Trends and Performance of EVs in Today's Automotive Landscape

José Ramírez

Agenda

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Project description

In this project, our primary focus revolves around addressing a series of analytical questions related to the use of electric vehicles (EVs) over the past five years. We have at our disposal two main datasets: the first one provides us with a comprehensive EV census spanning from 2018 to 2022 in the United States, while the second dataset offers an in-depth insight into the technical specifications and pricing information of the most popular EV models.

Our primary goal is to put into practice the skills acquired in our classroom through the creation of insightful visualizations and present our findings as the solutions to these analytical inquiries.

Analysis Questions

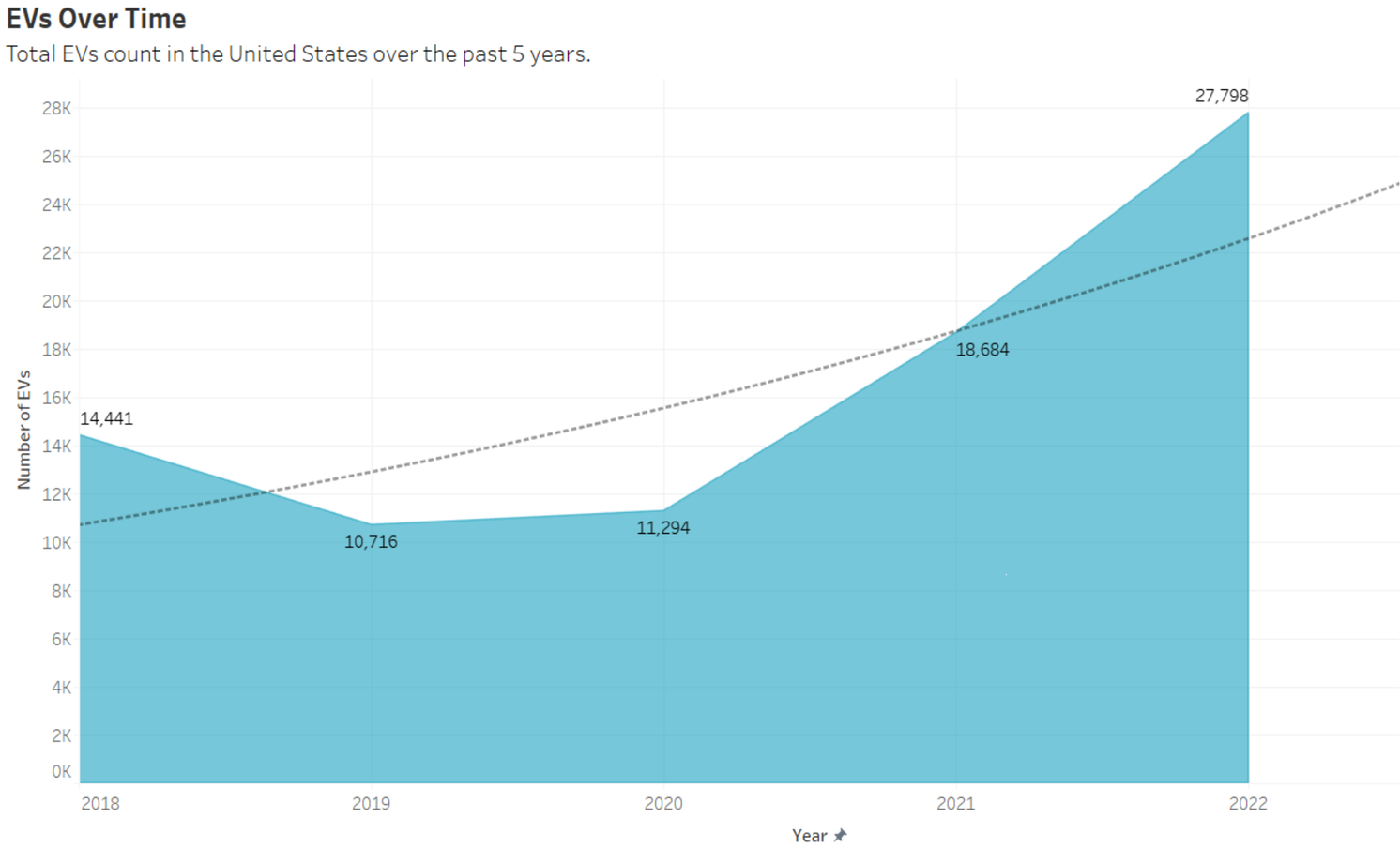
- Are people using more EVs in recent years?
- Which states had more EVs?
- Which county held the highest number of EVs?
- Which manufacturer had the majority of EVs?
- Which style of EVs do people tend to gravitate towards?
- Which manufacturer had the highest battery pack capacity?
- Which manufacturer had the highest efficiency?
- Which manufacturer had the lowest acceleration?
- Which manufacturer had the highest top speed?
- Are specific features of EVs linked to their pricing?

