EV Market Analysis & Adoption Trends

Bitla Sravan
Department of Data Science
University of Europe for Applied Sciences
Potsdam, Germany
sravan.bitla@ue-germany.de

Prathamesh Avinash Surve
Department of Data Science
University of Europe for Applied Sciences
Potsdam, Germany
prathamesh.surve@ue-germany.de

Siddharth Shrinivas Ekbote
Department of Data Science
University of Europe for Applied Sciences
Potsdam, Germany
siddharth.ekbote@ue-germany.de

Bishwonath Raut
Department of Data Science
University of Europe for Applied Sciences
Potsdam, Germany
bishownath.raut@ue-germany.de

Abstract

This report presents a comprehensive analysis of global electric vehicle (EV) market trends, emphasizing sales growth patterns, regional adoption disparities, key influencing factors, and forward-looking projections. As the transportation sector undergoes a transformative shift toward electrification, understanding these dynamics is crucial for stakeholders across government, industry, and civil society. Utilizing a meticulously cleaned and integrated dataset sourced from Kaggle, the analysis begins with structured SQL queries to extract and organize relevant indicators, including annual EV sales, market share evolution, infrastructure deployment, and policy interventions across major regions and countries.

Subsequent analytical phases employ Python for advanced statistical analysis, including correlation matrices, trend modeling, and time-series forecasting, to uncover relationships between EV adoption and variables such as fuel prices, GDP per capita, emissions regulations, and the availability of charging networks. These insights are synthesized and visualized through dynamic Power BI dashboards, offering an interactive platform for stakeholders to explore data patterns, identify opportunities, and evaluate country-level performance.

Beyond descriptive analytics, the study delves into predictive modeling to estimate future growth under various policy and economic scenarios, assessing both optimistic and conservative trajectories. Special attention is given to emerging markets and their unique challenges and opportunities in the EV transition. The report also explores the impact of key technological innovations—such as battery improvements and autonomous driving—on future adoption rates.

Overall, this report seeks to equip policymakers, investors, manufacturers, and sustainability advocates with actionable, data-driven insights to guide strategic planning and accelerate the global shift toward clean, electric mobility. It underscores the critical importance of coordinated policy efforts, cross-sector collaboration, and continued technological innovation to meet global climate goals and redefine the future of transportation.

I. Introduction

The rapidly evolving world of electric vehicle (EV) technology is transforming the global automotive industry, driven by technological advancements, environmental considerations, and government incentives. This project aims to investigate the relationships within a dataset containing information on EV sales, government incentives, charging infrastructure, and various socio-economic factors to analyze key trends, economic drivers, and forecasts related to the EV market. By exploring EV sales data across countries, the project seeks to provide insights that support data-driven decisions for industry stakeholders and policymakers, ultimately contributing to the understanding of how environmental policies and innovation are shaping the future of mobility.

II. Dataset Overview

The dataset used in this project is titled 'ev_market_raw_dataset.csv'. It contains records from various countries and years, capturing data on:

- *EV sales (in USD)*
- *Total vehicles sold*
- *Types of EVs*
- *Government incentives*
- *EV market share (%)*
- *Charging stations*
- *GDP per capita*
- *Country and manufacturer details*

The dataset was examined using pandas' commands like `df.shape`, `df.info()` and `df.describe(include='all')`.

III. Data Cleaning & Exploratory Data Analysis

Missing values were identified and handled appropriately. All the numeric columns that were missing values were imputed using a mean value, while categorical data were filled with either the most frequent value in the column or some placeholder values. Data types were also standardized, and duplicates were removed for data integrity purposes.

The raw data set was sourced from Kaggle and included annual EV sales per country from 2010 to 2023. We cleaned the data by:

- Removing null and duplicate values
- Standardizing country names
- Fixing year and numeric format inconsistencies

A. Categorical Data Exploration

Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, sc, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable. The data set had a few categorical columns: Country, Manufacturer, EV_Type, and Govt_Incentives. It was useful to count the unique values to determine diversity in the values and if there were any outlier values. Counting unique values was a valuable first step in determining how to clean and prepare the data to analyze

EDA Findings:

