

## **ELECTRIC VEHICLE ADOPTION: AN INVESTIGATION INTO PUBLIC PERCEPTIONS, MARKET PREFERENCES, AND STATE POLICIES**

Electric vehicles (EVs) are more energy efficient and can solve health problems linked to air pollution. As adoption expands in the United States (US), the EV market is no longer shaped only by challenges typical of the early adoption stage, such as high upfront costs, limited charging infrastructure, and range anxiety, but it is also increasingly influenced by evolving consumer preferences, changing policy design, and public perceptions of EVs and charging technologies. Despite this shift, important gaps remain in understanding how these factors jointly affect EV adoption.

This dissertation addresses these gaps by developing a framework for EV adoption based on three interconnected elements: market preferences, policies, and public perceptions. These elements are investigated under four research questions: (RQ1) How different are the determinants of EV leasing and EV purchasing intentions in future timeframes? (RQ2) Which segments of the population intend to purchase a used EV? (RQ3) Do the factors associated with the adoption of EV registration fees differ from those associated with the fee amount? (RQ4) What are the perceived local impacts of EVs and charging technologies during infrastructure construction?

The first two research questions examine market preferences using data from a designed public opinion survey with Indiana residents. For the first study (RQ1), two multivariate ordered probit models were estimated to investigate how the determinants of EV leasing and purchasing intentions differ across future timeframes. The results show that leasing and purchasing intentions are shaped by different factors and that these relationships change in different future timeframes, highlighting the importance of distinguishing vehicle ownership pathways when studying EV adoption. The second study (RQ2) focuses on the secondary EV market. For that, latent class analysis identified different public segments who would prefer to purchase used EVs. The study confirms that financial considerations are central to preferences for used EVs but reveals that these considerations are not homogenous among groups, providing tailored policy recommendations to foster the secondary EV market.

The third study (RQ3) investigates EV policy design through panel data on statewide EV registration fees in the US. By jointly examining both fee implementation and fee amount, this study shows that the factors associated with adopting EV registration fees are not necessarily the

same as those associated with determining their magnitude. The findings indicate that EV policy design is shaped by considerations beyond fiscal conditions alone. The fourth study (RQ4) examines perceived local impacts of EVs and charging technologies during infrastructure construction using survey data collected in the context of the Indiana Dynamic Wireless Power Transfer (DWPT) testbed construction. This study estimates multivariate ordered probit models and identifies the main perceived benefits and concerns associated with EVs and emerging charging technologies, providing the groundwork for public education strategies.

Overall, this dissertation contributes to the transportation electrification literature by developing an integrated perspective on EV adoption that connects heterogeneous consumer preferences, evolving state policies, and local perceptions of electrification. The findings demonstrate that EV adoption should be understood as a multidimensional process rather than as the result of a single set of determinants. To translate these insights into practice, this dissertation proposes the DRIVE framework as a practical guide for fostering EV adoption through differentiated market strategies, reinforcement of the secondary EV market and available incentives, public information and education, validation of balanced policy design, and engagement with residents. By applying the DRIVE framework, policymakers, organizations, and other transportation stakeholders can support greater EV adoption while contributing to broader goals such as improving air quality, enhancing public health, and increasing transportation efficiency.