EVs Use in USA

Evolution of EV Registrations in the US

- Shows a consistent increase in EV registrations from 2020, despite a minor decline between 2018 and 2019.

- Illustrates a growing trend in EV popularity and utilization, emphasizing a significant shift towards sustainable transportation options, depicted by the ascending trendline.

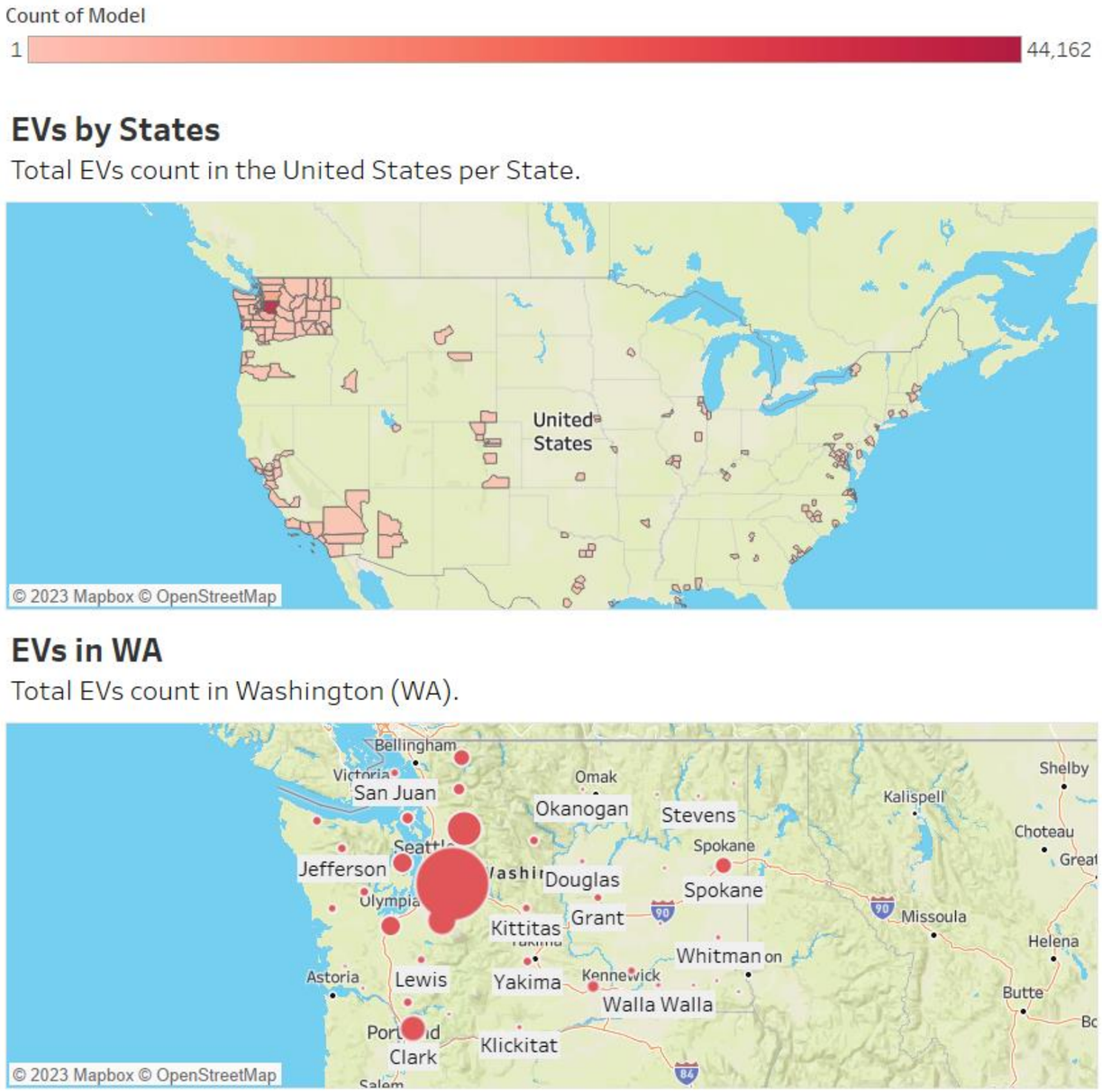


EV Distribution Across States and Counties

- Washington recorded the highest count of EVs between 2018 and 2022, followed by California, Maryland, Virginia, Texas, and North Carolina.

- Regions with higher EV counts often correlated with larger populations, established EV infrastructure, and supportive policies, potentially influencing higher EV adoption rates.

- In Washington, King County led in EV numbers with 44,162 cars, followed by Snohomish, Pierce, and Clark counties, contributing to Washington's total of 82,706 EVs.



User Preference

