AXON CAR RETAILER

Introduction

In today's data-driven business landscape, companies of all sizes rely on effective data management and analysis to make informed decisions. For Axon, a small retailer specializing in classic cars, managing and analysing their sales data has become a significant challenge. The absence of a centralized system has hindered their ability to gain meaningful insights from their sales data, impacting their sales team's performance and overall decision-making process.

To address these challenges, Axon has embarked on implementing a robust Business Intelligence (BI) solution. This solution leverages the power of Microsoft Power BI and SQL to efficiently manage and analyse sales data.

The primary objective of this project is to design and implement a BI solution that empowers Axon, by providing user-friendly tools and delivering valuable insights, this project aims to empower Axon to improve its decision-making process and, ultimately, enhance its sales performance.

Database Description

The MySQL sample database schema for this project includes eight tables:

1. **Customers:** Contains customer data, providing insights into Axon's client base.
2. **Products:** Stores a list of scale model cars available for sale.
3. **Product Lines:** Categorizes products into different product line categories.
4. **Orders:** Captures sales orders placed by customers.
5. **Order Details:** Contains detailed information about the line items within each sales order.
6. **Payments:** Records payments made by customers, helping track financial transactions.
7. **Employees:** Stores comprehensive employee information, including the organizational hierarchy.
8. **Offices:** Contains data related to sales office locations, contributing to sales operations management.

This database schema serves as the foundation for the project, allowing for the extraction, transformation, and analysis of sales data to meet Axon's objectives effectively.

