Axon Retail Cars Analysis

Problem Statement

Company Background:

Axon is a small retailer specializing in vintage cars, classic cars, etc. However, they are facing challenges in managing and analysing their sales data. The lack of a centralized system is hindering the sales team's ability to understand the data, leading to inaccuracies in sales reports. The absence of accurate, up-to-date sales data is adversely affecting decision-making within the company.

Project Goal:

The project aims to design and implement a Business Intelligence (BI) solution using Power BI and SQL to effectively manage and analyse Axon's sales data. The solution should address the following objectives:

1. Data Integration: Import and integrate data from the MySQL database into PowerBI.
2. Data Cleaning: Clean and transform data to ensure it is analysis-ready.
3. Dashboard Creation: Build interactive dashboards and reports in PowerBI to facilitate data understanding.
4. Advanced Analytics: Use SQL for advanced analytics to derive insights for sales improvement (if needed).
5. Real-time Access: Enable real-time access to dashboards and reports for management decision-making. The success of this project will be measured by its ability to empower Axon to effectively manage and analyse their sales data, leading to improved decision-making.

Database Description:

The MySQL sample database schema comprises eight tables containing typical business data:

1. Customers: Stores customer data.
2. Products: Contains a list of scale model cars.
3. ProductLines: Lists product line categories.
4. Orders: Stores sales orders placed by customers.
5. OrderDetails: Contains sales order line items for each sales order.
6. Payments: Stores payments made by customers based on their accounts.
7. Employees: Contains employee information and organizational structure data.
8. Offices: Stores sales office data.

Project Steps:

To address the Capstone project, the following steps can be followed:

1. **Data Source:** Utilize the provided MySQL database as the data source.
2. **Data Extraction and Cleaning**: Extract data from the source and perform data cleaning tasks, including handling duplicates, missing values, and ensuring data consistency. Orders table cleaning in MySQL:

Orders table cleaning in MySQL:

```sql
SELECT * FROM orders;
```

orderNumber	orderDate	requiredDate	shippedDate	status	comments	customerNumber
10100	2003-01-06	2003-01-13	2003-01-10	Shipped	NULL	363
10101	2003-01-09	2003-01-18	2003-01-11	Shipped	Check on availability.	128
10102	2003-01-10	2003-01-18	2003-01-14	Shipped	NULL	181
10103	2003-01-29	2003-02-07	2003-02-02	Shipped	NULL	121
10104	2003-01-31	2003-02-09	2003-02-01	Shipped	NULL	141
10105	2003-02-11	2003-02-21	2003-02-12	Shipped	NULL	145

```sql
update orders set comments=coalesce(comments,"No comments");
SELECT * FROM orders;
```

orderNumber	orderDate	requiredDate	shippedDate	status	comments	customerNumber
10100	2003-01-06	2003-01-13	2003-01-10	Shipped	No comments	363
10101	2003-01-09	2003-01-18	2003-01-11	Shipped	Check on availability.	128
10102	2003-01-10	2003-01-18	2003-01-14	Shipped	No comments	181
10103	2003-01-29	2003-02-07	2003-02-02	Shipped	No comments	121
10104	2003-01-31	2003-02-09	2003-02-01	Shipped	No comments	141

Customers table cleaning in MySQL and PowerBI:

```sql
SELECT * FROM classicmodels.customers;
```

customerNumber	customerName	contactLastName	contactFirstName	phone	addressLine1
103	Atelier graphique	Schmitt	Carine	40.32.2555	54, rue Royale
112	Signal Gift Stores	King	Jean	7025551838	8489 Strong St.
114	Australian Collectors, Co.	Ferguson	Peter	03 9520 4555	636 St Kilda Road
119	La Rochelle Gifts	Labrune	Janine	40.67.8555	67, rue des Cinquante Ota
121	Baane Mini Imports	Bergulfsen	Jonas	07-98 9555	Erling Skakkes gate 78

```sql
update customers
set phone= replace(phone,' ','');
update customers set phone=replace(phone,'-','');
update customers set phone=replace(replace(phone,'(',''),')','')
where phone like "%(%" or phone like "%)%";
```

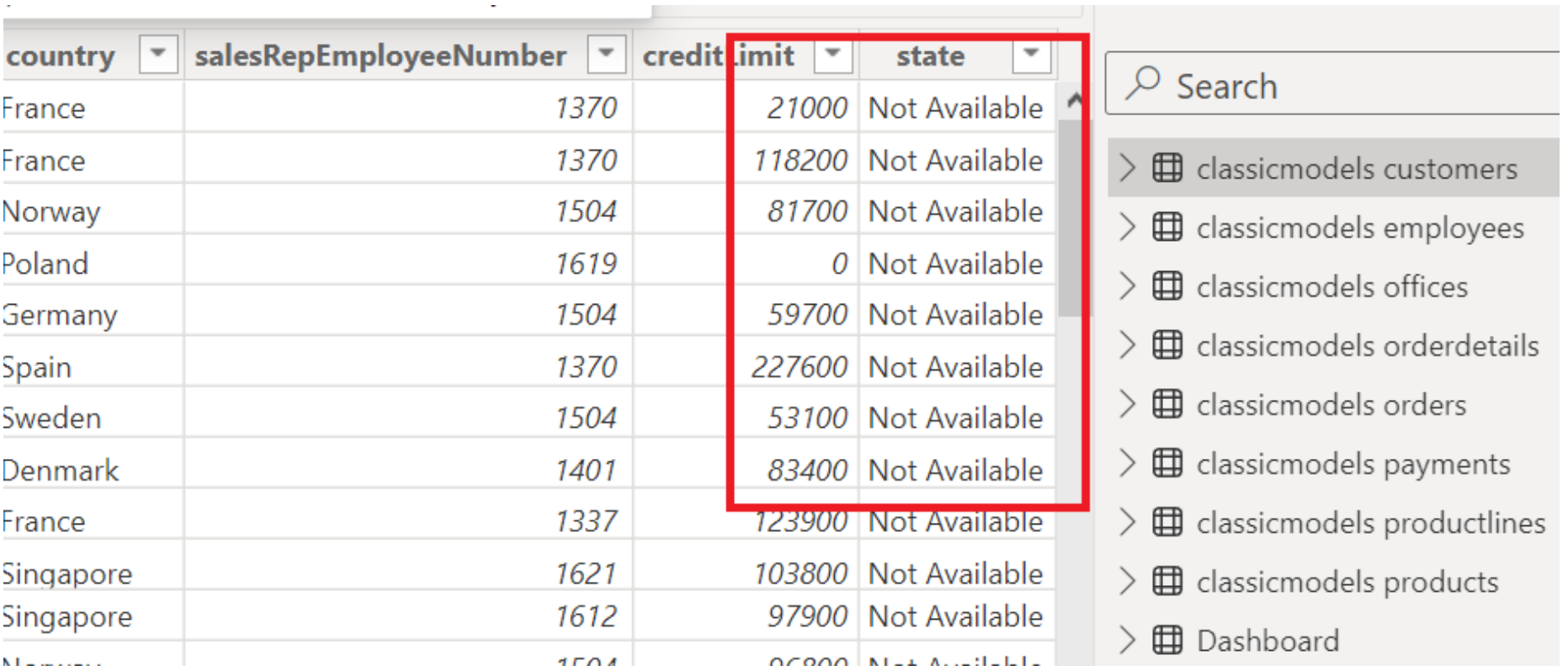
customerNumber	customerName	contactLastName	contactFirstName	phone	addressLine1
103	Atelier graphique	Schmitt	Carine	+40322555	54, rue Royale
112	Signal Gift Stores	King	Jean	+7025551838	8489 Strong St.
114	Australian Collectors, Co.	Ferguson	Peter	+0395204555	636 St Kilda Road
119	La Rochelle Gifts	Labrune	Janine	+40678555	67, rue des Cinquante Otages
121	Baane Mini Imports	Bergulfsen	Jonas	+07989555	Erling Skakkes gate 78