Tesla's Dominance in the US EV Market

- Tesla stood out as the primary manufacturer of EVs between 2018 and 2022, capturing 54.27% of the total surveyed vehicles.
- Models like the Model S, Model 3, Model X, and Model Y contributed to Tesla's widespread popularity and played a significant role in the mass adoption of EVs.
- While competitors like Volkswagen, Nissan, and Chevrolet actively develop notable EV options, Tesla has consistently maintained its leading market position in the US EV landscape.

EVs by Brand

Total EVs count in the United States by Manufacturer.

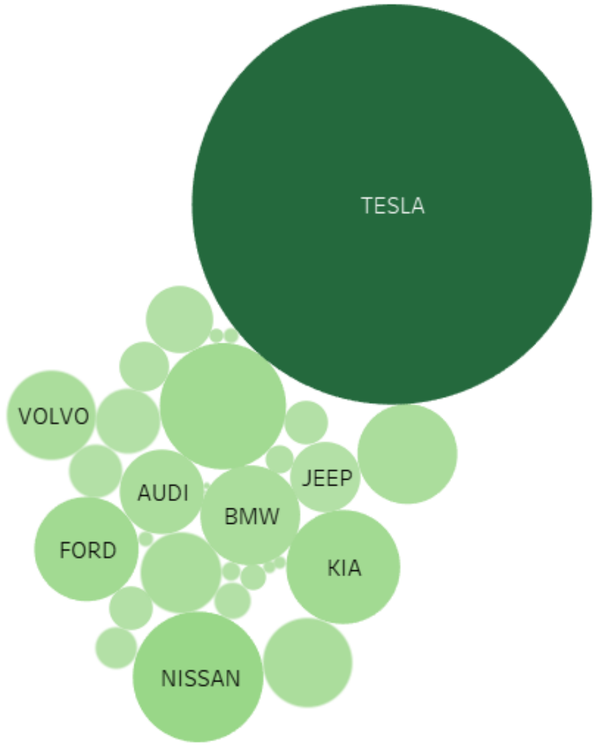
Brand	
TESLA	45,006
NISSAN	4,794
CHEVROLET	4,488
KIA	3,650
FORD	3,056
TOYOTA	2,807
BMW	2,738
VOLKSWAGEN	2,252
VOLVO	2,241
AUDI	2,006
CHRYSLER	1,841
JEEP	1,390
RIVIAN	1,269
HYUNDAI	1,183
HONDA	801
PORSCHE	695
MITSUBISHI	536
MINI	523
POLESTAR	488
MERCEDES-BENZ	373
JAGUAR	223
LINCOLN	185
LUCID	99
FIAT	69
SUBARU	64