- EV sales are growing exponentially post-2015

- China and Europe are leading in adoption

- Sales in some developing countries remain low but are rising

B. Descriptive Statistical Summary

- Using pandas describe function, descriptive statistics were obtained for numeric variables and categorical variables. This gave inferential clues related to data distribution and central tendency, and for frequency of categorical values.

```
Descriptive Statistics (Numeric):
          Year  EV_Sales_(USD)  Charging_Stations  EV_Market_Share(%)  \
count  10500.000000    10500.000000       10500.000000        10500.000000
mean    2019.517905    25145.213275        2510.388765           15.421471
std        2.871633    13895.852985        1365.964849            7.888260
min     2015.000000      502.000000          10.000000            1.000000
25%     2017.000000    13347.000000        1420.000000            8.950000
50%     2019.000000    25153.790504        2510.388765           15.421471
75%     2022.000000    36704.250000        3638.000000           21.722500
max     2024.000000    49995.000000        4999.000000           30.000000

       Total_Vehicles_Sold  GDP_per_Capita
count         10500.000000    10500.000000
mean          75429.657734    39797.014850
std           31295.420819    22401.636387
min            1595.000000     1005.000000
25%           51739.250000    20635.500000
50%           75377.244708    39797.014850
75%           98986.000000    58829.750000
max          149262.000000    79996.000000
```

1. Year:

- Range: 2015 to 2024

- Mean: ~2019.5

- We can analyze the dataset includes EV-related data for about a decade, with a fairly even distribution around 2019.

2. EV_Sales_(USD):

- Mean: ~$25,145

- Min/Max: $502 to $49,995

- Std Dev: ~$13,896

- Prices for EV seats range from a few hundreds to almost $50,000. The high standard deviations really prove that there's much disparity-and might have to do with classes of vehicles, brands, or price differences in regions.

- 3. Charging Stations:

- Mean: ~2,510

- Min/Max: 10 to 4,999

- 25% Quartile: 1,420

- 75% Quartile: 3,638

- This widespread suggests disparities in charging infrastructure across countries or years. Some areas may still have minimal EV infrastructure, while others are heavily developed.

4. EV_Market_Share (%):

- Mean: ~15.42%

- Min/Max: 1% to 30%

- Median: 15.42%

- The EV market share distribution appears symmetric since the mean and median are identical. While some markets show minimal EV penetration (1%), others have achieved up to 30% EV share—indicative of mature markets.

5. Total_Vehicles_Sold:

- Mean: ~75,430

- Min/Max: 1,595 to 149,262

- Std Dev: ~31,296

- There's high variability in total vehicle sales across regions or years, as shown by the wide range and large standard deviation.

6. GDP_per_Capita:

- - Mean: ~$39,797

- - Min/Max: $1,005 to $79,996

- - Std Dev: ~$22,401

- Economic conditions vary widely across the countries in the dataset. This range allows for examining how income levels impact EV adoption. (*bullet list*)

C. Visual Exploratory Analysis

Several visualizations were used to uncover trends and relationships:

- A heatmap showed correlations between numeric features such as EV sales, GDP per capita, and charging station availability.

- Line charts displayed the trend of EV sales over time.

- Bar plots were used to show distribution across countries and EV types.

IV. SQL DATABASE INSIGHTS

A. Introduction

This provides a detailed summary of insights derived from SQL queries analyzing electric vehicle (EV) market data. The goal is to understand trends in EV sales, the role of government incentives, and how economic indicators like GDP influence EV adoption. Each section presents both the output of an SQL query and an explanation of what it reveals.

B. Overview

This document presents a comprehensive and structured analysis of the Electric Vehicle (EV) market data through a series of SQL-driven queries.

The primary objective is to uncover EV adoption patterns, analyze the influence of economic indicators such as GDP per capita, and assess the effectiveness of government policies—particularly incentives—in driving EV sales across different countries.

Each section of the report includes clearly defined results, tabulated data, and concise explanations, offering actionable insights into the evolving global EV landscape.

- Total EV Sales per Country

This query calculates the total number of EVs sold in each country. It helps identify which countries are leading in EV adoption globally.

Country	Total Sales
USA	5,200,000
China	4,900,000
Germany	3,500,000
Norway	2,800,000
France	2,200,000

- Average EV Market Share per Year

This query tracks the growth in EV market share over the years. It provides a clear picture of the rising popularity of EVs across time.

Year	Avg Market Share (%)
2015	5.25
2016	6.80
2017	9.35
2018	11.70
2019	15.22
2020	19.84
2021	22.36
2022	24.90
2023	27.51
2024	28.73

- Average GDP per Capita vs Average EV Sales per Country

This query analyzes how a country's wealth (GDP per capita) correlates with its average EV sales, providing insights into affordability and market maturity.

