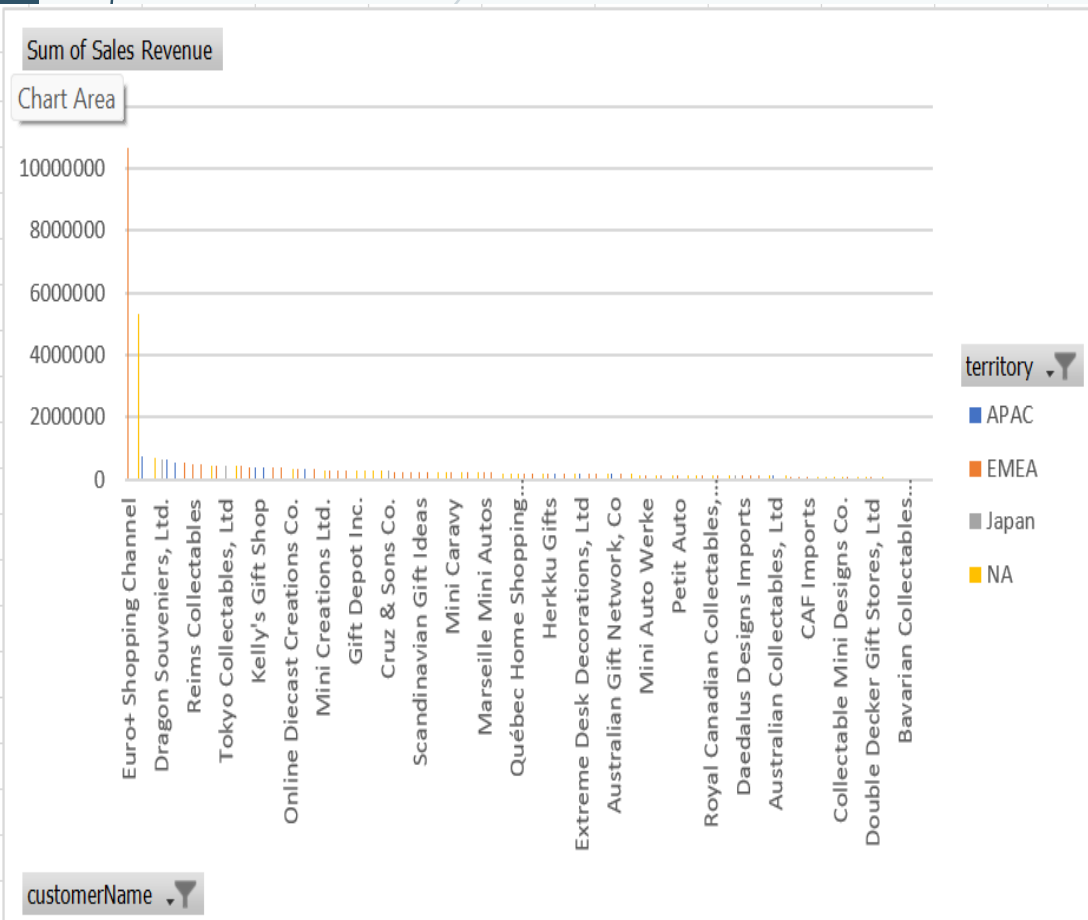
- **Analysis:** Here after going through the data set, I only found **one** demographic factor that is **Location**. I have analyzed customer preferences based on location in this problem statement. I have noticed different Location have different buying behavior after analysis.
- Classic cars are more preferred in Spain followed by USA, France and Australia.
- Motor cycles are more preferred in USA followed by Spain.
- Planes are more preferred in Spain and USA.
- Ships are more preferred in Spain and USA.
- Trains are more preferred in Spain and USA.
- Trucks are and Buses more preferred in USA and Spain.
- and Vintage cars are more preferred in USA and Spain.
- Based on the above demographic analysis I suggest Retailers to design separate marketing campaign for different Location.

What are the characteristics of high-value customers, and how can similar customers be targeted for acquisition?



- **High value Customers** are those who rely on your product or services more than other customers and bring in more business in the long run. High-value customers are labeled differently depending on your business. For retail stores, this will be someone who purchases items or services regularly and at great volume.
- **Analysis:** In this analysis of High value customer for our retail products I have taken Quantity Ordered and Sales Revenue to know High Value Customer for our retail products.
- From the above analysis I have noticed that our High Value Customers are **Euro+shopping, Minigifts Distributions. Ltd, Australian collector.co, Muscle Machine and Anna Decorations.** I have analyzed them based on sales revenue given by them.
- And our similar customers like HVC who can be converted to HVC are Down Under soveniers, Dragon souvenirs, Reim collectables, which can be converted to High Value Customers by giving special discounts and Goodies along with our products. This is my suggestion to the retailers.