% of Total Count of Model

0.00% 54.27%

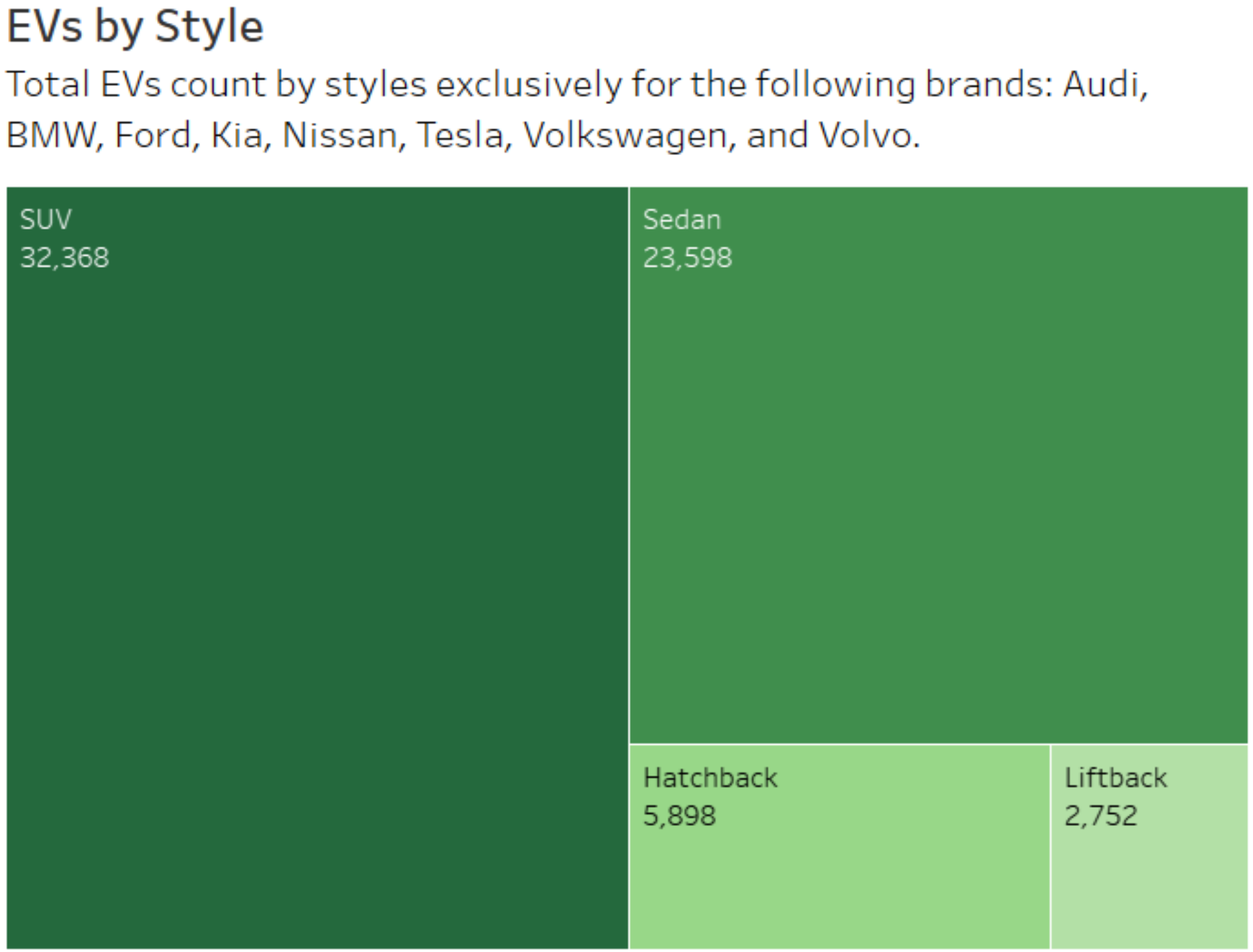
EVs by Brand (%)