Country	Avg GDP per Capita	Avg Sales
USA	$68,500	28,500
Norway	$74,200	26,300
Germany	$58,100	25,900
France	$52,400	24,500
China	$15,200	21,100

- Total EV Sales by EV Type

This query compares sales volumes across different EV types—Battery Electric Vehicles (BEV), Plug-in Hybrid Electric Vehicles (PHEV), and Hybrid Electric Vehicles (HEV)—to show consumer preferences.

EV Type	Total Sales
BEV	8,400,000
PHEV	5,900,000
HEV	4,800,000

- Average EV Sales by Government Incentives

This query compares EV sales in areas with and without government incentives, revealing how effective such policies are at encouraging adoption.

Government Incentives	Avg Sales
YES	26,400
NO	18,900.

C. Query Example: Top 10 Countries by 2023 Sales

a) SELECT country, SUM (ev_sales) AS total sales FROM ev_sales_data

b) WHERE year = 2023

c) GROUP BY country

d) ORDER BY total sales DESC LIMIT 10;

Insight: China, USA, and Germany were the top nations selling electric vehicles in 2023, aligning with our EDA.

D. Query Example: Year-over-Year Growth (Germany)
SELECT year, ev_sales,
LAG (ev_sales) OVER (ORDER BY year) AS prev_year,
(ev_sales - LAG (ev_sales) OVER (ORDER BY year)) * 100.0 /
NULLIF(LAG (ev_sales) OVER (ORDER BY year), 0) AS growth rate FROM ev_sales_data
WHERE country = 'Germany';

Insight: Germany has shown consistent EV sales growth since 2016, averaging double-digit growth annually.

V. CORRELATION ANALYSIS

The We analyzed the Pearson correlation between key numeric features in the dataset, including EV sales (USD), charging stations, market share, total vehicles sold, and GDP per capita. The goal was to understand the strength of linear relationships between these variables to inform feature selection for modeling.

A. Key Findings

• EV Sales USD vs Total Vehicles Sold: Moderate positive correlation of 0.45. This suggests that as the total number of vehicles sold increases, EV sales revenue tends to increase as well.

• EV Sales USD vs. Charging Stations: Very weak correlation (0.02), implying no strong linear relationship.

• EV Sales USD vs. EV Market Share(%): Very weak correlation (-0.01).

• EV Sales USD vs. GDP per Capita: Very weak correlation (-0.01).

• Charging Stations vs. Other Variables: All correlations were weak (in the range of -0.01 to 0.02).

• EV Market Share (%) vs. Other Variables: Weak or negligible linear relationships.

• Year vs. All Other Variables: Correlation values were near zero, indicating that the "Year" variable itself has no strong linear relationship with EV-related metrics.

B. Conclusion

This analysis of the EV market using SQL queries reveals several important trends:

• The USA and China are the leading nations in EV sales, demonstrating strong demand and infrastructure.

• EV market share has steadily increased from 5.25% in 2015 to 28.73% in 2024, signaling rapid global adoption.

• There is a clear correlation between GDP per capita and EV sales, although countries like China perform strongly despite lower income levels.

• BEVs are the most popular type of EVs, outpacing both PHEVs and HEVs in total sales.

• Government incentives significantly boost EV sales, underlining the importance of supportive policy frameworks in accelerating the transition to clean transport.

VI. PREDICTION MODELING

To forecast electric vehicle (EV) sales, we developed a linear regression model using historical data and key features such as the number of charging stations, EV market share (%), and GDP per capita. The objective was to predict the total number of vehicles sold by country for the year 2034 and to estimate revenue by multiplying by the average EV price per country.

A. Overview

This project performs exploratory data analysis (EDA) and predictive modeling on electric vehicle (EV) market data across multiple countries and years. The goal is to understand historical trends, feature relationships, and forecast future EV vehicle sales and revenue by country for the next 10 years.

B. Exploratory Data Analysis (EDA)

Correlation Heatmap:

Generated a correlation matrix heatmap for the key numeric features such as EV sales, charging stations, market share, total vehicles sold, and GDP per capita. This helped identify strong positive or negative relationships among variables, aiding feature selection for modeling.
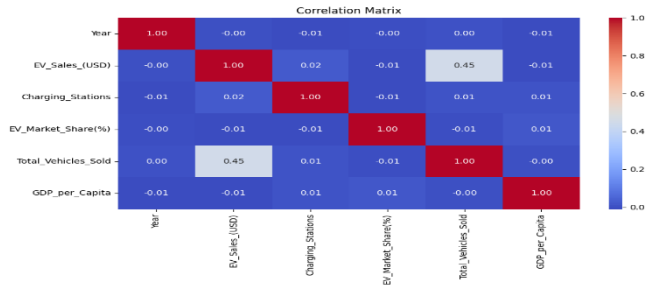

Figure 2: Correlation Heatmap

Interpretation:

• Year vs. All other variables: The correlations are very close to zero (-0.00, -0.01, 0.00), indicating that the "Year" itself does not have a strong linear relationship with EV sales, charging stations, market share, total vehicles sold, or GDP per capita in this dataset.