Parameters | Parameters | Query | Manage Columns | Reduce Rows | Sort | Transform

```
= Source{[Schema="classicmodels",Item="customers"]}[Data]
```

addressLine2	city	state	postalCode	co
Valid 18% / Error 0% / Empty 82%	Valid 100% / Error 0% / Empty 0%	Valid 40% / Error 0% / Empty 60%	Valid 94% / Error 0% / Empty 6%	Val / Err / Em
null	Nantes	null	44000	France
null	Las Vegas	NV	83030	USA
Level 3	Melbourne	Victoria	3004	Austra
null	Nantes	null	44000	France
null	Stavern	null	4110	Norwa
null	San Rafael	CA	97562	USA
null	Warszawa	null	01-012	Polanc
null	Frankfurt	null	60528	Germa
null	San Francisco	CA	94217	USA
null	NYC	NY	10022	USA
null	Madrid	null	28034	Spain
null	Luleå	null	S-958 22	Swede
null	Kobenhavn	null	1734	Denma
null	Lyon	null	69004	France
Bronz Apt. 3/6 Tesvikiye	Singapore	null	079903	Singap

We have dropped AddressLine2 column because it had 82% null values and state had 60% null values so we replaced states with not available where null values were present.

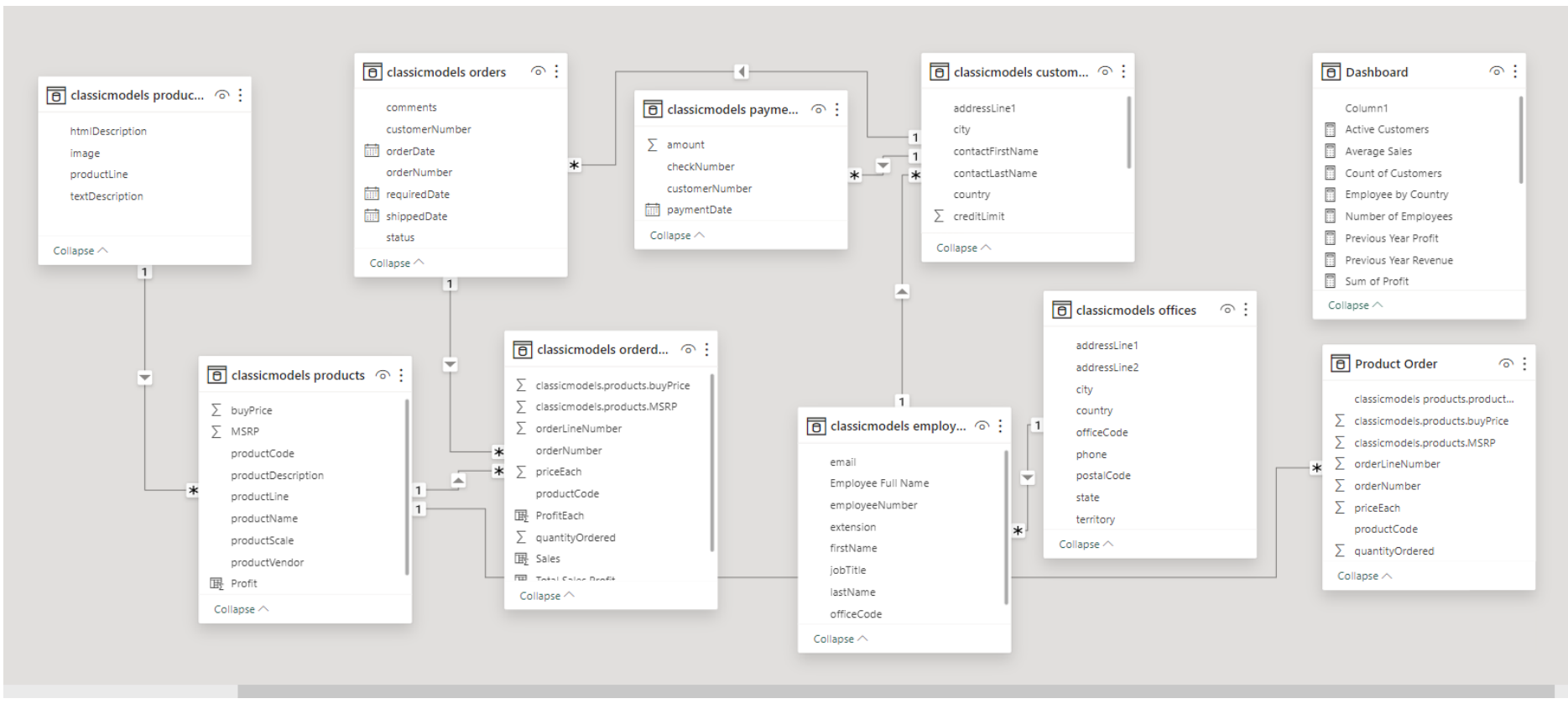


country	salesRepEmployeeNumber	creditLimit	state
France	1370	21000	Not Available
France	1370	118200	Not Available
Norway	1504	81700	Not Available
Poland	1619	0	Not Available
Germany	1504	59700	Not Available
Spain	1370	227600	Not Available
Sweden	1504	53100	Not Available
Denmark	1401	83400	Not Available
France	1337	123900	Not Available
Singapore	1621	103800	Not Available
Singapore	1612	97900	Not Available

3.Data Loading: Load the cleaned data into Power BI, documenting the process thoroughly.

