Driving Resistance: Investigating How Political Ideology and Vehicle Symbolism Shape Electric Vehicle Adoption in the United States

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Christopher Connolly

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

Advisor

MC Forelle, Department of Engineering and Society

Introduction

As the threat of man-made climate change has grown in severity over the last several decades, engineers have been on the front-line developing technologies that can help mitigate these threats, which include extreme weather events and unsustainable energy demands. The development of electric vehicles (EVs) is a prime example of an engineering effort that can help address the issues surrounding climate change. EVs offer a reduced carbon footprint while simultaneously fulfilling the needs of our increasingly mobile society. Global EV sales have increased nearly 100-fold between 2013-2023, rising from 400,000 vehicles sold in 2013 to 39.3 million vehicles in 2023, reflecting global society's growing emphasis on sustainable technologies (EPA, n.d.).

Given all this optimism surrounding sustainability, one might wonder: where are all the electric vehicles in the United States? In 2023, battery electric vehicles (BEVs) accounted for just 7% percent of light vehicle sales in the U.S. with total EV sales (BEV, hybrid, and hybrid plug-in light vehicles) reaching only 16.3% of total vehicle sales (EIA, n.d.). EVs made up less than two of every ten cars sold in the U.S. in 2023. In contrast, in countries like Norway, EVs made up over 90% of the market share in 2023 (UAFO, n.d.). Given the maturity of EV technology today, the persistent gap in U.S. sales compared to other countries brings forward an important question: what factors stunt EV growth in the U.S.?

Currently in the U.S., the mention of EVs is more likely to evoke political controversy rather than images of sustainable technology. Polarizing political figures such as Elon Musk, whose name is synonymous with Tesla, the top U.S. EV manufacturer he helms, have added a political dimension to EVs by intertwining them with political ideological affiliation. Musk's increasingly controversial public image has even led some to express their discontent through

acts of vandalism against Teslas, using the cars as a symbol for their resentment toward Musk with arson attacks against Tesla vehicles reported in cities including Las Vegas, Seattle, and Portland (*AP News*, n.d.). This symbolic targeting of Teslas raises the question: how have cars, and more specifically EVs, a technology that is meant to help combat man-made climate change, become a political battleground in the U.S.? Furthermore, how has this politicalization of EVs affected EV adoption rates in the U.S.?

The paper investigates how political factors can contribute to disparities in EV adoption between California and Texas. These states were chosen because they share many similarities, such as large populations, with California having roughly 39 million residents and Texas having roughly 29 million residents (CBD, n.d.), major urban centers such as Los Angeles and Houston, diverse geography such as desert and farmland, and economies of similar scale. Despite these parallels, California and Texas differ along partisan lines, with California generally leaning towards progressive governments and Texas leaning toward conservative governments over the last decade. These leanings are evident in the state level governments that have maintained power. This difference in political ideology allows us to explore to what extent politics, specifically through the politicization of EVs as artifacts, can influence EV adoption in the United States.

Literature Review

Although the U.S. plays a significant role in EV sales globally, EV sales in comparable economies outpace American sales. For example, between 2018 and 2023, U.S. EV sales fell 6.8% behind Europe and 18.5% behind China (U.S. EPA, 2016). EV sales within the U.S. vary regionally, with states such as California and Washington recording an EV registration rate of 24% and 19% respectively in Q3 of 2023, compared to states like Ohio and West Virginia, which

recorded an EV registration rate of just 5% during the same time period (Rattner, 2023). These patterns suggest that a uniform national narrative cannot fully explain EV adoption trends; instead, regional factors, such as political culture, geography, and technological factors must be examined.

Historically, political affiliation has been one of the strongest predictors of attitudes toward EVs in the U.S. Individuals who identify with progressivism are more likely to hold positive views on EVs (Sintov et al., 2020). Consequently, progressive individuals are more likely to adopt them at higher rates than conservative identifying individuals, who have historically expressed reservations about adopting EVs (Sintov et al., 2020). This divide is based in the association between EVs and environmentalism (White & Sintov, 2017, pg. 26), which itself is associated with progressivism.

The function of cars as a tool of ideological expression raises the question: how have cars, which are simply mechanical vehicles meant to get their driver from point A to point B, come to represent their owners' political ideologies? Research shows that cars can serve as extensions of one's personal identity and may carry symbolism such as advertising one's financial status and openness to technological innovation (Ashmore et al., 2018, pg. 568). More broadly, cars have been a staple in U.S. culture and are often-used symbols of characteristic American traits such as self-reliance and social mobility (Gartman, 2004). Cars can take on symbolic meanings that reflect their owners, specifically with regards to political values and ideology.