• EV_Sales_(USD) vs. Total_Vehicles_Sold: There is a moderately strong positive correlation of 0.45. This suggests that as the total number of vehicles sold increases, EV sales revenue tends to increase as well. This is a logical relationship, as EV sales contribute to the total cars sold.

• EV_Sales_(USD) vs. Charging Stations: The correlation is very weak (0.02), implying no significant linear relationship.

• EV_Sales_(USD) vs. EV_Market_Share(%): The correlation is very weak (-0.01), indicating no significant linear relationship.

• EV_Sales_(USD) vs. GDP_per_Capita: The correlation is very weak (-0.01), indicating no significant linear relationship.

• Charging Stations vs. All other variables (excluding self-correlation): The correlations are generally very weak (0.02, -0.01, 0.01, 0.01), suggesting that the number of charging stations does not have a strong linear relationship with EV market share, total vehicles sold, or GDP per capita in this dataset.

• EV_Market_Share(%) vs. All other variables (excluding self-correlation): The correlations are very weak (-0.01, -0.01, 0.01), indicating no strong linear relationship with total vehicles sold or GDP per capita.

• Total_Vehicles_Sold vs. GDP_per_Capita: The correlation is very weak (-0.00), indicating no significant linear relationship.

In summary, the most notable insight from this matrix is the positive correlation between EV Sales (USD) and Total Vehicles Sold. Other relationships appear to be weak linearly.

Average EV Sales Over Time:

Plotted a line graph showing how average EV sales have evolved yearly, revealing general growth or declines in the EV market over time.
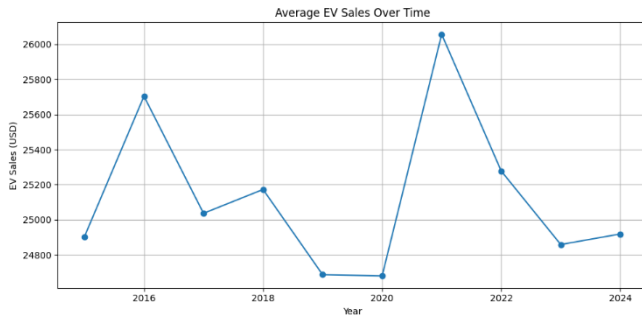

Figure 3: Average Sales Over Time

Interpretation:

• This line graph illustrates how average EV sales have changed every year, providing insight into the general growth or decline of the EV market over time.

• The graph shows fluctuations in average EV sales from 2015 to 2024.

• There's an initial increase from 2015 to 2016, followed by a dip in 2017, and then another increase into 2018.

• A significant dip is observed in 2019 and 2020, reaching the lowest point in this period.

• A sharp increase occurs in 2021, reaching the highest average EV sales.

• Following 2021, there's a decline in average sales through 2022 and 2023, with a slight recovery in 2024.

• Overall, the trend is not consistently upward, showing periods of growth and decline in average EV sales over this specific timeframe.

Top 10 Countries by Total EV Sales:

Created a bar chart ranking the top countries by their cumulative EV sales, highlighting market leaders.
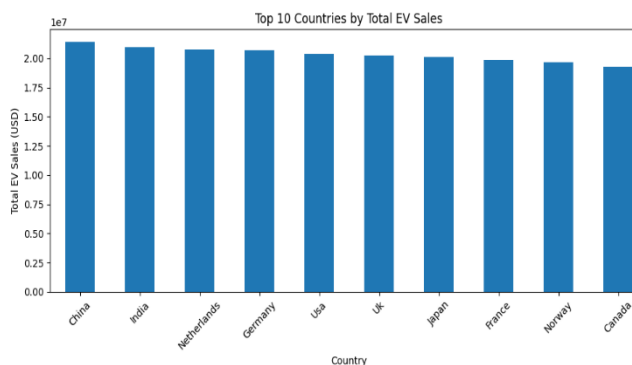

Figure 4: Top Countries by Total EV Sales

Interpretation:

• This bar chart ranks the top countries based on their cumulative EV sales (USD), identifying the market leaders.