4.Data Modelling:

After transformation in the power query now comes the most crucial part of the analysis in power bi that is data modeling as follows:



Few DAX formulae Used to create calculated columns and measures are:

1. Active Customers:

```
1  Active Customers = COUNTROWS(FILTER('classicmodels customers','classicmodels customers'[creditLimit]>1))
```

2. Average Sales:

```
1  Average Sales = AVERAGE('classicmodels orderdetails'[Sales])
```

3. Count of Customers:

```
1 Count of Customers = COUNT('classicmodels orderdetails'[orderNumber])
```

4. Employee by Country:

```
1 Employee by Country = DISTINCTCOUNT('classicmodels customers'[salesRepEmployeeNumber])
```

5. Number of Employees:

```
1 Number of Employees = COUNT('classicmodels employees'[employeeNumber])
```

6. Previous Year Profit:

```
1 Previous Year Profit = CALCULATE(SUM('classicmodels orderdetails'[Total Sales Profit]),DATEADD('classicmodels orders'[orderDate].
  [Date],-1,YEAR))
```

7. Previous Year Revenue:

```
1 Previous Year Revenue = CALCULATE( [Total Sales] , DATEADD( 'classicmodels orders'[orderDate].[Date] , -1, YEAR ) )
```

8. Total Profit:

```
1 Total Sales Profit = 'classicmodels orderdetails'[ProfitEach]*'classicmodels orderdetails'[quantityOrdered]
```

9. Total Customers:

```
1 Total Customers = COUNT('classicmodels customers'[customerNumber])
```

10. Total Orders:

```
Total Orders = CALCULATE(DISTINCTCOUNT('classicmodels orderdetails'[orderNumber]), GROUPBY('classicmodels products',
'classicmodels products'[productName]))
```

11. Total Product Ordered:

```
1 Total Product Ordered = DISTINCTCOUNT('classicmodels orderdetails'[productCode])
```

12. Total Products:

```
Total Products = COUNT('classicmodels products'[productCode])
```

13. Total Sales:

```
Total Sales = SUM('classicmodels orderdetails'[Sales])
```

14. Total Unit Ordered:

```
Total Unit Ordered = SUM('classicmodels orderdetails'[quantityOrdered])
```

15. YOY Profit:

```
YOY Profit = [Sum of Profit]-[Previous Year Profit]
```

16. YOY Profit %:

```
YOY Profit% = DIVIDE([YOY Profit],[Previous Year Profit],1)
```

17. YOY Sales:

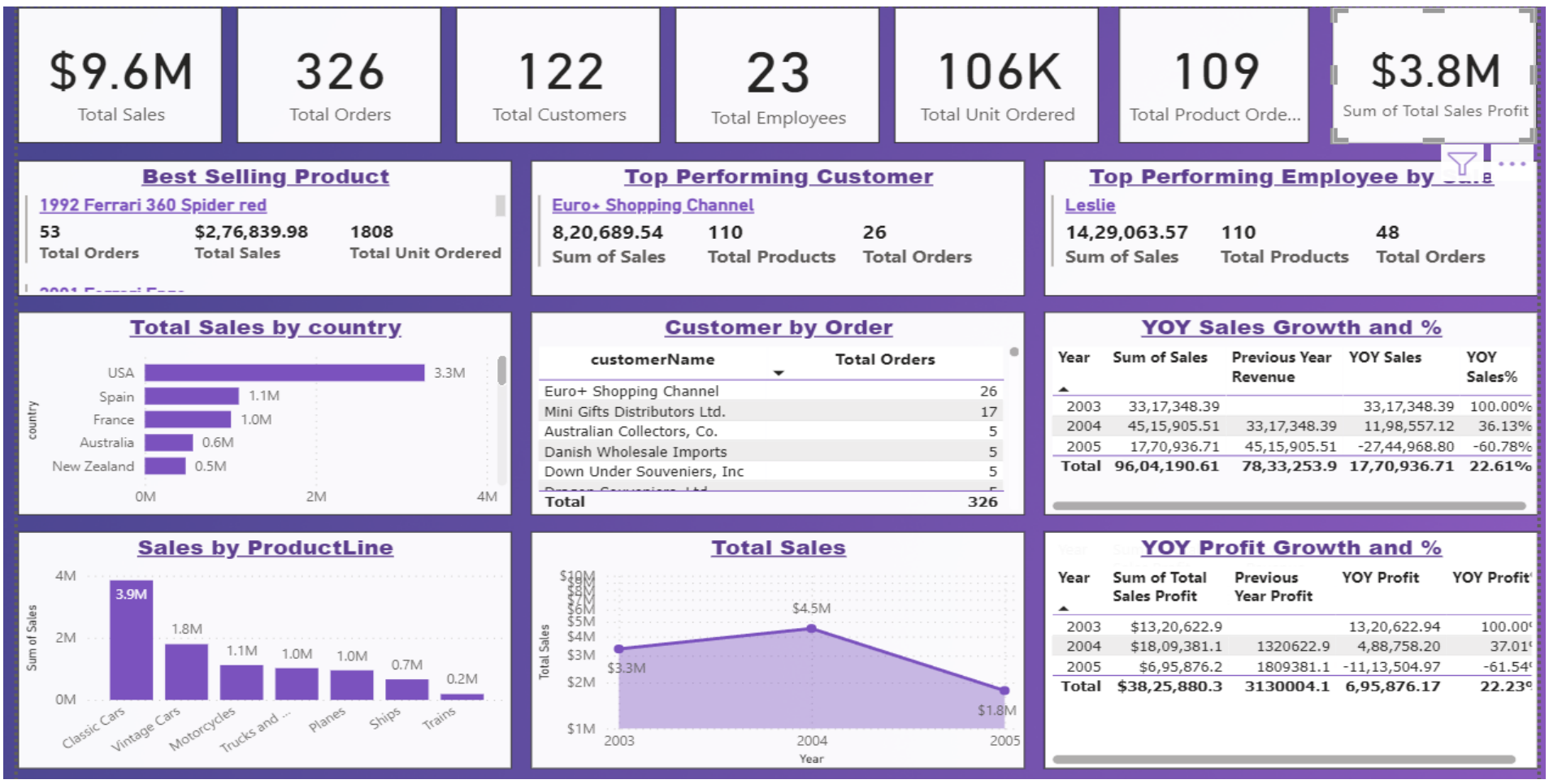
```
YOY Sales = [Total Sales]-[Previous Year Revenue]
```