While political identity plays a significant role in consumer interaction with EVs, it is important to analyze how technological factors may also impact consumer attitudes toward EVs. Currently, infrastructure in the U.S. is inadequate to facilitate a large increase in EVs on the road

(Yang et al., 2024, pg. 1), specifically in terms of charging accessibility. Because EV charging infrastructure development is linked to EV demand (*CBO,* 2023), regions with lower EV adoption rates can see slower infrastructure network development, creating a feedback loop that can further discourage EV adoption. Despite these infrastructural limitations, research shows that current EV technology is adequate for the needs of 95% of average drivers in the U.S. (Rainieri et al., 2023, pg. 64). This finding highlights a gap between public perception and actual driving habits, as many consumers continue to express concerns about range limitations despite current EVs offering adequate range for most drivers in the U.S. The psychological mechanism that drives this irrationalism is known as *range anxiety*, which is an apprehension unique to battery electric vehicles (BEVs) that involves drivers being more concerned about range issues for EVs than they would be for conventional internal combustion engine (ICE) cars (Rainieri et al., 2023, pg. 53).

Ultimately, research suggests that the slow adoption rate in the U.S. cannot be attributed solely to technological limitations. Instead, it may, at least in part, be due to an interaction between cultural symbolism and infrastructural feedback loops. To help understand this interaction, I utilize two complementary frameworks: the Social Life of Things (SLOT) and Technological Momentum (TM). SLOT, which is originally an anthropology concept but is often applied as science and technology studies (STS) framework, can provide greater insight into how cars function as artifacts of personal expression. SLOT argues that the meanings of objects are not inherent but socially constructed through relationships and interactions that people have with them (Appadurai, 2013). TM, an STS framework that explores how technologies become harder to transition away from as time progresses (Hirsh & Sovacool, 2006), can help explain how existing vehicle infrastructure systems and consumer attitudes act as barriers toward EV

adoption. Together, these frameworks provide a cohesive lens for understanding EV adoption factors. SLOT gives insight into the cultural factors at play, while TM shows how these cultural factors can manifest themselves as structural barriers that reinforce existing patterns of EV adoption.

Methods

I use a qualitative comparative case study to examine the role that political identity and symbolic meaning play in affecting EV adoption rates in the U.S. My analysis focuses on California and Texas from 2023 to 2025, due to their comparable population sizes, demographies, scale of economies, and geographic diversity, and yet starkly different political environments. Data sources include state-level EV adoption statistics, which provide quantitative insight regional EV uptake; government infrastructure investment reports, which offer details on infrastructure networks and government funding priorities; government EV incentives datasheets, including tax incentives and rebates; and secondary literature including research articles, which contextualize the cultural, political, and economic topics.

The analysis is broken into three sections. I first provide cultural context as to how cars have historically been politically framed in each state. I then compare government investment in EV infrastructure, purchasing incentives, and how political leadership may influence this EV investment. Lastly, I analyze how current EV adoption rates in these states are a function of infrastructural momentum, which itself is a function of the politicization of EVs. The TM framework enables an examination of how current technological environments reinforce existing adoption rate patterns, while SLOT is used to explain how cars, particularly EVs, are used as a tool for political expression.

Analysis

Throughout American history, cars have long been artifacts of cultural expression. This cultural context can help us understand the politicalization of EVs. Historically, cars in America have served as symbols for values critical to the American identity, such as independence, self-reliance, and social mobility. During the Cold War, especially during the 1950s, flashy and materially excessive American cars such as the Cadillac Coupe Deville served as symbols of American capitalism. These boisterous vehicles were beacons for American ideals such as individualism, prosperity, and technological superiority, creating a tangible counterargument against the austerity associated with the U.S.'s communist counterparts (Alan J, 2008). This historical precedent demonstrates how cars have served as powerful cultural symbols in the U.S.

SLOT can help explain how cars have taken on a significant cultural meaning in the U.S. by suggesting that commodities derive their value from the societies in which they exist. In his essay "The Social Life of Things," Appadurai writes that the "meanings" that "things" inherit are "inscribed in their forms, their uses, their trajectories" (Appadurai, 2013, pg. 5). Applied to vehicles, SLOT implies that a car's value is not inherent just in its practical purpose as a mechanical device, but also in the value that the society that it exists in assigns to it. Americans assign personal ideologies, including political ideologies, to vehicles. For example, self-reliance is associated with pick-up trucks, while eco-consciousness is associated with EVs. The idea that a vehicle is representative of its owner is addressed by business academic Russel Belk in his paper "Possessions and the Extended Self," where he proposes that consumers both intentionally and unintentionally regard their possessions as an extension of themselves (Belk, 1988, pg.139).

This STS lens explains how cars, particularly EVs, have come to represent their owners in the U.S.