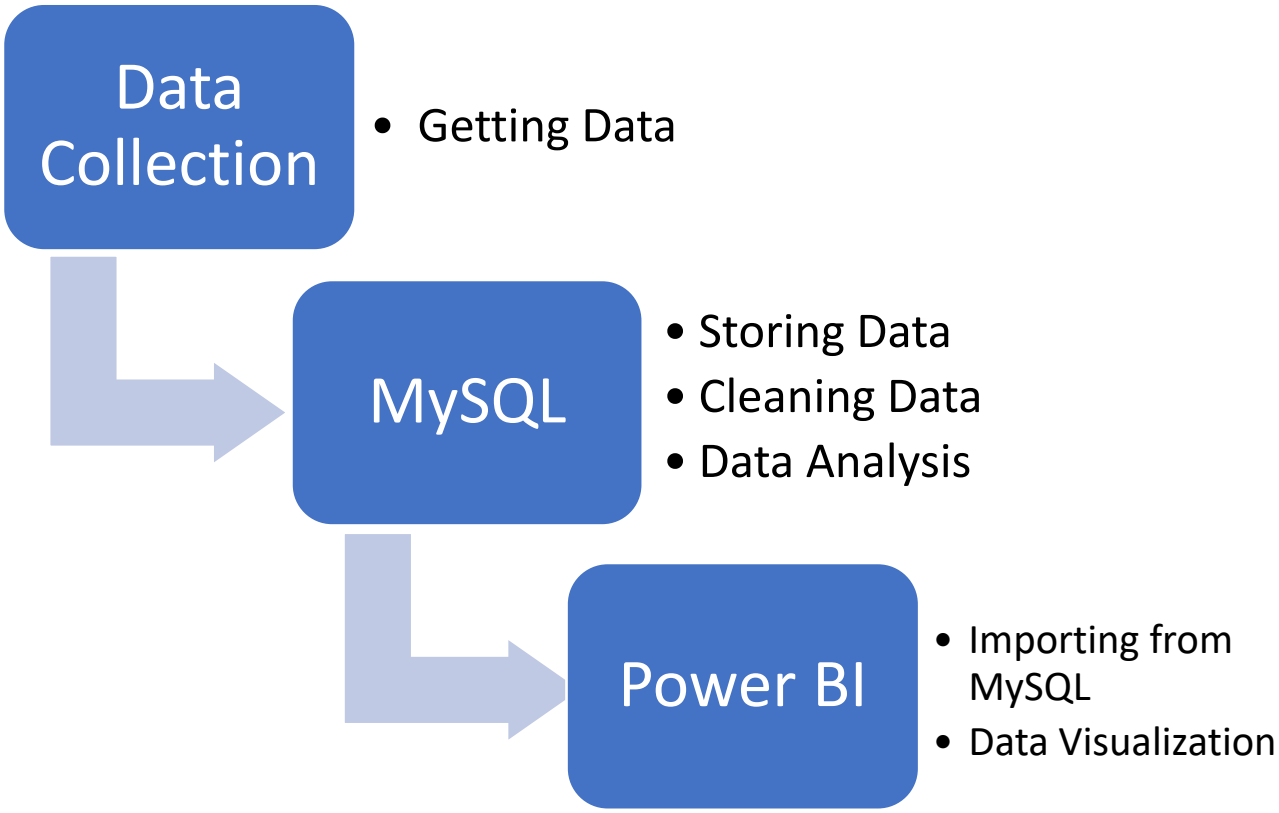
Column and rows of the Each table

Table Name	Column Names	Row Count
Customers table	a. Customer number b. Customer first name c. Customer last name d. Address e. City f. Country g. Sales rep employee number h. Credit limit	122
Employees table	a. Employee number b. Employee first name c. Employee last name d. Office code e. Reports to f. Job title	23
Offices table	a. Office code b. City c. Country d. Territory	07
Order Details table	a. Order Number b. Product code c. Quantity Ordered d. Price each	2996
Orders table	a. Order number b. Order Date c. Required Date d. Shipped Date e. Status f. Customer Number	326
Payments table	a. Customer number b. Payment date c. Amount	273
Product lines table	a. Product line b. Product Description	07
Products table	a. Product code b. Product Name c. Product line d. Product scale e. Product vendor f. Quantity in stock g. Buy price h. MSRP	110

Methodology

- **Data Collection:** Data Collection is the initial step in gathering and quantifying information on specific variables within an established system. It serves as the foundation for answering pertinent questions and assessing outcomes.
- **Data Storage:** The data is efficiently stored and managed using the MySQL database management system.
- **Data Cleaning:** An imperative phase after data storage, involves the thorough cleansing and transformation of data. This process is pivotal for ensuring the data's quality, which, in turn, impacts the quality of subsequent visualizations and reporting. Meticulous data cleaning and transformation are essential to create accurate and reliable visualizations.
- **Data Analysis:** Data Analysis comprises a series of actions, including inspection, cleaning, transformation, and modelling of data. The primary objective is to unearth valuable insights, draw conclusions, and support informed decision-making.
- **Visualization:** Visualization is the art of converting raw data into visual representations. This process entails the manual transformation of data into charts, graphs, and various other visual formats. The objective is to present collected data visually, aiding in its interpretation and comprehension.

Flow Chart



Data Analysis using MySQL

In the dynamic landscape of the automotive sector, harnessing the power of data-driven insights is paramount. This analysis takes a deep dive into Axon Cars' extensive sales performance, presenting a treasure trove of vital information.

Following a meticulous data cleaning process, which involves scrutinizing for null and duplicate values and removing redundant columns, the data becomes primed for analysis. This clean dataset serves as the foundation for extracting valuable insights.

These insights span a spectrum of critical areas, including sales patterns, customer ordering behaviours, and product performance. They converge to provide a comprehensive portrait of Axon Cars' footprint in the market. Beyond their informative value, these insights act as a strategic compass for the sales team, offering guidance and actionable strategies for continuous enhancement.

1. Total Sales or Revenue for the year 2003 to 2005
   Query: -
   ```
   SELECT SUM(QUANTITYORDERED * PRICEEACH) AS TOTAL_SALES
   FROM ORDERDETAILS;
   ```
   Output:

TOTAL SALES
9604190.61

2. Total Profit for the year 2003 to 2005
   Query: -
   ```
   SELECT SUM((QUANTITYORDERED * PRICEEACH) - (BUYPRICE * QUANTITYORDERED))
   as PROFIT FROM PRODUCTS
   JOIN ORDERDETAILS ON PRODUCTS.PRODUCTCODE =
   ORDERDETAILS.PRODUCTCODE;
   ```
   Output:

PROFIT
3825880.25

3. Total Orders
   Query:
   ```
   SELECT SUM(QUANTITYORDERED) AS TOTAL_ORDERS FROM ORDERDETAILS;
   ```
   Output:

TOTAL_ORDERS
105516

4. Total Cancelled or In Process or On Hold Orders
   Query:
   ```
   SELECT STATUS, COUNT(*) AS ORDERS FROM ORDERS
   WHERE STATUS= 'IN PROCESS' OR STATUS = 'ON HOLD' OR
   STATUS = 'CANCELLED'
   GROUP BY STATUS;
   ```
   Output:

STATUS	ORDERS
Cancelled	6
On Hold	4
In Process	6

5. Monthly Orders
   Query:

```
SELECT DATE_FORMAT(ORDERDATE, '%Y-%m') AS YEARMONTH,
SUM(QUANTITYORDERED) AS TOTAL_ORDERS
FROM ORDERDETAILS
JOIN ORDERS ON ORDERS.ORDERNUMBER = ORDERDETAILS.ORDERNUMBER
GROUP BY YEARMONTH
ORDER BY YEARMONTH;
```

   Output:

YEARMONTH	TOTAL_ORDERS
2003-01	1357
2003-02	1449
2003-03	1755
2003-04	1993
2003-05	2017
2003-06	1685
2003-07	2145
2003-08	1974
2003-09	2510
2003-10	5731

Note: The above output contains more rows

6. Maximum Orders by Sales Representative
   Query:

```
SELECT CONCAT(FIRSTNAME, ' ', LASTNAME) AS EMPLOYEE_FULL_NAME,
SUM(QUANTITYORDERED) AS TOTAL_ORDERS FROM EMPLOYEES
JOIN CUSTOMERS ON CUSTOMERS.SALESREPEMPLOYEENUMBER =
EMPLOYEES.EMPLOYEENUMBER
JOIN ORDERS ON CUSTOMERS.CUSTOMERNUMBER = ORDERS.CUSTOMERNUMBER
JOIN ORDERDETAILS ON ORDERS.ORDERNUMBER = ORDERDETAILS.ORDERNUMBER
GROUP BY EMPLOYEE_FULL_NAME
ORDER BY TOTAL_ORDERS DESC;
```

   Output:

EMPLOYEE_FULL_NAME	TOTAL_ORDERS
Gerard Hernandez	14231
Leslie Jennings	11854
Pamela Castillo	9290
Larry Bott	8205
Barry Jones	7486
George Vanauf	7423
Peter Marsh	6632
Andy Fixter	6246
Loui Bondur	6186
Steve Patterson	5561
Foon Yue Tseng	5016
Mami Nishi	4923
Julie Firrelli	4227
Martin Gerard	4180
Leslie Thompson	4056

7. Monthly Sales
   Query:
   ```
   SELECT DATE_FORMAT(ORDERDATE, '%Y-%m') AS YEARMONTH,
   SUM(QUANTITYORDERED * PRICEEACH) AS MONTHLY_SALES FROM ORDERS
   JOIN ORDERDETAILS ON ORDERS.ORDERNUMBER = ORDERDETAILS.ORDERNUMBER
   GROUP BY YEARMONTH
   ORDER BY YEARMONTH;
   ```
   Output:

YEARMONTH	MONTHLY_SALES
2003-01	116692.77
2003-02	128403.64
2003-03	160517.14
2003-04	185848.59
2003-05	179435.55
2003-06	150470.77
2003-07	201940.36
2003-08	178257.11
2003-09	236697.85
2003-10	514336.21

Note: The above output contains more rows

8. Average Monthly Sales
   Query:
   ```
   SELECT DATE_FORMAT(ORDERDATE, '%Y-%m') AS YEARMONTH,
   ROUND(AVG(QUANTITYORDERED * PRICEEACH)) AS AVERAGE_MONTHLY_SALES
   FROM ORDERS
   JOIN ORDERDETAILS ON ORDERS.ORDERNUMBER = ORDERDETAILS.ORDERNUMBER
   GROUP BY YEARMONTH
   ORDER BY YEARMONTH;
   ```
   Output:

YEARMONTH	AVERAGE MONTHLY SALES
2003-01	2992
2003-02	3132
2003-03	3210
2003-04	3204
2003-05	3094
2003-06	3202
2003-07	3205
2003-08	3073
2003-09	3114
2003-10	3136
2003-11	3137
2003-12	3334
2004-01	3213
2004-02	3290
2004-03	3349