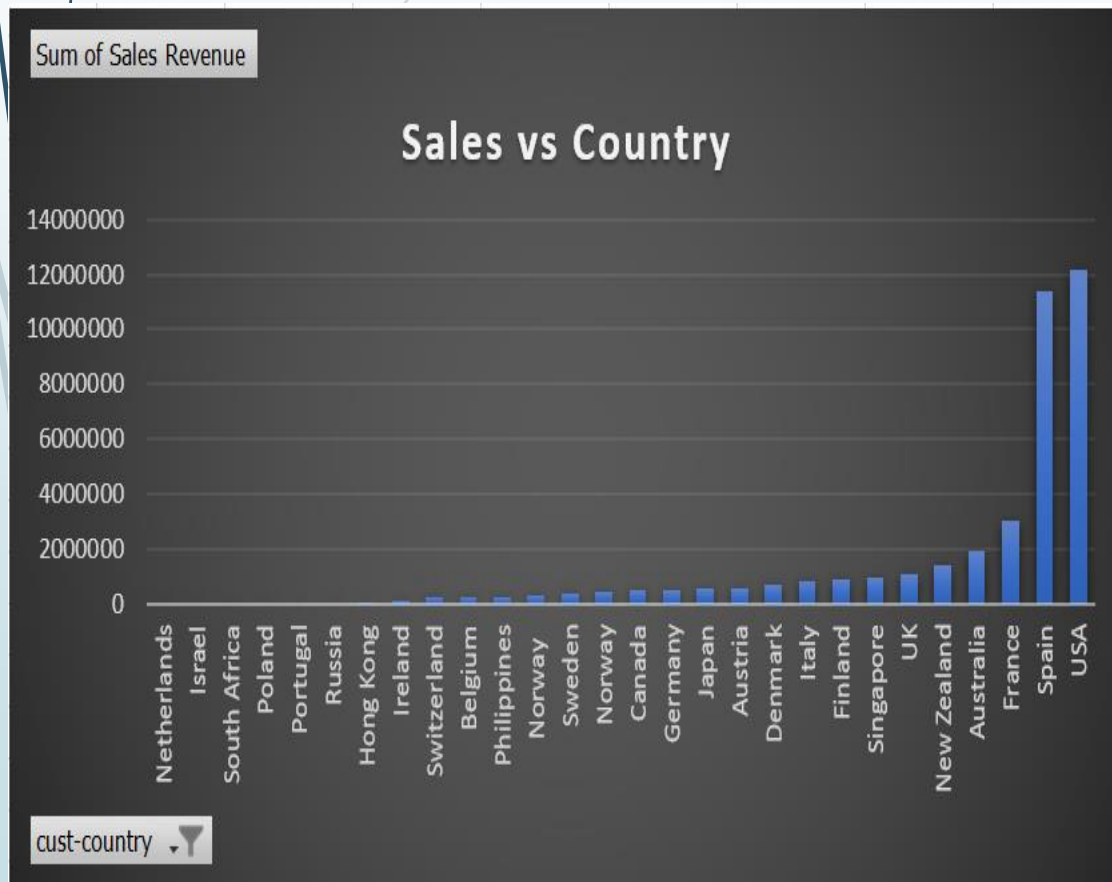
## How can marketing strategies be tailored to target specific demographic segments in different regions?



- Here in this problem statement, we need marketing strategies and demographic segments data which is not given in our data set. Only regions are given and no other analysis is possible with that data.
- I have analyzed data of customers based on different location and their sales to know which strategy to apply for improving sales in that region.
- **Analysis:** After analyzing the data thoroughly, I have seen that each market has different sales and should be targeted differently.
- There is no much data other than country in this question to do. So, I analyzed region wise sales and based on my analysis Euro shopping channel is top in sales in EMEA Region and Mini gifts is top in North America region so, different marketing strategies to be applied to different region for sales growth.