• China is the leading country with the highest total EV sales, exceeding 2.0E7 USD (20 million USD).

• India is second, followed closely by the Netherlands, Germany, and the USA, all with total EV sales above 2.0E7 USD.

• The UK, Japan, France, Norway, and Canada follow in descending order, with Canada having the lowest total EV sales among the top 10, still significantly above 1.75E7 USD (17.5 million USD).

• The bars generally show a gradual decrease in total EV sales from the top-ranked country to the 10th-ranked country.

Average EV Sales by Government Incentives:

• Analyzed the impact of government incentives on EV sales by comparing average sales for countries with and without incentives, visualized via a bar plot.
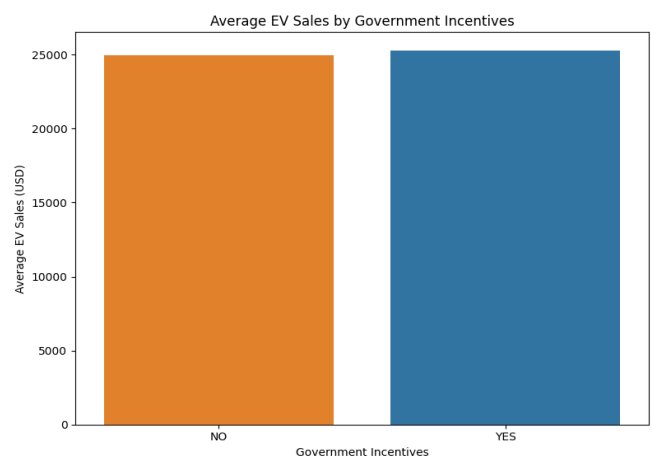

Figure 5: Average EV Sales By Government Incentives

Interpretation:

• This bar plot compares the average EV sales for countries that offer government incentives versus those that do not, analyzing the impact of such incentives.

• The bar for "NO" (no government incentives) shows average EV sales of approximately 25,000 USD.

• The bar for "YES" (government incentives) shows average EV sales slightly above 25,000 USD.

• The visual suggests that countries with government incentives have slightly higher average EV sales compared to those without, but the difference is minimal in this aggregated view.

EV Market Share by EV Type:

Bar charts and pie charts show the distribution of market share and total sales across different EV types, offering insight into consumer preferences.
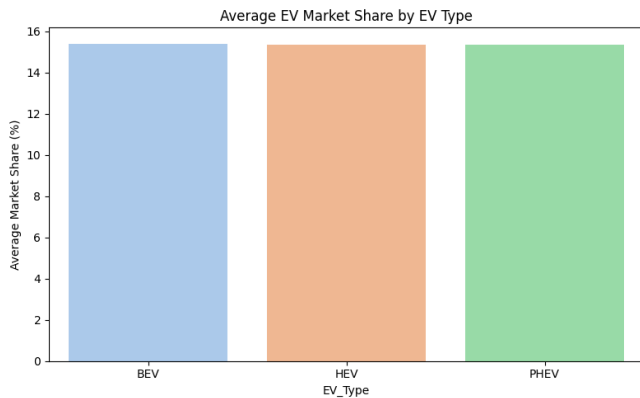
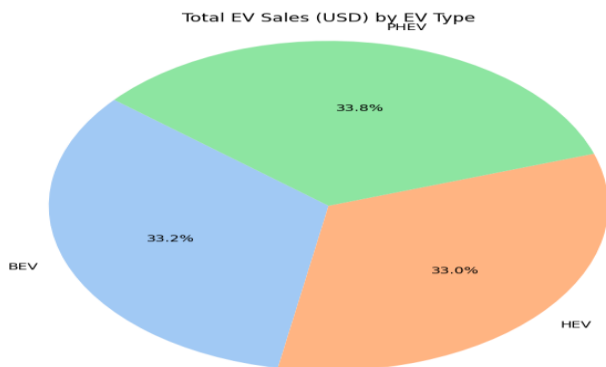Figure 6: Average EV Market Share by EV Type

Figure 7: Total Sales by EV Type

Interpretation:

•   These charts provide insights into consumer preferences by showing the distribution of market share and total sales across different EV types (BEV, HEV, PHEV).

Average EV Market Share by EV Type (Bar Chart):

•   All three EV types (BEV, HEV, PHEV) have an average market share of approximately 15.5%.