Note: The above output contains more rows

9. Total Sales by Country
   Query:

```
SELECT COUNTRY, SUM(QUANTITYORDERED * PRICEEACH) AS TOTAL_SALES
FROM CUSTOMERS
JOIN ORDERS ON CUSTOMERS.CUSTOMERNUMBER = ORDERS.CUSTOMERNUMBER
JOIN ORDERDETAILS ON ORDERS.ORDERNUMBER = ORDERDETAILS.ORDERNUMBER
GROUP BY COUNTRY
ORDER BY TOTAL_SALES DESC;
```

   Output:

COUNTRY	TOTAL_SALES
USA	3273280.05
Spain	1099389.09
France	1007374.02
Australia	562582.59
New Zealand	476847.01
UK	436947.44
Italy	360616.81
Finland	295149.35
Norway	270846.30
Singapore	263997.78
Denmark	218994.92
Canada	205911.86

Note: The above output contains more rows

10. Total Sales Contribution by Product Vendor
    Query:

```
SELECT PRODUCTVENDOR, SUM(QUANTITYORDERED * PRICEEACH) AS TOTAL_SALES
FROM PRODUCTS
JOIN ORDERDETAILS ON PRODUCTS.PRODUCTCODE =
ORDERDETAILS.PRODUCTCODE
GROUP BY PRODUCTVENDOR
ORDER BY TOTAL_SALES DESC;
```

    Output:

PRODUCTVENDOR	TOTAL_SALES
Classic Metal Creations	934554.42
Unimax Art Galleries	884167.33
Gearbox Collectibles	828013.76
Second Gear Diecast	803892.06
Exoto Designs	793392.31
Welly Diecast Productions	776165.33
Autoart Studio Design	736928.03
Motor City Art Classics	704806.89
Min Lin Diecast	680657.99
Carousel DieCast Legends	667190.00
Highway 66 Mini Classics	664508.39
Red Start Diecast	655487.61
Studio M Art Models	474426.49

11. Total Sales by Product Category (Product lines)
    Query:

```
SELECT PRODUCTLINE, SUM(QUANTITYORDERED * PRICEEACH) AS TOTAL_SALES
FROM PRODUCTS
JOIN ORDERDETAILS ON PRODUCTS.PRODUCTCODE =
ORDERDETAILS.PRODUCTCODE
GROUP BY PRODUCTLINE
ORDER BY TOTAL_SALES DESC;
```

    Output:

PRODUCTLINE	TOTAL_SALES
Classic Cars	3853922.49
Vintage Cars	1797559.63
Motorcycles	1121426.12
Trucks and Buses	1024113.57
Planes	954637.54
Ships	663998.34
Trains	188532.92

12. Total Sales by Products
    Query:

```
SELECT PRODUCTNAME, SUM(QUANTITYORDERED * PRICEEACH) AS TOTAL_SALES
FROM PRODUCTS
JOIN ORDERDETAILS ON PRODUCTS.PRODUCTCODE =
ORDERDETAILS.PRODUCTCODE
GROUP BY PRODUCTNAME
ORDER BY TOTAL_SALES DESC;
```

    Output:

PRODUCT NAME	TOTAL_SALES
1992 Ferrari 360 Spider red	276839.98
2001 Ferrari Enzo	190755.86
1952 Alpine Renault 1300	190017.96
2003 Harley-Davidson Eagle Drag Bike	170686.00
1968 Ford Mustang	161531.48
1969 Ford Falcon	152543.02
1980s Black Hawk Helicopter	144959.91
1998 Chrysler Plymouth Prowler	142530.63
1917 Grand Touring Sedan	140535.60
2002 Suzuki XREO	135767.03
1956 Porsche 356A Coupe	134240.71
1969 Corvair Monza	132363.79
1928 Mercedes-Benz SSK	132275.98
1957 Corvette Convertible	130749.31
1972 Alfa Romeo GTA	127924.32
1962 LanciaA Delta 16V	123123.01
1970 Triumph Spitfire	122254.75
1976 Ford Gran Torino	121890.60
1948 Porsche Type 356 Roadster	121653.46