The relationship between car owner and personal identity is foundational to understanding why governments invest in EV infrastructures differently because it reveals how cars, particularly EVs, can become highly politicized symbols. California's progressive political culture prioritizes sustainable energy practices and environmental stewardship (Rochlin, 2021). This emphasis on sustainability and environmentalism often manifests itself in the promotion of sustainable, or "green," technologies such as EVs. This transition from carbon-emitting ICE cars towards more sustainable EVs helps to lower the carbon footprint of cars and create a more environmentally sustainable automotive industry (Chen & Ma, 2024). Because environmentalism is closely associated with progressive political values, EVs serve not just as technical solutions to climate change but also as a symbolic expression of the progressive political identity (Sintov et al., 2020). Conversely, in conservative states like Texas, this symbolic association can have the opposite effect. Negative partisanship, which is defined as disdain towards an opposing political party (Bankert, 2022, pg. 1), can lead conservative individuals to view EVs in a negative light. Thus, by filtering EVs through a partisan lens, EVs take on the role as political symbols.

Having established the relationship between EVs and the political ideologies of their owners, we can now examine how this relationship manifests itself in disproportionate adoption rates between California and Texas. State governments generally reflect the ideological preferences of their constituents and tend to enact policy, especially those related to social issues, that align with their states' constituents (Caughey & Warshaw, 2018). This implies that state governments generally reflect the public's priorities, such as supporting environmental

sustainability through policy change. The current Democratic government in California places higher priority on EV investment compared to the current Republican government in Texas. This partisan difference is exemplified by state policies such as EV purchase incentives, where California has offered up to $7500 in EV rebates (*CVRP*, n.d.), compared to Texas which has offered up to $2500 in EV rebates (*AFDC*, n.d.). Beyond financial incentives, government support of EVs through infrastructure development such as public EV charging ports further illustrates the disparity in priorities between the Democratic-led state and the Republican-led state, with California recording 51,305 public EV charging ports and Texas recording 10,943 ports as of April 2025 (*AFDC*, n.d.-a). The lack of infrastructure investment in Texas, which in part is attributable to the political priorities at the state government level (Patrick et al., n.d.), shapes consumer behavior by dissuading potential consumers from purchasing EVs due to a perceived lack of infrastructure support. This lack of investment can reinforce existing ICE vehicle networks by keeping consumer demand shifted away from EV infrastructure and toward ICE infrastructure (Sovacool & Hirsh, 2009) . This suggests that low EV infrastructure is simultaneously a cause and consequence of low EV adoption rates. The TM framework suggests that as ICE vehicle infrastructures develop, they will become more difficult to challenge as they become resistant to outside influence (Hirsh & Sovacool, 2006, pg. 72), making attempts at transition to a majority EV market increasingly difficult with time.

Ultimately, the interactions between political ideology, EVs, and state governments can have an impact on EV sales. EV adoption reports from 2023 show that California had an EV adoption rate of 3,224.9 EVs per 100,000 residents while Texas had 754.3 EVs per 100,000 residents (*AFDC*, n.d.; *U.S. CB* n.d.) Despite sharing many similarities including large and diverse populations, a geographical mix of urban centers and rural farmland, and economies of

the same magnitude, Californians adopt EVs at a rate over four times higher than Texans, suggesting that interaction between politics and symbolism may play a role in influencing EV sales.

Conclusion

Varying EV adoption patterns in the U.S. show that technology often evolves in the environment that it exists in. As the global climate crisis rapidly increases in severity, it is alarming that many American consumers remain apprehensive about EVs given the potentially extremely hazardous ramifications of climate change, and even more concerning given the dramatic advancement in EV technology in recent decades. However, upon deeper examination, it becomes clear that EV hesitancy in the U.S. is not just a matter of technological capability but also of cultural and political ideology. Given the intensely divided political landscape of the Trump Era, it is not surprising that EVs, given their role as political emblems, have become divisive artifacts.

To help increase nationwide adoption of EV to members across the entire political spectrum, it essential that EVs lose their partisan affiliation. An example we can follow of a once politically controversial item that became culturally normalized is the seatbelt. In the U.S., seatbelts faced heavy political resistance from conservative groups that viewed mandatory seatbelt laws as “Orwellian” and made political statements by opposing federal mandates (Walters, 1966, pg. 1342). Over the course of several years, efforts to help educate the public on the importance of seatbelts in automotive safety combined with motivation from health insurers, who saw financial incentives to promote seat belt use, changed public perception surrounding seatbelts. Taking inspiration from this, EV adoption in the U.S. can expand if consumers begin to see EVs as beneficial technologies, like seatbelts becoming widely accepted for their role in

public safety. Furthermore, industries significantly affected by climate change like property insurers and farmers, who have both seen increased financial strain due to increasingly common extreme weather events, may have a growing incentive to support technologies with less negative environmental impact and may use their influence to help push governments to expedite investment in EV infrastructure.

Ultimately, EV adoption relies on how society chooses to frame this technology. By decoupling EVs from political symbology and rebranding them as beneficial tools for all consumers, regardless of political affiliation, we may see an increase in EV adoption rates as they become more accessible and acceptable to customers of all backgrounds.

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