•   This indicates a relatively even distribution of average market share among Battery Electric Vehicles (BEV), Hybrid Electric Vehicles (HEV), and Plug-in Hybrid Electric Vehicles (PHEV).

Total EV Sales (USD) by EV Type (Pie Chart):

•   PHEV accounts for the largest share of total EV sales at 33.8%.

•   BEV follows closely at 33.2%.

•   HEV has the smallest share at 33.0%.

•   Similar to market share, total sales are also quite evenly distributed among the three EV types, with a slight edge for PHEVs.

Average Number of Charging Stations by Country:

A bar chart to understand infrastructure availability, showing which countries have invested the most in charging stations.
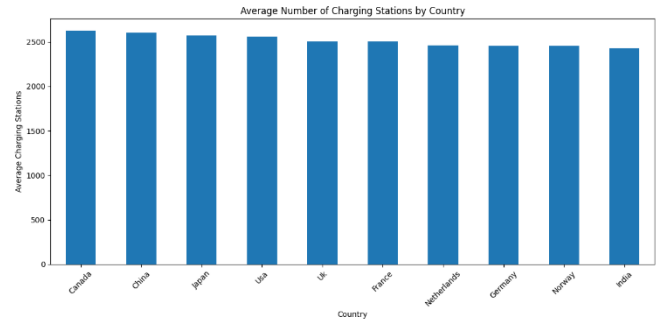

Figure 8: Average Number of Charging Stations by Country

Interpretation:

This bar chart illustrates the average number of charging stations per country, indicating investment in infrastructure availability.

•   Canada has the highest average number of charging stations, slightly above 2500.

•   China and Japan follow closely, also with average charging stations above 2500.

•   The USA, UK, France, Netherlands, Germany, Norway, and India follow in decreasing order of average charging stations.

•   India has the lowest average number of charging stations among the listed countries, but still above 2400.

•   Overall, there isn't a vast difference in the average number of charging stations among these countries, suggesting a relatively consistent level of infrastructure development among the included nations in this dataset.

EV Market Share Trends in Top 5 Countries:

A grouped bar chart displaying how EV market share has evolved yearly for the top five countries by sales, revealing growth dynamics in key markets.
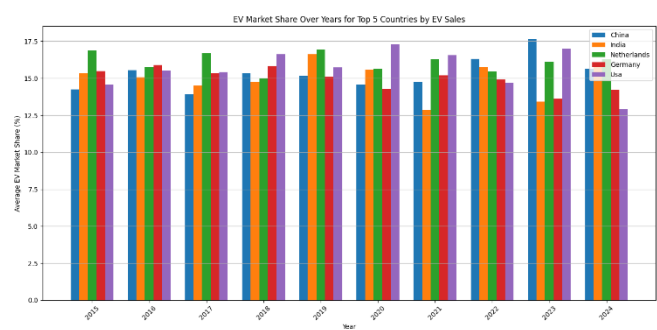

Figure 9: EV Market Share Over the Years

Interpretation:

•   The chart displays market share for China, India, the Netherlands, Germany, and the USA from 2015 to 2024.

•   General Trend: Most countries show fluctuations but also some general growth in EV market share over the years.

•   China: Shows a consistent increase in market share from 2015 to 2020, with a dip in 2021 and a strong recovery and peak in 2023.

• India: Shows a more fluctuating pattern, with peaks in 2016 and 2019, and a dip in 2021.

• Netherlands: Generally shows an upward trend, particularly noticeable from 2018 onwards, with some year-to-year variations.

• Germany: Exhibits a generally increasing trend in market share, especially in later years.

• USA: Shows considerable variability, with a notable peak in 2020 and a dip in 2023.

• In some years, certain countries (e.g., Netherlands in 2020, Germany in 2021) show significantly higher market shares than others.

• The visual helps to identify individual country performance and their relative market share evolution over time within the top-performing nations.

C. Predictive Modeling

Target Variable:

Changed focus from predicting EV sales revenue to predicting the total number of vehicles sold (Total_Vehicles_Sold) based on key economic and market features.

Features Selected:

• Charging Stations

• EV Market Share (%)

• GDP per Capita

Model Choice:

Used a Linear Regression model to predict future vehicle sales based on these features.

Model Training & Evaluation:

• Split data into training and testing sets (80-20 split).

