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Cementing the U.S. as a global leader in EV technology requires continual investment in equity-centered, community-based initiatives across government administrations.

Research Issue

The automotive industry is undergoing an unprecedented global change, marked by a transition away from traditional internal combustion engine vehicles toward battery-powered electric vehicles (EVs). The increased adoption of EVs has the potential to establish the U.S. as a global leader in this high-growth economic subsector. Furthermore, a move toward EV adoption is significant given U.S. national objectives to halve greenhouse gas (GHG) emissions by year 2030 and reach net-zero by 2050. To meet these carbon reduction and EV adoption objectives, there are various community access and industry challenges that must be overcome. These challenges include equitable access to EVs and charging infrastructure, barriers in the supply of pertinent critical materials, and industry labor limitations. Our research can help cement the U.S. as the global leader in EV technology by developing novel insights for how to facilitate more equitable access to EV technologies and provide insights about economic opportunities that can be created across U.S. sociodemographic subgroups (e.g., rural, urban, and socioeconomic groups). Equitable access to emerging EV technologies will help meet the goals established in the Bipartisan Infrastructure Law, the Inflation Reduction Act, and the Justice40 Initiative.

Methods and Data

To understand the barriers and challenges associated with equitable access to emergent EV technologies, we employ two methodological approaches. The first approach involves a scientifically rigorous and comprehensive review that explores existing challenges in EV technology adoption, with a lens oriented towards barriers of EV adoption and transportation access for lower income customers. This review covers capital cost and financing access barriers, public and private charging infrastructure barriers, and how these barriers intersect with the EV supply chain. The second method involves the administration of a survey that investigates scenario-based U.S. consumer behavior regarding personal EV adoption, access to critical EV technology (e.g., in-home and community charging station infrastructure), and public transportation access across key socio-demographic subgroups. In this latter approach, we expect to produce new and meaningful data that will complement the insights identified in the comprehensive literature review.

Insights

Here are some of the major insights revealed thus far:

- Based on recent data, the EV market share is trending upward, with expectations that this trend will intensify. Strategically investigating in this upward trend could help address the national objectives established in the Bipartisan Infrastructure Law and Inflation Reduction Act.
- For the U.S. to become a global leader in EV technology, it requires addressing constraints and geopolitical barriers in the supply of pertinent critical materials, securing equitable financing and



access to EV technology, and addressing industry labor limitations. These efforts will help address the national objectives established in the Inflation Reduction Act and Justice40 Initiative.

- An under-investigated impediment in EV growth involves addressing EV technology skepticism and balancing inequitable access to EVs for broader socioeconomic benefit across socio-demographic subgroups. Further research in this area will help meet goals of the Justice40 Initiative.

Options and Trade-offs

There are two paths that can be taken when it comes to EV technology and equity. A business-as-usual approach relies on existing market forces to dictate the supply of critical materials and how the pricing and financing of EV technology emerges. This market-based approach allows for considerable uncertainty and exposes geopolitical and national security vulnerabilities. For example, current supply chains have significant reliance on China and may weaken other U.S. national security interests. This approach may also exacerbate existing challenges around transportation sector GHG emissions and produce adverse climate change effects. A second path focuses on investing in and leveraging U.S. diversity for equitable EV technology adoption. This latter path would require continuity in the effective administration of initiatives such as the Justice40 Initiative, and like measures, across U.S. governmental administrations over longer periods. Doing so could lead to more sustained and predictable EV outcomes in the U.S. (e.g., more equitable and improved labor outcomes, reduced national security vulnerabilities, and reduced transportation sector GHG emissions); however, this path will likely require more upfront capital and community-based investments.

Early wins

Helping to achieve the aims of the Justice40 Initiative is one of the early wins worth highlighting from this ongoing effort. Ensuring that forty percent of Federal investment flows to historically marginalized communities requires a deep understanding for how these investment flows might be leveraged to synergize long-term socioeconomic prowess. Yet, these investments will benefit different socio-demographic groups differently, and it is therefore important to evaluate the unique characteristics and profiles of these groups as they relate to EVs (e.g., low, middle, and high-income subgroups or rural and urban community needs). Our work has already coalesced many of these important insights such that they can inform decision making in EV technology strategy.

Next Steps: Upcoming work and finalization

The next steps involve administering the U.S.-wide survey on EV technology across sociodemographic subgroups and analyzing the survey data to produce novel insights in this regard. We expect to have preliminary insights by the mid-June demonstration events and finalized survey data by the end of summer 2023. Furthermore, we expect to move both the comprehensive review and survey contents to formal journal submission in this same period.