Note: The above output contains more rows

13. Most Profitable Customers
    Query:

```
SELECT CONCAT(CUSTOMERFIRSTNAME, ' ', CUSTOMERLASTNAME) AS
CUSTOMER_NAME, SUM(QUANTITYORDERED * PRICEEACH) AS TOTAL_SALES
FROM CUSTOMERS
JOIN ORDERS ON CUSTOMERS.CUSTOMERNUMBER = ORDERS.CUSTOMERNUMBER
JOIN ORDERDETAILS ON ORDERS.ORDERNUMBER = ORDERDETAILS.ORDERNUMBER
GROUP BY CUSTOMER_NAME
ORDER BY TOTAL_SALES DESC
LIMIT 10;
```

    Output:

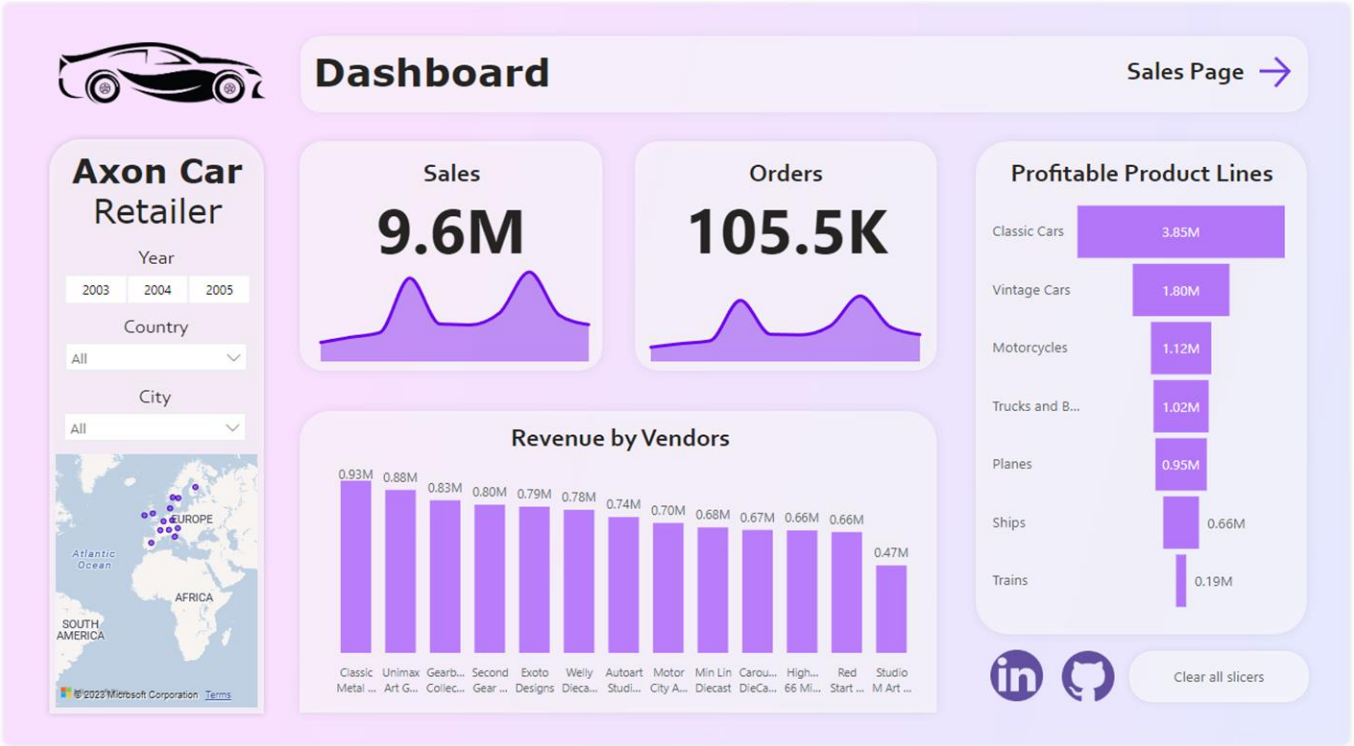
CUSTOMER_NAME	TOTAL_SALES
Diego Freyre	820689.54
Susan Nelson	591827.34
Peter Ferguson	180585.07
Jeff Young	177913.95
Janine Labrune	158573.12
Eric Natividad	156251.03
Mike Graham	154622.08
Kwai Lee	149085.15
Rachel Ashworth	148410.09
Sue Frick	143536.27

The insights provided in the analysis encompass a wide range of details pertaining to the sales performance of Axon Cars, a crucial resource for the company's sales team. These insights encompass a variety of aspects, including sales trends, customer ordering behaviour, product performance, and more. By examining these insights, the sales team gains a deeper understanding of how the company is performing in the market and what factors are influencing its sales figures.