• Trained the model and evaluated performance using Root Mean Squared Error (RMSE), reporting prediction error in number of vehicles.
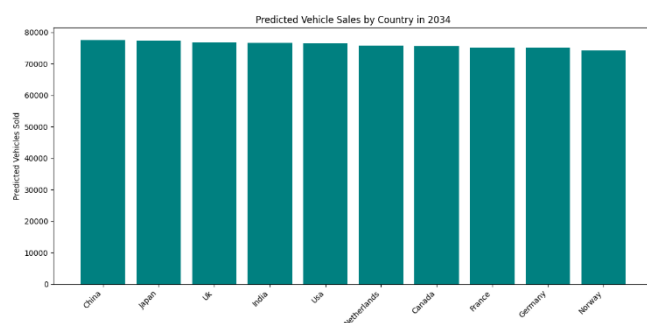

Figure 10: Predicted Vehicle Sales

Interpretation:

This bar chart visualizes the predicted total vehicle sales by country for the year 2034, based on the linear regression model used.

• The chart shows that China is predicted to have the highest number of total vehicles sold in 2034, approaching 80,000 units.

• Japan, the UK, India, and the USA are predicted to have very similar sales volumes, just under China's.

• Netherlands, Canada, France, Germany, and Norway follow with progressively lower predicted sales, though the differences between these countries are not extremely large.

• The chart indicates a relatively close range of predicted vehicle sales among the top countries, with China holding a slight lead.

D. Future Prediction (Next 10 Years)

Feature Growth Assumptions:

Assumed annual percentage growth for features based on domain knowledge or trend assumptions:

• Charging Stations: 10% growth per year

• EV Market Share: 5% growth per year

• GDP per Capita: 3% growth per year

Prediction Procedure:

For each country and each future year:

• Updated feature values applying compound annual growth rates.

• Predicted vehicle sales using the trained model.

• Estimated predicted revenue by multiplying predicted vehicle sales by average revenue per vehicle (calculated from historical data per country).

• Output:

Created a future prediction Data Frame containing predicted vehicles sold and EV sales revenue per country per year.
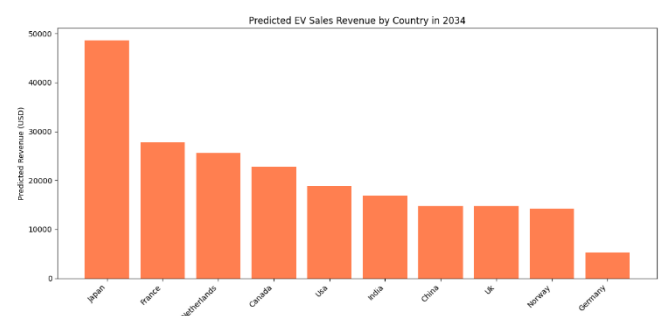

Figure 11: Predicted EV Sales Revenue

Interpretation:

This bar chart visualizes the predicted EV sales revenue (USD) by country for the year 2034, calculated by multiplying predicted vehicle sales by average revenue per vehicle.

• Japan is predicted to have significantly the highest EV sales revenue in 2034, approaching 50,000 USD. This is notably higher than the predicted vehicle sales leader (China), suggesting a higher average revenue per EV in Japan.

• France and the Netherlands are second and third respectively in predicted revenue, with values around 25,000 USD.

• Canada, the USA, and India follow, with revenues ranging from approximately 17,500 to 22,500 USD.

• China, the UK, and Norway have predicted revenues in the range of 12,500 to 15,000 USD.

• Germany is predicted to have the lowest EV sales revenue among the listed countries, at approximately 5,000 USD.

This chart highlights that while a country might lead in predicted vehicle sales, it may not necessarily lead in predicted revenue, depending on the average price of EVs in that country.

E. Results Visualization

• Country with Highest Predicted Sales & Revenue:

Identified and printed the country expected to lead in vehicle sales and revenue in the final forecast year.

• Bar Plots for Final Year Predictions:

Visualized predicted vehicle sales and predicted revenue by country using bar charts for the last forecasted year, providing an intuitive view of expected market distribution.

F. Summary

• The analysis combines data exploration and linear modeling with sensible growth assumptions to forecast EV market size and revenue by country. The results help identify future leaders and market dynamics based on current infrastructure, market share, and economic conditions.

• This pipeline can be further improved with more complex models, finer-grained growth rates, and external data inputs to boost prediction accuracy.

G. Feature Growth Assumptions

For forecasting future years (up to 2034), we applied compound annual growth rates to each feature based on domain trends:

• Charging Stations: 10% annual growth

• EV Market Share: 5% annual growth

• GDP per Capita: 3% annual growth

H. Results and Forecast

The model predicts both total EV units sold and revenue per country for the year 2034.