18. YOY Sales %:

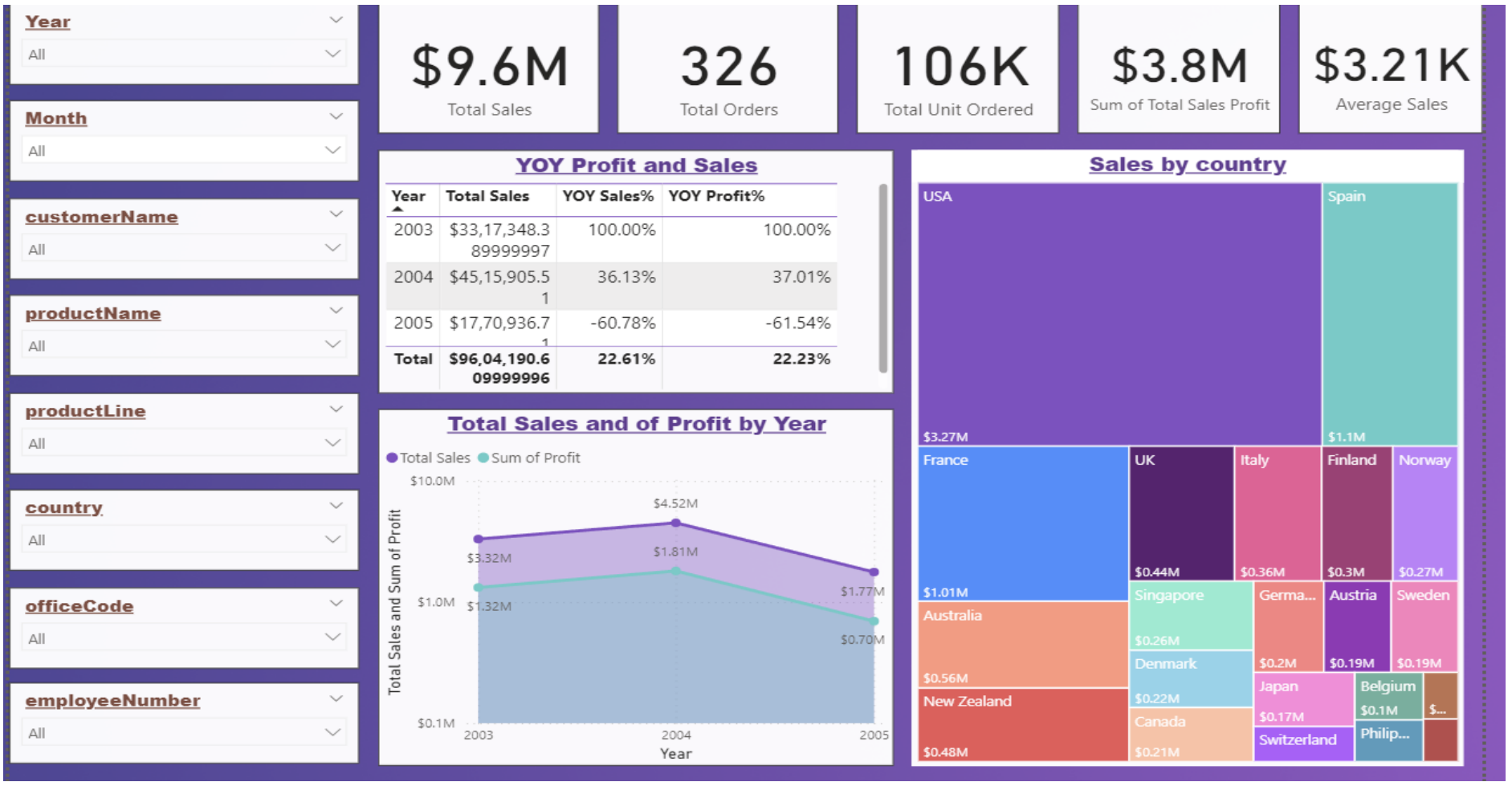
```
YOY Sales% = DIVIDE([YOY Sales],[Previous Year Revenue],1)
```

5. Dashboard and Report Design: Utilize PowerBI to design interactive dashboards and reports, incorporating charts, graphs, tables, and DAX functions for data analysis:

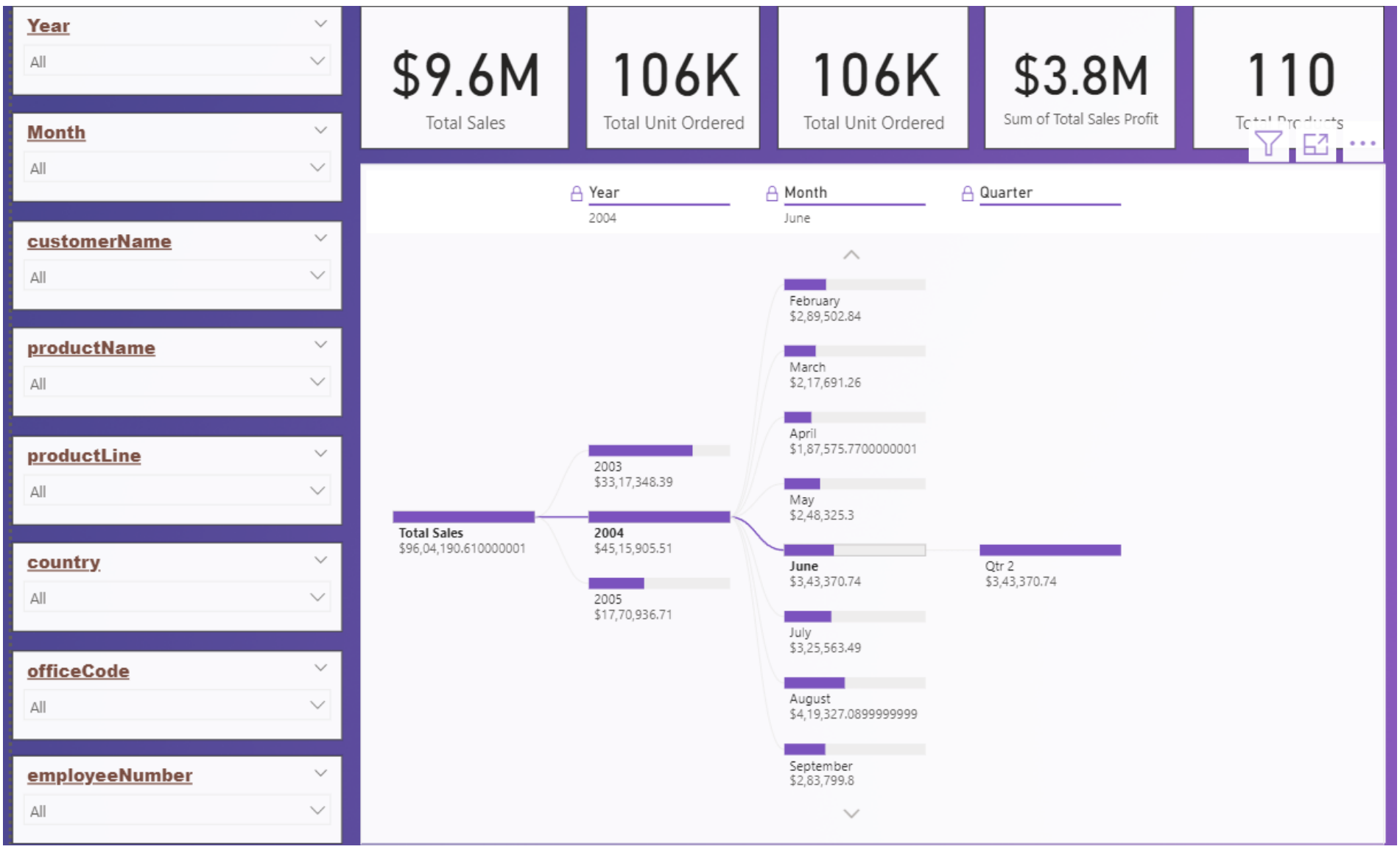
Overview:



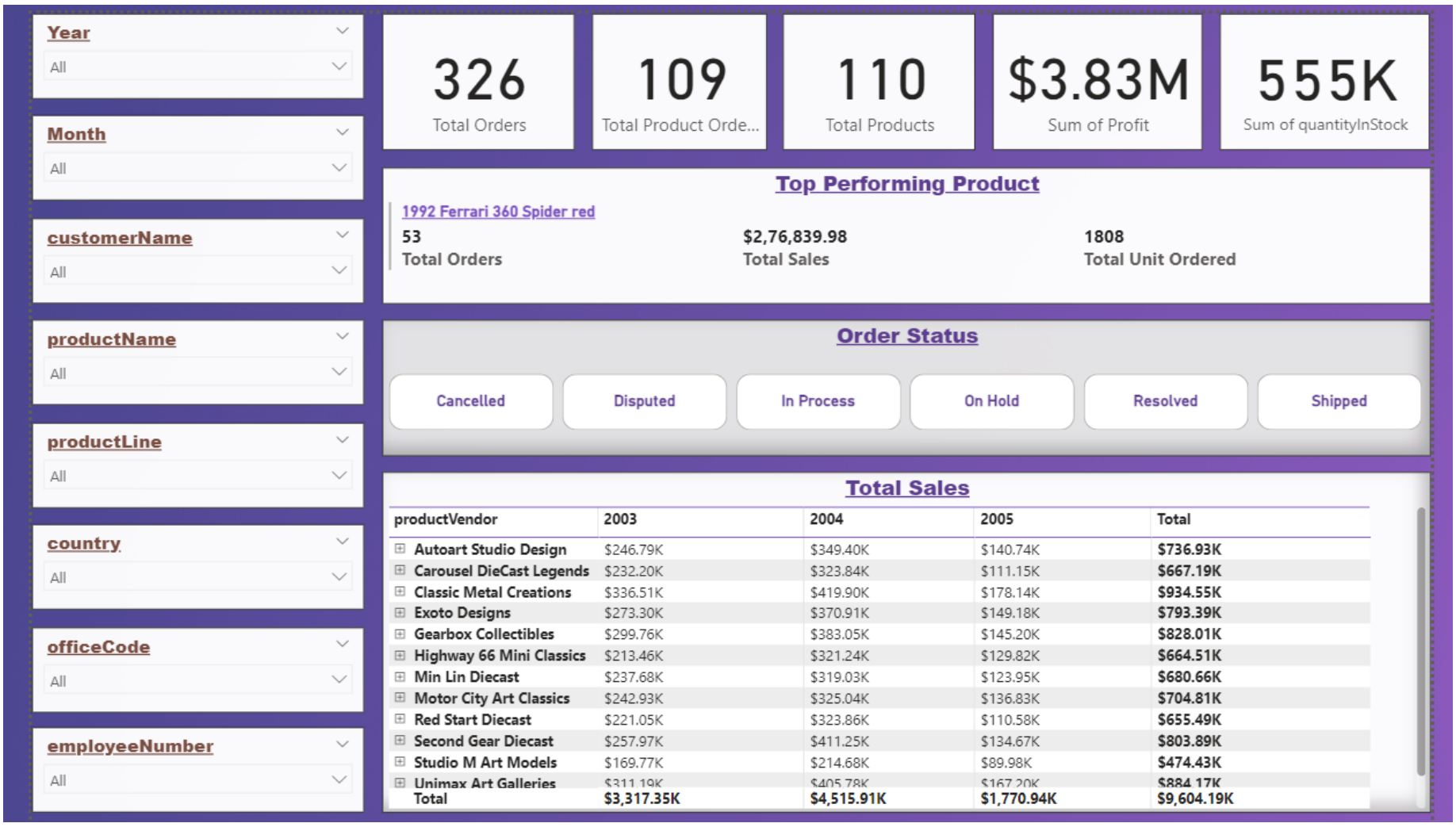
Sales Analysis:



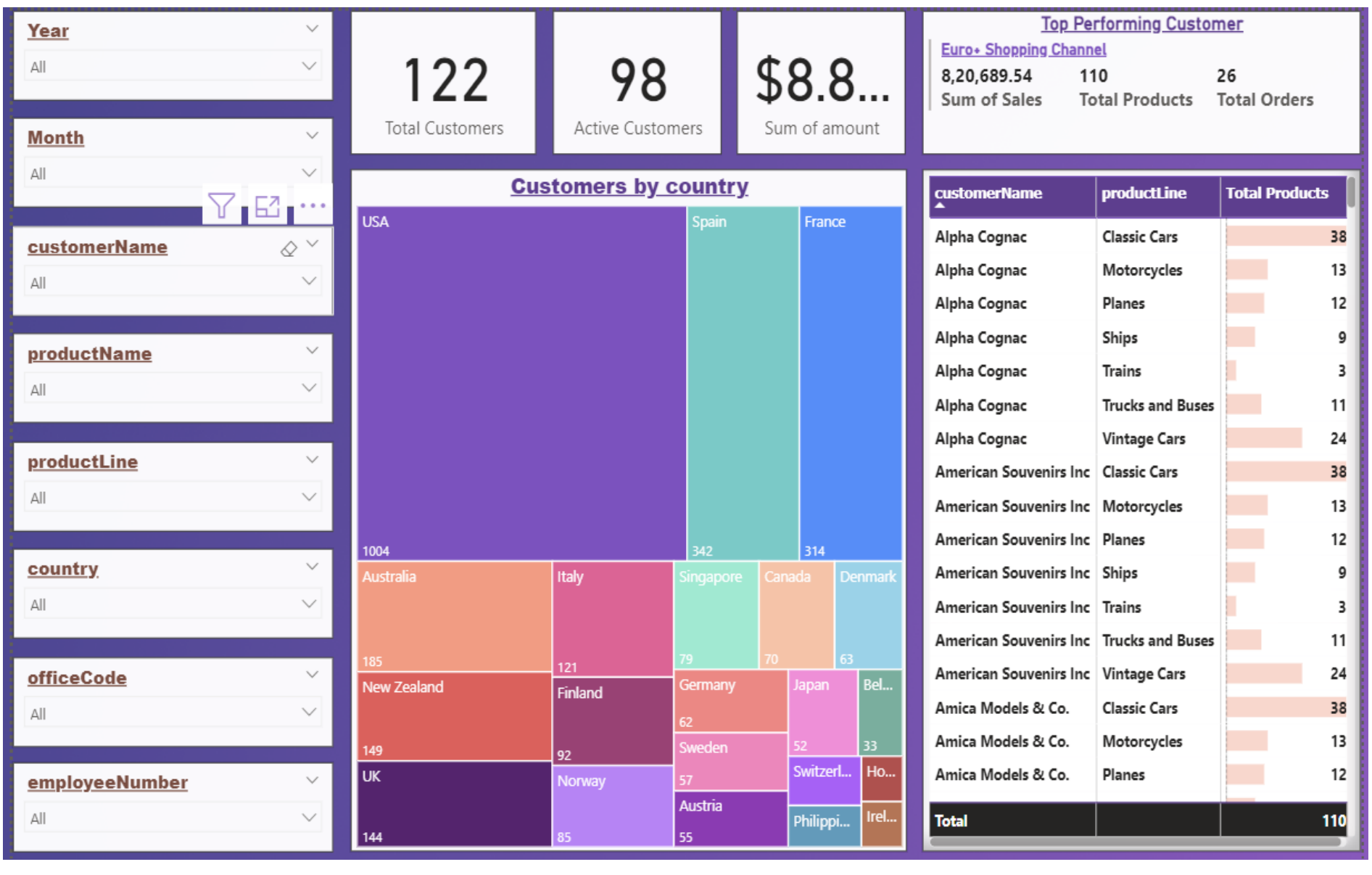
Sales Analysis 2:



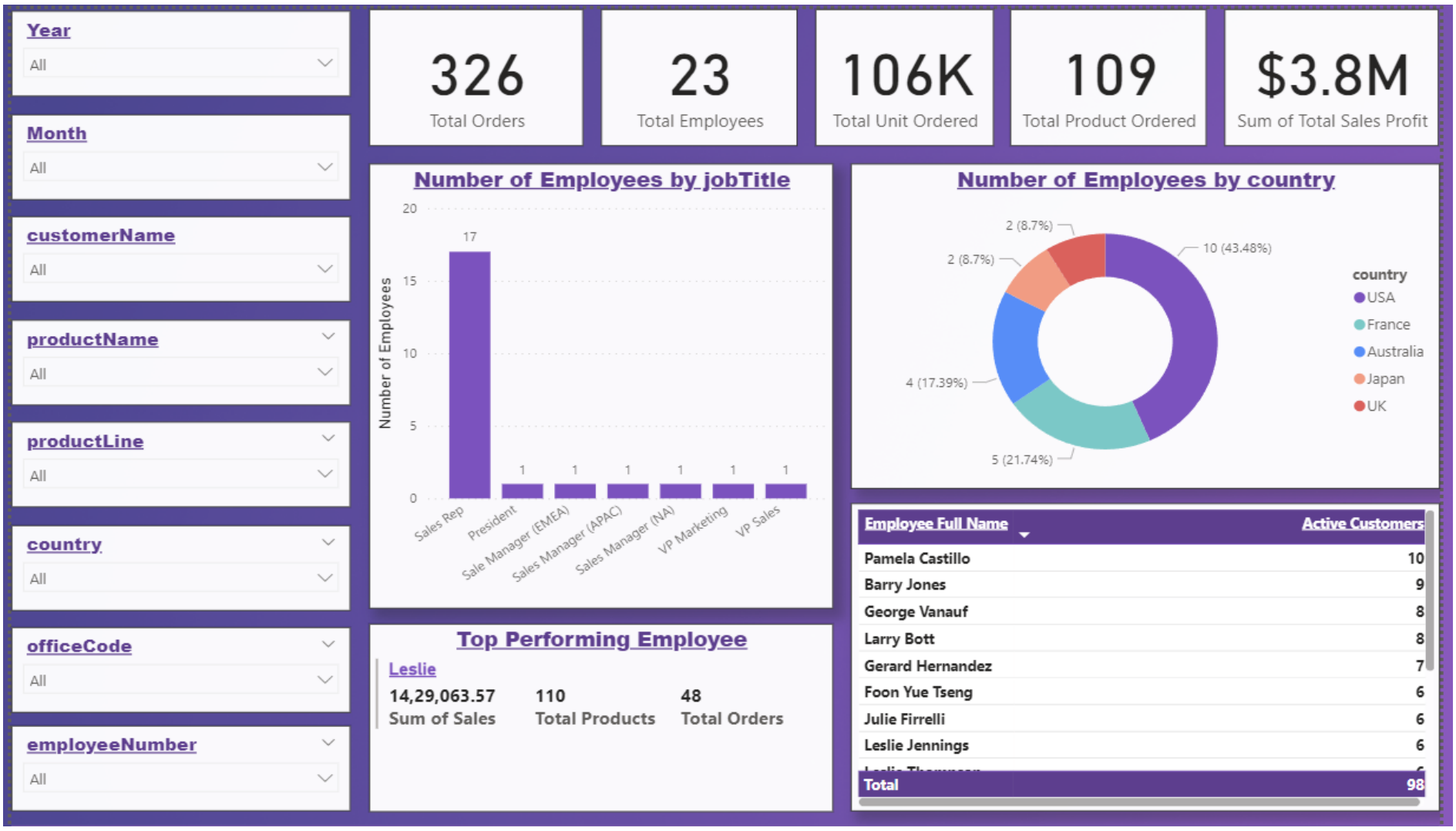
Product Analysis:



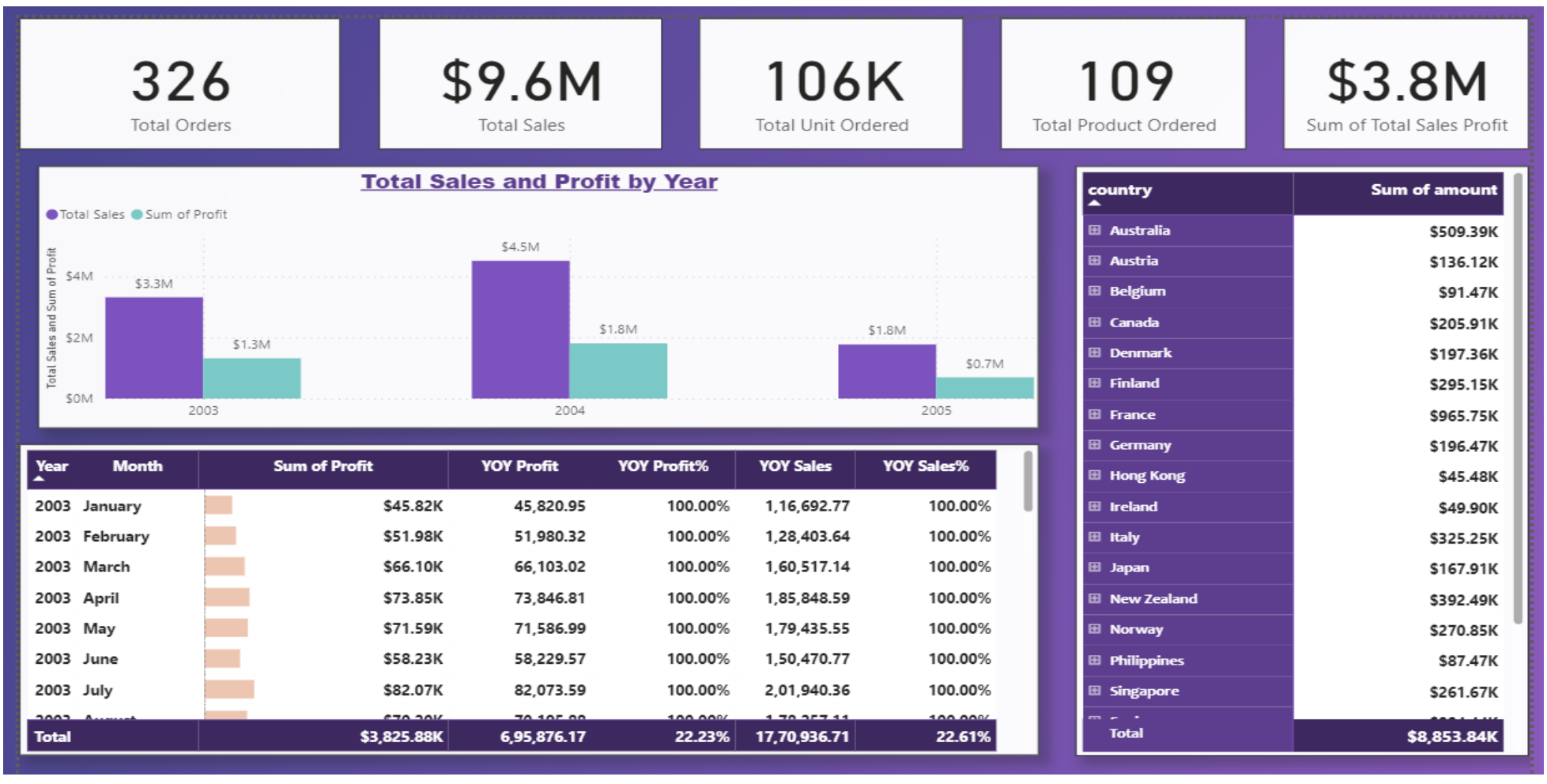
Customer Analysis:



Employees:



Payments:



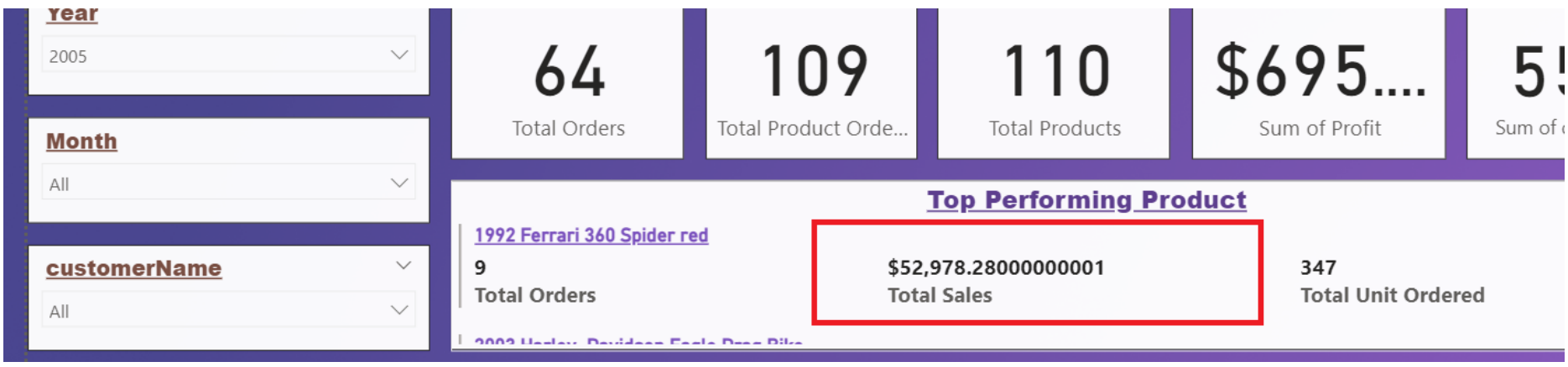
5. Advanced Analytics: Employ SQL for advanced analytics, including running queries, and generating views to extract actionable insights.