Furthermore, the insights serve as a guide for the sales team, offering valuable information on areas that require attention and potential strategies for improvement. For instance, if the analysis reveals a decline in sales for a particular product, the team can investigate the root causes and formulate strategies to boost sales in that category. Likewise, if there are trends indicating high-demand periods, the team can prepare accordingly to meet customer needs more effectively.

In essence, the insights derived from this analysis are not only informative but also actionable. They empower the sales team to make informed decisions and implement changes that can enhance the company's sales performance in the future. It's a dynamic process that enables continuous improvement and adaptation to the ever-changing market conditions.

Data Visualization



Home Page

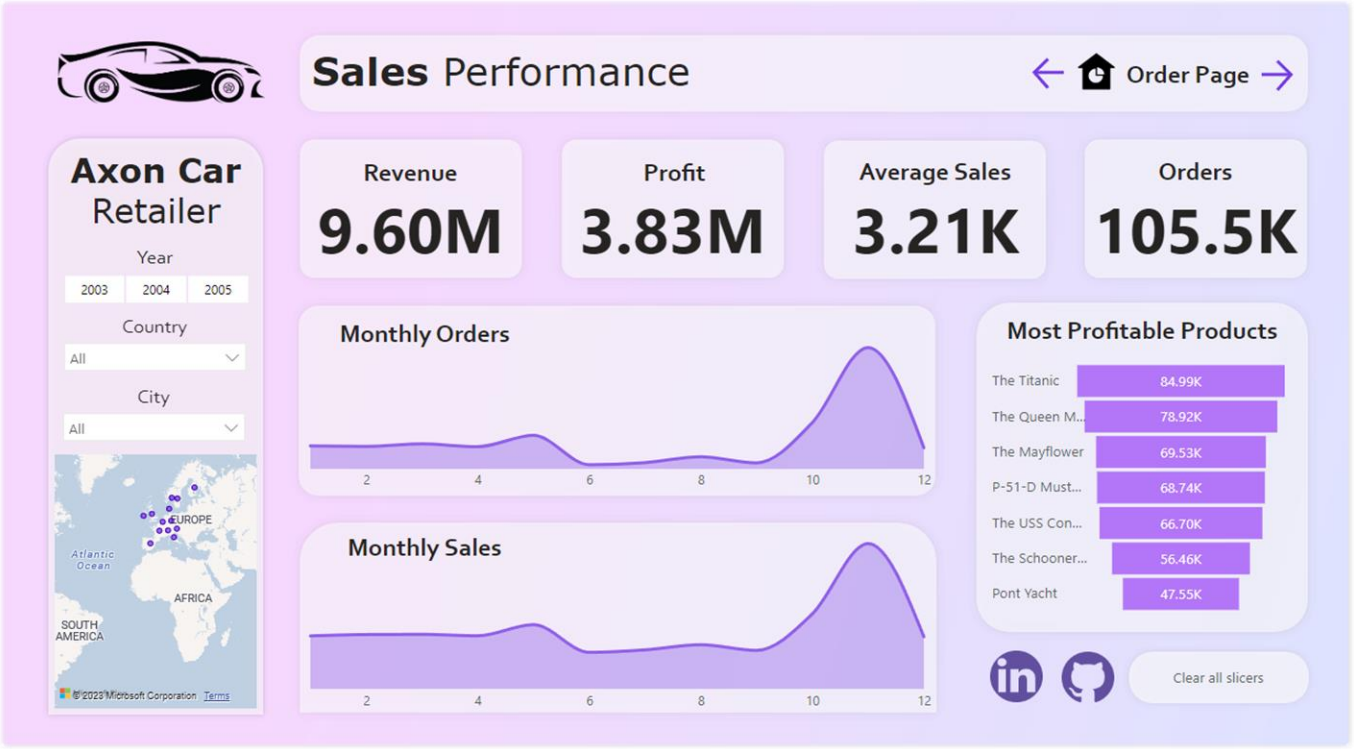
The dashboard presented above offers a comprehensive view of Axon Cars' performance from 2003 to 2005. It prominently features two cards displaying essential information: Total Sales and Total Orders. These cards provide an instant snapshot of the company's financial and operational health during this time frame, making it easy for users to gauge overall performance at a glance.