Total EVs count in the United States by Manufacturer (%).



Preferred EV Styles: SUV Dominance

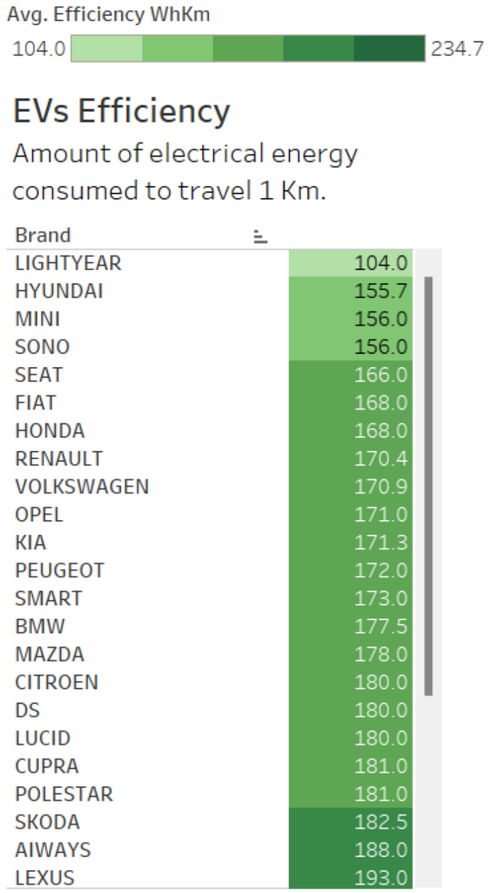
- SUVs emerged as the favored style among EVs, totaling 32,368 cars in the survey, signifying their dominance as the top choice among electric vehicle types.

