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:

```
SELECT * FROM orders;
```

orderNumber	orderDate	requiredDate	shippedDate	status	comments	customerNumber
10100	2003-01-06	2003-01-13	2003-01-10	Shipped		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		181
10103	2003-01-29	2003-02-07	2003-02-02	Shipped		121
10104	2003-01-31	2003-02-09	2003-02-01	Shipped		141
10105	2003-02-11	2003-02-21	2003-02-12	Shipped		145

```
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

```
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

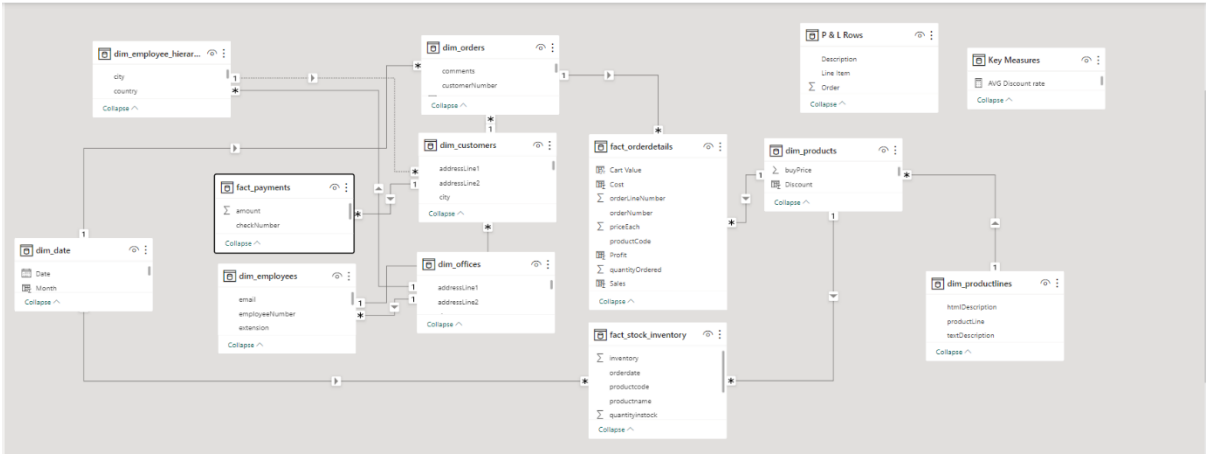
```
update customers
set phone= replace(phone,' ','');
update customers set phone=replace(phone,'-','');
update customers set phone=replace(replace(phone,'(',''),')','')
where phone like "%(%" or phone like "%)%";
```

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

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:

Total_sales:

```
Total Sales = SUM(fact_orderdetails[Sales])
```

Sold_units:

```
Sold units =
var startdate=MAX(fact_stock_inventory[orderdate])
var enddate=MIN(fact_stock_inventory[orderdate])
return
SUMX(
    FILTER(fact_stock_inventory, fact_stock_inventory[OrderDate] >= startdate && fact_stock_inventory
    [OrderDate] <= enddate),
 fact_stock_inventory[total_orders_each]
)
```

Credit Level:

```
Credit Level = SWITCH(TRUE(),
                    dim_customers[creditLimit]<=10000,"Low",
                    dim_customers[creditLimit]<=50000,"Medium",
                    dim_customers[creditLimit]<=150000,"Moderate High",
                    dim_customers[creditLimit]>20000,"High",
                    Blank()
                    )
```

Cart Value:

```
Cart Value = SWITCH(TRUE(),
                    fact_orderdetails[Sales]<1000,"Low",
                    fact_orderdetails[Sales]<5000,"Medium",
                    fact_orderdetails[Sales]<10000,"High",
                    fact_orderdetails[Sales]>=10000,"Very High",
                    BLANK()
                    )
```

Quarters:

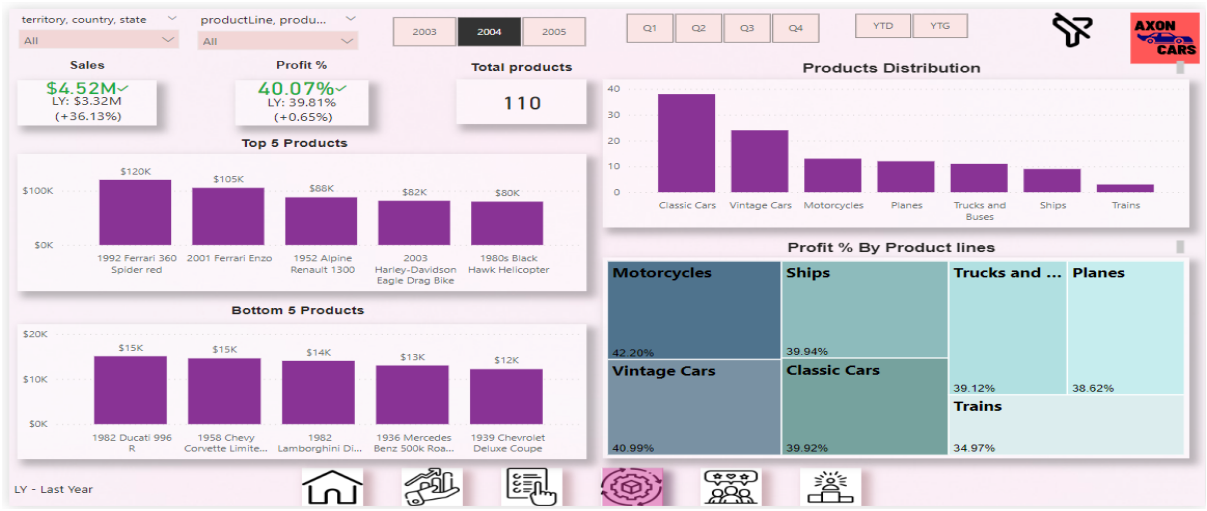
```
1  Quarter = "Q" & QUARTER(dim_date[Date])
```

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

Sales View:

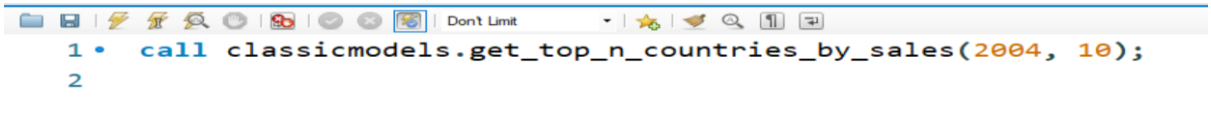
Orders View:

Product View:

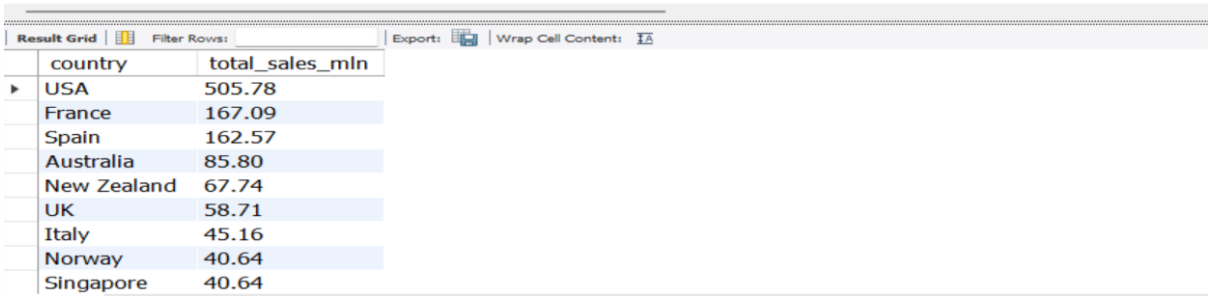


5. Advanced Analytics: Employ SQL for advanced analytics, including creating store procedures, running queries, and generating views to extract actionable insights.

Store Procedure for top countries generating revenue:

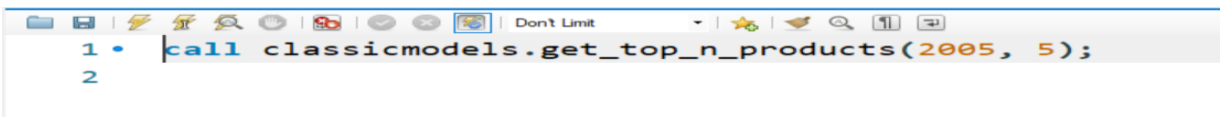


```
call classicmodels.get_top_n_countries_by_sales(2004, 10);
```

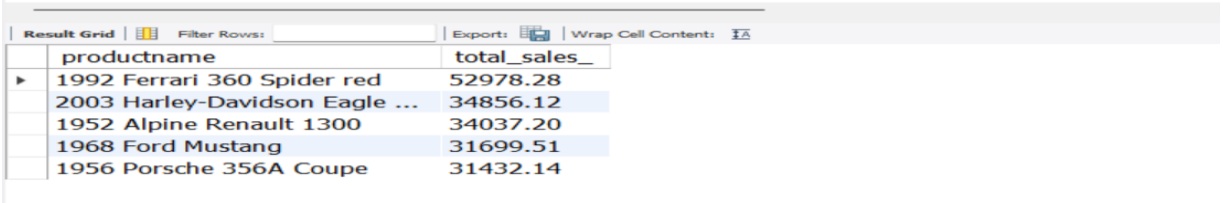


country	total_sales_mln
USA	505.78
France	167.09
Spain	162.57
Australia	85.80
New Zealand	67.74
UK	58.71
Italy	45.16
Norway	40.64
Singapore	40.64