Furthermore, the dashboard employs various visualization tools to provide deeper insights. The stacked column chart, for instance, delves into vendor contributions to revenue. Each column represents a vendor, and the segments within it indicate their revenue impact. This visual representation helps users quickly identify vendors driving revenue growth and those needing attention.

The funnel chart, on the other hand, focuses on product categories. It visually ranks categories by profitability, offering insights into which ones are performing exceptionally well and which might benefit from optimization efforts.

The dashboard's interactivity is enhanced through filters that enable users to refine their data view based on criteria like year, country, and city. This customization ensures that users can zero in on the specific data subsets most relevant to their analysis.

For those seeking a more detailed examination, the dashboard also offers page navigation buttons that seamlessly transition users to a dedicated sales page. Here, a more comprehensive analysis of sales-related data is available, providing a deeper understanding of Axon Cars' performance during the specified years.



Sales Page

The image presented above provides a comprehensive overview of Axon Cars' sales performance. This dashboard has been thoughtfully designed to offer users essential insights into the company's financial performance and sales trends.

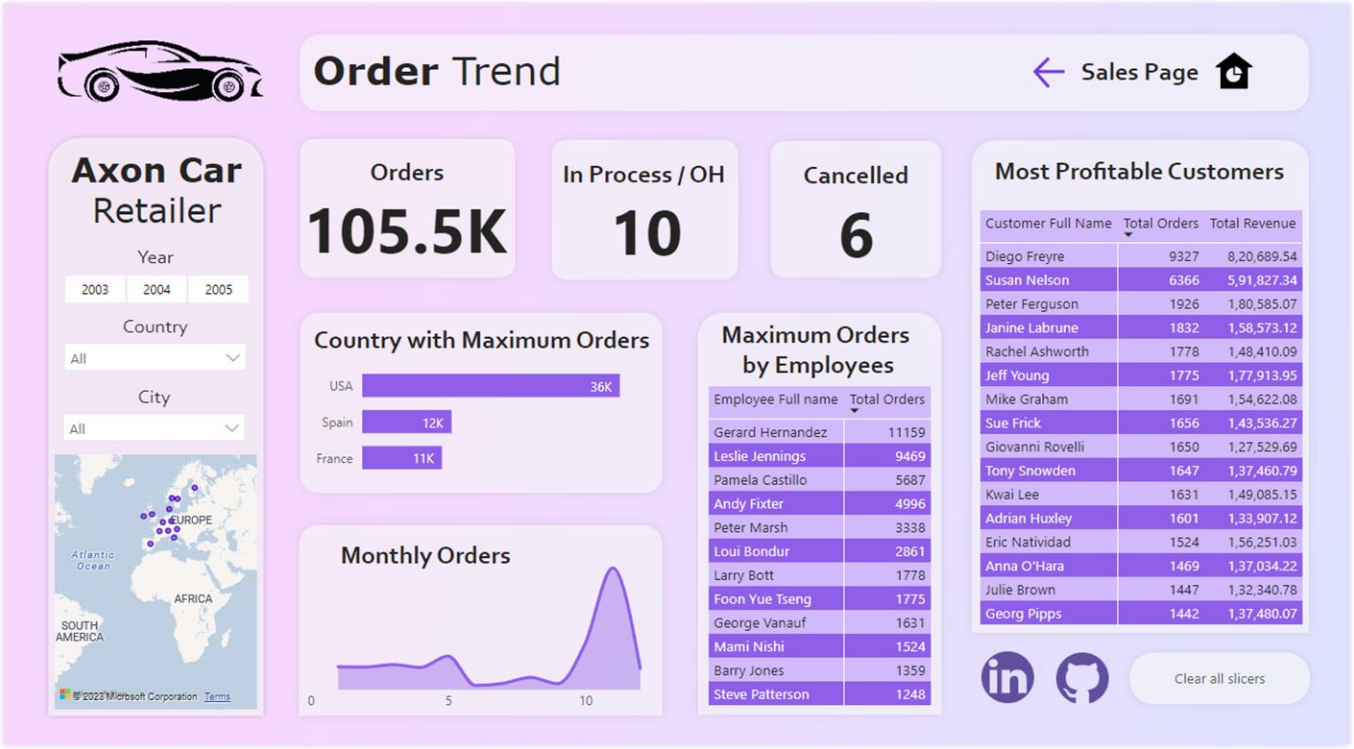
Central to this dashboard are four key cards, each displaying critical metrics. These cards showcase Total Revenue (Sales), Total Profits, Average Sales, and Total Orders. These metrics serve as pivotal indicators of the company's overall performance, allowing users to quickly assess its financial health and achievements.