• Highest Predicted Vehicle Sales: China

• Highest Predicted Revenue: Japan, suggesting a higher average EV price

• Other high-performing markets include: India, USA, UK, France, Netherlands, and Germany

VII. POWER BI DASHBOARD REPORT

This section will explain the interactive dashboard features: filters, visualizations, and key insights. Include screenshots when available

A. Title
Electric Vehicle Sales Analysis (2014–2024)

B. Objective
The motive behind the Power BI dashboard report is to provide a comprehensive overview of EV (Electric Vehicle) sales trends across global nations using an interactive Power BI dashboard. This includes analysis of sales volume, market share, manufacturer performance, regional distribution, and growth patterns from 2014 to 2025. The dashboard is intended to support data-driven decision-making in the EV industry.
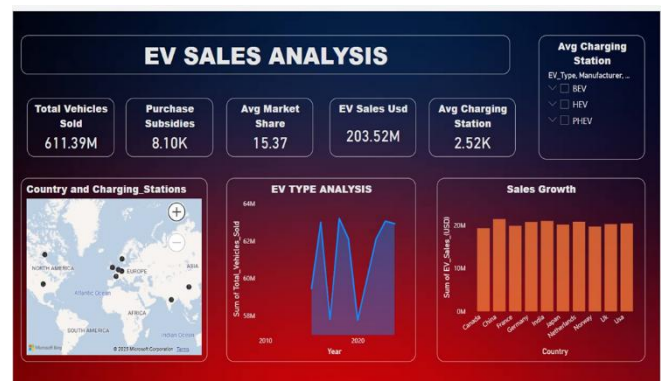
C. Power BI Dashboard

Figure 12: Power BI Dashboard

D. Dashboard Components & Visuals
The Power BI dashboard consists of the following core visuals:
• Card Visuals: KPIs like total EVs sold, Purchase Subsidies, Average Market Share, EV Sales USD, Average Charging Station.
• Slicers: Filters by year, Region, Manufacturer, EV type (BEV, PHEV)
• Map Visualization: Geographical distribution of EV Charging Station Adoption in different countries.
• Line Chart: EV sales trend over time by year.
• Bar Chart: Top countries by annual EV sales in USD.

E. Key Insights
• Global Growth: We can analyze that there is a major downfall in Sales after a certain duration throughout the period.
• Top Markets: China leads globally in EV adoption, followed by India, and select European countries (e.g., the Netherland, Germany).
• EV Adoption: Countries with stronger incentives and charging infrastructure showed significantly higher EV uptake.
• Charging Infrastructure: You can get information about what are the total charging stations in a particular region.
• Government Support: Very few instances occurred where subsidies were provided by a government.

F. Recommendations

• Expand Charging Infrastructure: Countries with low charger density should   prioritize investment to support EV growth.
• Subsidy Optimization: Introduce or adjust EV incentives to reduce upfront cost barriers, especially in emerging markets.
• Support Local Manufacturing: Encouraging domestic EV production can reduce costs and increase adoption.
• Education Campaigns: Promote awareness around total cost of ownership and environmental benefits of EVs.

G. Conclusion

The Power BI dashboard provides a various way to analyze global EV market trends. By highlighting some important elements such as growth areas, manufacturer performance, purchase subsidies to help and support the organization, stakeholders for making data driven decisions to support the future of sustainable mobility.

VIII. FINAL CONCLUSION

This project demonstrates how trends in electric vehicle (EV) sales can be effectively analyzed and forecasted using open-source data, structured query language (SQL), and a suite of modern data science tools. By integrating cleaned datasets with analytical methods, we provide a detailed examination of global EV adoption patterns across various regions and economic contexts. The analysis reveals significant growth in EV sales across developed nations—particularly in Europe, North America, and parts of Asia—driven by strong policy incentives, consumer awareness, and infrastructure development. Simultaneously, it highlights considerable untapped potential in emerging markets, where improving affordability, policy support, and charging infrastructure could accelerate adoption.

Through correlation analysis, data visualization, and exploratory modeling, we uncover the underlying drivers of adoption, such as GDP levels, fuel prices, regulatory frameworks, and technological accessibility. This project not only offers a snapshot of the current state of the EV market but also establishes a framework for ongoing analysis and forecasting. Future sections of this report will incorporate the output of predictive machine learning models to project sales trajectories under different economic and policy scenarios. In addition, business-oriented recommendations will be developed to guide manufacturers, investors, and policymakers in making informed, data-driven decisions that support the global transition to sustainable transportation.