Store Procedure for top products generating revenue:

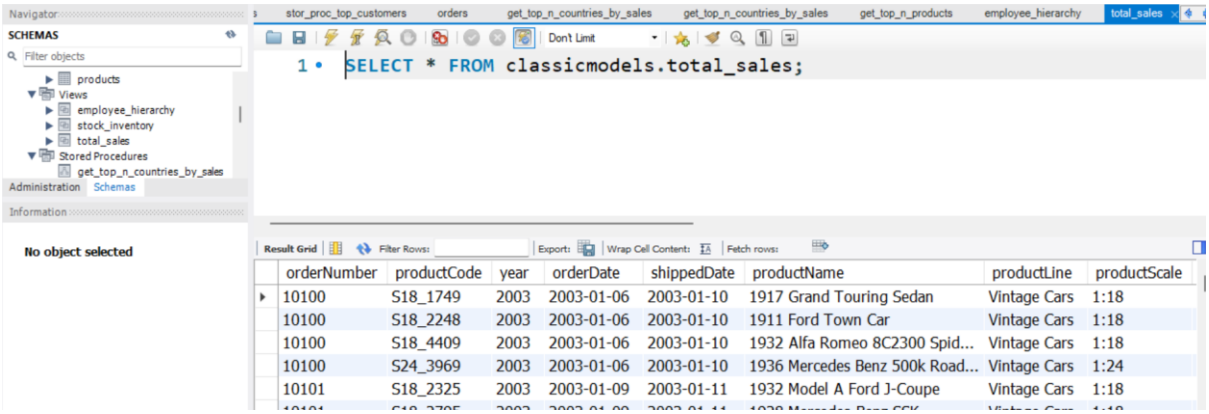


```
call classicmodels.get_top_n_products(2005, 5);
```



productname	total_sales_
1992 Ferrari 360 Spider red	52978.28
2003 Harley-Davidson Eagle ...	34856.12
1952 Alpine Renault 1300	34037.20
1968 Ford Mustang	31699.51
1956 Porsche 356A Coupe	31432.14

Total sales View:



orderNumber	productCode	year	orderDate	shippedDate	productName	productLine	productScale
10100	S18_1749	2003	2003-01-06	2003-01-10	1917 Grand Touring Sedan	Vintage Cars	1:18
10100	S18_2248	2003	2003-01-06	2003-01-10	1911 Ford Town Car	Vintage Cars	1:18
10100	S18_4409	2003	2003-01-06	2003-01-10	1932 Alfa Romeo 8C2300 Spid...	Vintage Cars	1:18
10100	S24_3969	2003	2003-01-06	2003-01-10	1936 Mercedes Benz 500k Road...	Vintage Cars	1:24
10101	S18_2325	2003	2003-01-09	2003-01-11	1932 Model A Ford J-Coupe	Vintage Cars	1:18

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 39%. This reflects the company's expanding customer base and product popularity.
2. **Profit Stability:** Notably, the company has maintained a consistent profit margin of around 40% in both 2004 and 2005, indicating effective cost management strategies.
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. **Average Order Value:** While the average order value has generally increased, there was a slight dip of 1.52% observed in May 2005 compared to May 2004. Investigating the cause behind this decrease may provide insights into customer behaviour.
5. **Improved Shipping Efficiency:** Axon has significantly reduced shipping days from an average of 4.25 to 3.47 in less than two and a half years. This efficiency improvement can lead to higher customer satisfaction and cost savings.
6. **Order Placement Trends:** Analysis of order placement reveals that Wednesdays, Thursdays, and Fridays are the most common weekdays for customer orders. Understanding these patterns can assist in resource allocation and staffing.
7. **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.
8. **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.
9. **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.
10. **Strong European Sales Team:** The European sales team outperforms other teams globally, primarily due to strong sales performance in the Europe, Middle East, and Africa

(EMEA) region. Leveraging this success can lead to further expansion and growth opportunities.

These insights provide a comprehensive understanding of Axon's sales performance and customer behaviour, offering valuable guidance for future decision-making and strategic planning.

Conclusion: This Power BI project successfully transformed raw retail car's data into actionable insights. By analysing sales trends, order values, shipping days, and delivery times, the decision makers can make informed decisions to optimize operations and increase profitability.

Visuals Sample visuals for better understanding:

- Slicers for Products/Product Lines, , Territory/Country/State/City, Years, and Quarters.
- Sales performance trend over years.
- KPI for Profit percentage performance for the last year.
- Total Sales KPI visuals with last year's sales and its %.
- Order Quantity card visual.
- Average Delivery Days visualization
- Matrix chart for monthly and yearly increments.
- Sales by Year-to-Date visualization.
- Pie chart for shipping status.
- Toggle button to check the actual sales and to check the sales forecasted.