To delve deeper into sales patterns, the dashboard incorporates two stacked area charts, illustrating the monthly order trend and monthly sales trend. Notably, these visualizations highlight a significant increase in sales between the months of October and December compared to other months. Such insights can be invaluable for identifying seasonal trends and optimizing sales strategies accordingly.

Furthermore, a funnel chart is employed to offer a detailed view of product profitability. This visualization ranks products based on their profitability, aiding in the identification of top-performing products and areas for potential improvement.

Additionally, the dashboard provides users with the flexibility to filter records based on various criteria, including year, country, and city. This feature allows for customized data exploration, catering to specific analytical needs.

Lastly, the dashboard includes a page navigation button located at the top corner, enabling users to seamlessly transition to the home or order page. This page offers a more comprehensive visualization of order-related details, providing a deeper understanding of Axon Cars' sales processes.



Order Page

The image above offers valuable insights into the order performance of Axon Cars. The dashboard is thoughtfully designed to provide users with a comprehensive view of the company's order-related metrics and trends.

At the heart of this order page are three informative cards that present essential statistics. These cards showcase the Overall Orders placed between 2003 and 2005, the Total In-Process or On-Hold Orders, and the Total Cancelled Orders. These metrics serve as crucial indicators of the company's order management and customer interactions, enabling users to quickly assess performance and areas requiring attention.

The dashboard leverages a stacked bar chart to display Total Orders by Country, offering insights into regional order distribution. This visualization helps identify key markets and assess the geographical distribution of customer demand.

Additionally, a stacked area chart is employed to illustrate Monthly Order Trends. Notably, this chart reveals a notable surge in demand for products during the months of October to December, highlighting potential seasonality and the need for targeted strategies during this period.

Furthermore, the dashboard includes two table matrices, one showcasing the Employees with the Highest Order Counts and the other featuring the Most Profitable Customers. These tables provide valuable insights into employee performance and key customer relationships, presenting data on total orders and total revenue generated.

To enhance user experience and analytical capabilities, the dashboard offers flexible record filtering options based on year, country, and city. This feature enables users to tailor their data exploration to specific criteria and questions.

Lastly, a convenient page navigation button located at the top corner allows users to seamlessly switch between the home page and the sales page.

Conclusion

the dashboards presented offer a comprehensive view of Axon Cars' performance during the specified years. These dashboards serve as valuable tools for gaining insights into the company's financial health, sales patterns, and order management.

The Sales Performance Dashboard provides a quick overview of critical metrics, allowing users to gauge the company's overall financial performance. The stacked column chart and funnel chart further enhance the analysis by offering insights into vendor contributions and product profitability.

Similarly, the Order Performance Dashboard focuses on order-related metrics, including overall orders, in-process orders, and cancelled orders. The stacked bar chart and stacked area chart reveal geographical and temporal trends in orders, while the table matrices highlight top-performing employees and customers.

The interactive features, such as record filtering and page navigation, provide flexibility and depth to the analysis. Users can tailor their exploration to specific criteria and seamlessly transition between different views.

Overall, these dashboards empower users with the information needed to make informed decisions, identify areas for improvement, and optimize strategies for future success. They are valuable tools for both high-level executives and analysts seeking to understand and enhance Axon Cars' performance.