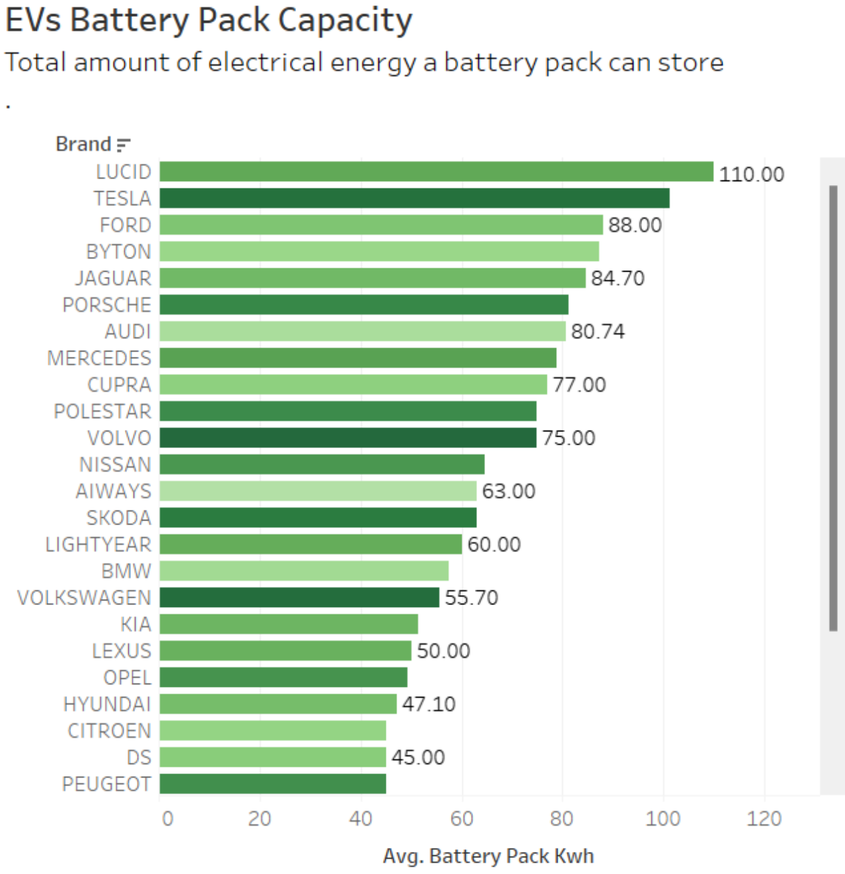


EVs Performance

EV Brands: Battery Capacity and Efficiency Leaders

- In terms of battery pack capacity, Lucid, Tesla, and Ford emerged as primary contenders.
- Evaluating efficiency based on electrical energy consumption per kilometer, Lightyear and Hyundai showcased remarkable prowess.