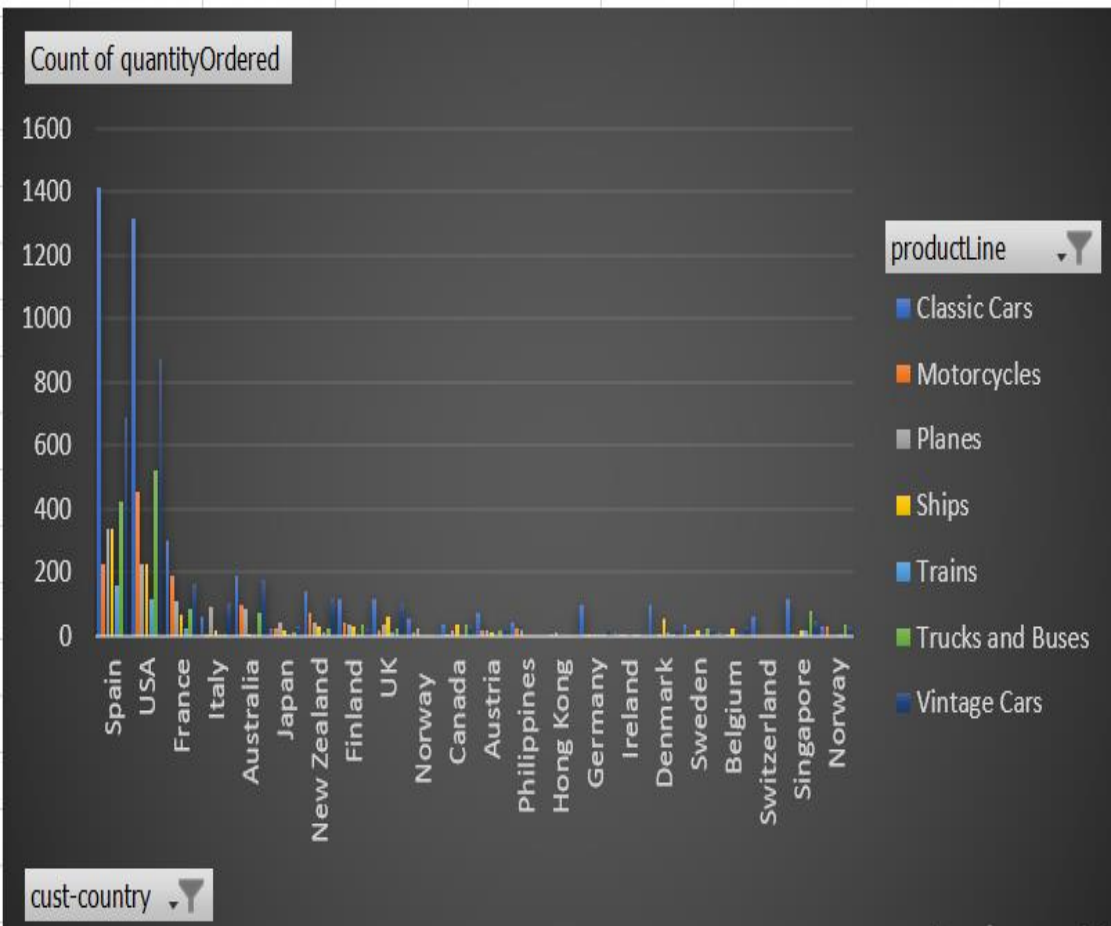


What are the potential untapped markets based on demographic indicators, and how can market penetration be increased?



- **Untapped Markets:** Untapped markets are the markets where a particular company will be having no presence in market and market share. Untapped markets will have good potential to launch new products and to grab opportunity in new markets.
- Market Penetration in to Untapped markets:
  - 1.The market penetration can be increased by penetrative pricing (low pricing).
  - 2.Providing special discounts on products on entry into market.
  - 3. Launching existing product as new in new market with more benefits.
- **Analysis:** Here in this problem statement, we need to identify Untapped markets in that region and provide strategies to penetrate into them. So, I have taken Sales and country to analyze and found that there are Untapped markets in 6 different regions this I have known from sales value of that markets. They have zero sales.
- The Untapped markets in the analysis are **Netherlands, Russia, Israel, Poland, Portugal, South Africa.**
- After the thorough analysis I suggest retailers to enter into these markets with penetrative pricing by providing product for Discount or for low pricing.

How do customer preferences and behavior differ based on demographic factors, and how can they be leveraged for personalized marketing campaigns?



- **Analysis:** Here after going through the data set I only found one demographic factor that is Location. I have analyzed customer preferences based on location in this problem statement. I have noticed different Location have different buying behavior after analysis.
- Classic cars are more preferred in Spain followed by USA, France and Australia.
- Motor cycles are more preferred in USA followed by Spain.
- Planes are more preferred in Spain and USA.
- Ships are more preferred in Spain and USA.
- Trains are more preferred in Spain and USA.
- Trucks and Buses are more preferred in USA and Spain.
- Vintage cars are more preferred in USA and Spain.
- Based on the above demographic analysis I suggest Retailers to design separate marketing campaign for different Location.





# CONCLUSION

- The Project for the Retail Analysis is a comprehensive and insightful analysis done to analyse various aspects of the retail business. While doing this project I have analysed different aspects of Retail business to give detailed insights to the Retailers. I have gone through lot of anomalies while doing the project and I have overcome them to give correct and meaningful and insightful data to retailers.
- This analysis will give a retailer information about the financial aspects of his store like Profit, Sales Revenue, Profitability and number of orders placed. It will also gives him about the details of his loyal customers and their demographic segmentation like Country, Credit Limits and their purchasing behaviour.