Top Selling Product by Year:

```
1  select productName,sum(orderdetails.quantityOrdered*orderdetails.priceEach) as sales from orderdetails join products
2  on orderdetails.productCode=products.productCode join orders on orderdetails.orderNumber = orders.orderNumber
3          where year(orders.orderDate)='2005' group by productName order by sales desc limit 5;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

productName	sales
1992 Ferrari 360 Spider red	52978.28
2003 Harley-Davidson Eagle Drag Bike	34856.12
1952 Alpine Renault 1300	34037.20
1968 Ford Mustang	31699.51
1956 Porsche 356A Coupe	31432.14

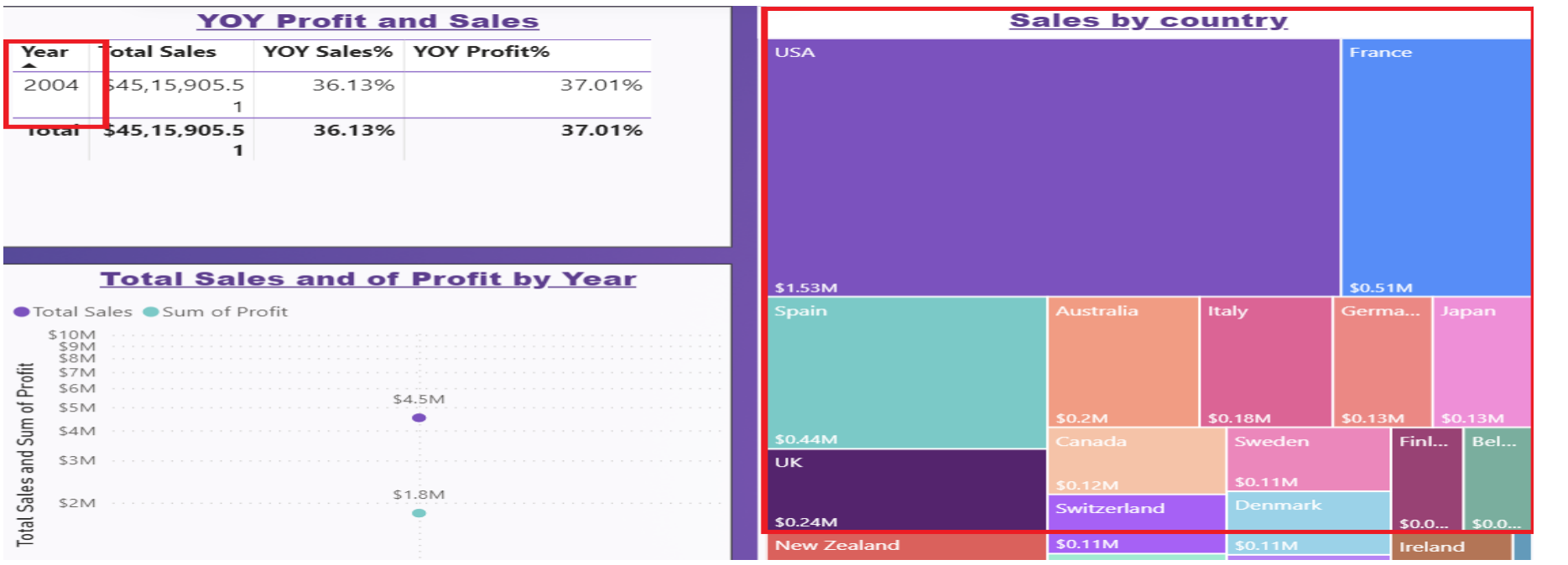


Top countries generating revenue:

```
1  select country,sum(orderdetails.quantityOrdered*orderdetails.priceEach) as sales from orderdetails
2      join orders
3  on orderdetails.orderNumber=orders.orderNumber join customers on
4      orders.customerNumber = customers.customerNumber
5     where year(orders.orderDate)='2004' group by country order by sales desc limit 10;
6
```

esult Grid | Filter Rows: | Export: | Wrap Cell Content:

country	sales
USA	1526499.65
France	506660.01
Spain	439881.84
UK	238193.93
New Zealand	233362.27
Australia	204213.18
Italy	179108.40
Germany	133831.70
Japan	133326.77



Total Sales by Customer Name:

```
1 •  select customerName,sum(orderdetails.quantityOrdered*orderdetails.priceEach) as sales from orderdetails
2        join orders
3    on orderdetails.orderNumber=orders.orderNumber join customers on
4        orders.customerNumber = customers.customerNumber group by customerName order by sales desc limit 10;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

customerName	sales
Euro+ Shopping Channel	820689.54
Mini Gifts Distributors Ltd.	591827.34
Australian Collectors, Co.	180585.07
Muscle Machine Inc	177913.95
La Rochelle Gifts	158573.12
Dragon Souveniers, Ltd.	156251.03
Down Under Souveniers, Inc	154622.08
Land of Toys Inc.	149085.15
AV Stores, Co.	148410.09

Result 1

Total Sales View:

```
1 •  SELECT * FROM classicmodels.total_sales;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: | Fetch rows:

orderNumber	productCode	year	shippedDate	productName	productLine	productScale
10107	S10_1678	2003	2003-02-26	1969 Harley Davidson Ultimate Chopper	Motorcycles	1:10
10121	S10_1678	2003	2003-05-13	1969 Harley Davidson Ultimate Chopper	Motorcycles	1:10
10134	S10_1678	2003	2003-07-05	1969 Harley Davidson Ultimate Chopper	Motorcycles	1:10
10145	S10_1678	2003	2003-08-31	1969 Harley Davidson Ultimate Chopper	Motorcycles	1:10
10159	S10_1678	2003	2003-10-16	1969 Harley Davidson Ultimate Chopper	Motorcycles	1:10
10168	S10_1678	2003	2003-11-01	1969 Harley Davidson Ultimate Chopper	Motorcycles	1:10
10180	S10_1678	2003	2003-11-14	1969 Harley Davidson Ultimate Chopper	Motorcycles	1:10
10188	S10_1678	2003	2003-11-24	1969 Harley Davidson Ultimate Chopper	Motorcycles	1:10
10201	S10_1678	2003	2003-12-02	1969 Harley Davidson Ultimate Chopper	Motorcycles	1:10

otal_sales 2

6. Testing and Debugging: Thoroughly test and debug the BI solution to ensure it functions as intended, addressing any issues that arise.

7. Deployment: Deploy the BI solution, including dashboards and reports, to the management team, providing comprehensive documentation for user-friendly adoption.

Insights and Analysis:

1. Steady Sales Growth: Over the years, Axon has shown consistent sales growth, with an

average annual increase of approximately 36% from 2003 to 2004 but decrease in sales from 2004 to 2005 by 60%. This reflects the company has to work on certain areas result in decreasing sales from 2004 to 2005

2. Profit Stability: Notably, the company has maintained a consistent profit margin of

around 37% in 2004 and later decrease by -61% in 2005, indicating need to improve management strategies over years.

3. Seasonal Sales Surge: There is a clear seasonal trend where sales experience an

exponential increase from mid-October to November, likely driven by holiday-related purchases. This seasonality can inform inventory planning and marketing strategies.

4. Customer Favourite: The "1992 Ferrari 360 Spider Red" consistently stands out as a customer favourite over the years. This information can guide inventory management and marketing efforts.

5. Profitable Product Categories: Although classic cars and vintage cars generate substantial revenue, motorcycles exhibit the highest profit margins among all product categories. Focusing on motorcycle sales strategies can further enhance profitability.

6. Underperforming Product Line: The analysis indicates that the "train" product line performs poorly. It may be advisable for the company to discontinue this product line to allocate resources more effectively.

7. USA, Spain, France, UK team outperforms other teams

globally, primarily due to strong sales performance.