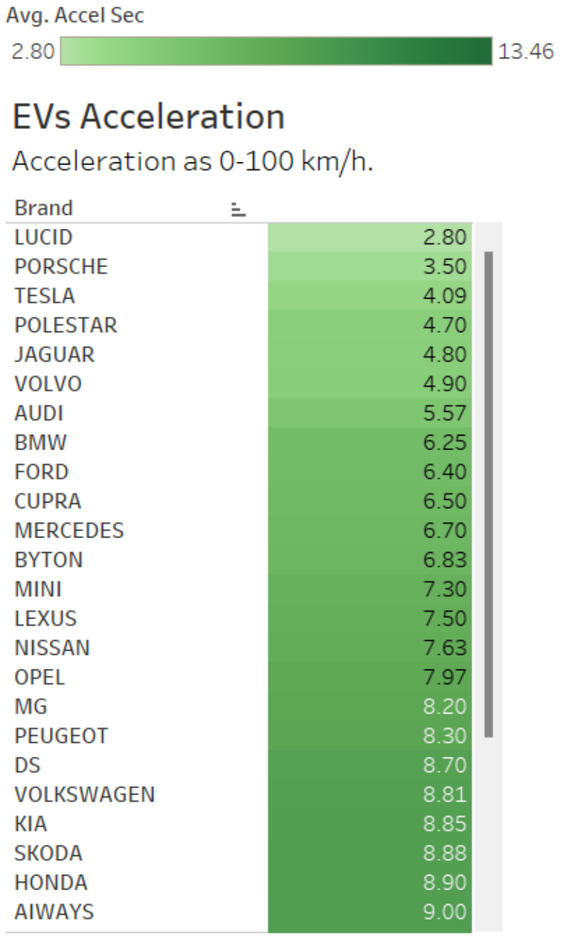


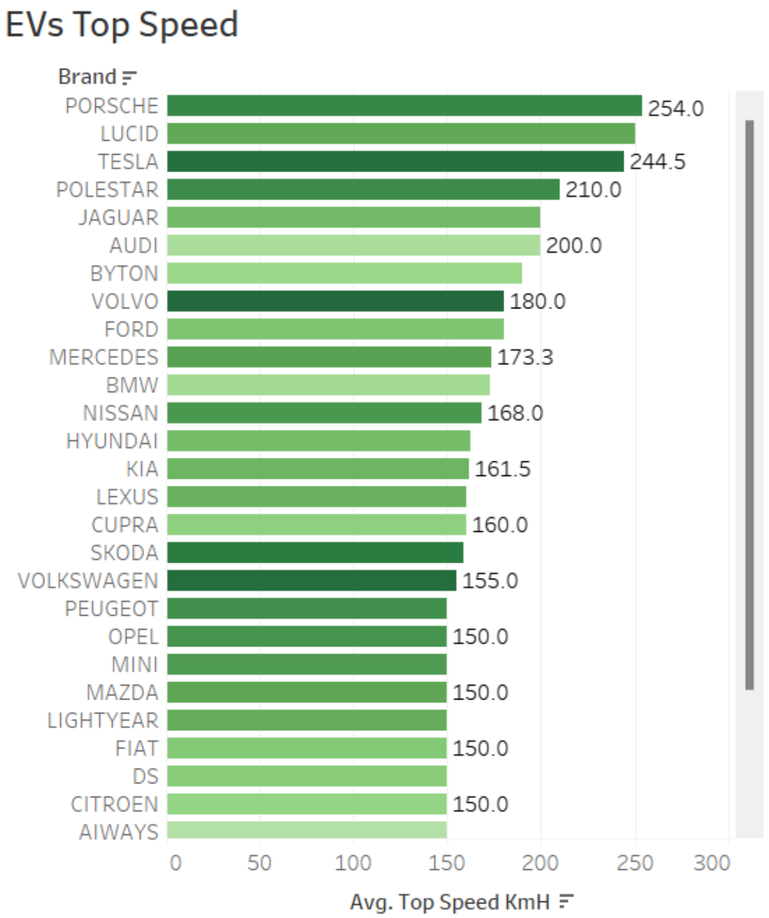


Acceleration and Top Speed Analysis

- Tesla, Porsche, and Lucid offer distinct acceleration experiences, with Tesla and Porsche focusing on performance-driven engineering, while Lucid emphasizes luxury and range, delivering slightly more progressive acceleration.

- In terms of top speed, Porsche stands out for its cars with remarkable maximum velocities. Also, Lucid and Tesla showcases impressive top speeds across some vehicle versions.





Factors Influencing EV Pricing

- EV pricing correlates strongly with certain attributes like speed, range, battery pack, and efficiency.
- However, the cost of EVs may also be influenced by a complex mix of factors beyond individual features, such as branding, target audience, and the overall package offered.

Price Trend

Price Correlation

EVs Features	Accel Sec	Battery Pack..	Efficiency W..	Fast Charge ..	Price Euro	Range Km	Seats	Top Speed K..
Accel_Sec	1.000	-0.678	-0.383	-0.783	-0.627	-0.678	-0.176	-0.786
Battery_Pack_Kwh	-0.678	1.000	0.641	0.694	0.657	0.910	0.330	0.722
Efficiency_WhKm	-0.383	0.641	1.000	0.318	0.395	0.314	0.302	0.355
Fast_Charge_KmH	-0.783	0.694	0.318	1.000	0.658	0.754	0.264	0.778
Price_Euro	-0.627	0.657	0.395	0.658	1.000	0.677	0.022	0.829
Range_Km	-0.678	0.910	0.314	0.754	0.677	1.000	0.300	0.748
Seats	-0.176	0.330	0.302	0.264	0.022	0.300	1.000	0.127
Top_Speed_KmH	-0.786	0.722	0.355	0.778	0.829	0.748	0.127	1.000

Conclusion

- The data analysis and visual representations have effectively addressed our analysis questions, shedding light on the steady rise of EV usage in the USA. However, a notable limitation arose due to incomplete information, primarily focused on Washington state.

Next steps

- Electric vehicles (EVs) hold significant importance due to their contributions to mitigating environmental impact by reducing greenhouse gas emissions and enhancing air quality, crucial steps in combating climate change. Consequently, we advocate for the continuation and expansion of comprehensive census efforts to cover diverse geographical regions.

- Collecting more data periodically is necessary as it enables states to track evolving consumer trends. This information equips cities and regions with insights necessary to develop and adapt infrastructure, ensuring it adequately supports the growing demand for EVs and comprehensive analysis.

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Thank you