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From Two Wheels to Four Wheels: An Empirical Analysis of Customer Preference towards Electric Car Purchase among Existing Electric Bike Users

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ABSTRACT

The global transition towards sustainable mobility is accelerating, with electric vehicles (EVs) at the forefront of this paradigm shift. While much research focuses on the general population's adoption barriers, a critical and growing segment remains under-explored: existing electric bike (e-bike) users. This study assumes a "stepping stone" hypothesis, positing that the positive experience and technological familiarity gained from e-bike ownership significantly influence the preference for adopting electric cars (e-cars). The primary objective of this research was to identify and analyze the key determinants influencing an e-bike owner's intention to purchase an e-car. A quantitative research methodology was employed, utilizing a structured questionnaire distributed to a targeted sample of 285 current e-bike users. The research model integrated constructs from behavioral spillover theory and technology acceptance models, examining factors such as E-bike Satisfaction, Perceived Environmental Impact, Reduced Technology Anxiety, and Perceived Financial Benefit. Findings from multiple regression analysis reveal that Reduced Technology Anxiety, stemming from prior e-bike usage, is the most significant predictor of e-car purchase intention. Users comfortable with charging routines and battery management on a smaller scale are less intimidated by e-car operations. Furthermore, E-bike Satisfaction and Perceived Environmental Impact showed strong positive correlations with purchase intention. However, Perceived High Upfront Cost remains a significant barrier, even for this environmentally conscious segment, indicating that financial incentives are still crucial. The study concludes that e-bike users represent a "warm lead" segment for e-car manufacturers. The implications for industry suggest targeted marketing strategies that leverage their existing knowledge base—framing the e-car as a natural upgrade. For society and policymakers, promoting e-bike adoption could serve as an effective, lower-barrier entry point into the broader electric mobility ecosystem, eventually fostering higher e-car adoption rates.

***Keywords**: Electric Vehicles (EV), Electric Bikes (E-bikes), Consumer Preference, Sustainable Mobility, Behavioral Spillover, Technology Acceptance, Purchase Intention.*

Introduction

The automotive industry is undergoing its most significant transformation in a century, driven by the imperative to de-carbonize transportation and combat climate change.[1] Governments worldwide are setting aggressive targets for phasing out internal combustion engine (ICE) vehicles in favor of electric vehicles (EVs).[2] While EV adoption is growing, it still faces substantial hurdles among the mainstream population, including "range anxiety," high initial purchase costs, and concerns about charging infrastructure availability (Egbue & Long, 2012).[3]

Amidst this broader transition, a parallel revolution has occurred in micromobility with the widespread adoption of electric bikes (e-bikes).[4] E-bikes offer a cleaner, faster alternative to traditional bicycles and cars for short-to-medium distance commuting.[5] Crucially, they introduce consumers to the fundamental concepts of electromobility: battery charging, range estimation, and the quiet, instant torque driving experience.

This creates a unique and theoretically significant customer segment: individuals who have already overcome the initial psychological barriers to electric transport on two wheels. The central premise of this research is that the lived experience of owning and operating an e-bike acts as a catalyst, reshaping preferences and lowering perceived risks associated with purchasing a full-sized electric car. This phenomenon can be viewed through the lens of "behavioral spillover," where adopting one pro-environmental behavior increases the likelihood of adopting another related behavior (Truelove et al., 2014).[6]

Research Gap and Rationale

Existing literature extensively covers general consumer barriers to EV adoption.7 Similarly, separate studies explore the motivations of e-bike riders. However, there is a paucity of research bridging these two domains. Few studies specifically investigate the cross-category influence of e-bike ownership on e-car purchase preferences. Understanding this transition mechanism is vital for automakers seeking to identify early majority segments and for policymakers aiming to create integrated sustainable transport ecosystems.

Research Objectives

The primary objectives of this study are:

- To determine the extent to which satisfaction with current e-bike ownership influences the intention to purchase an electric car.
- To analyze how the experience of using an e-bike affects perceived risks associated with e-cars, particularly range and technology anxiety.
- To identify the relative importance of environmental benefits versus financial considerations (total cost of ownership) for this specific user segment.
- To propose a conceptual model explaining the transition preference from e-bikes to e-cars.

Literature Review and Theoretical Framework

- **Barriers and Drivers of EV Adoption**

The classic barriers to EV adoption are well-documented. Range anxiety—the fear of running out of power before reaching a destination or charging station—is a primary psychological hurdle (Noel et al., 2019).8 Other significant barriers include the high upfront cost compared to ICE vehicles, uncertainty regarding battery longevity and replacement costs, and the perceived lack of public charging infrastructure. Conversely, primary drivers include lower operating and maintenance costs, environmental concerns, and government incentives.

- **The E-bike Experience as a "Stepping Stone"**

E-bikes serve as an accessible entry point to electrification.9 They are significantly cheaper than e-cars and require less behavioral change for basic charging (often using standard wall outlets). Research on technology acceptance suggests that prior successful experience with a related technology significantly reduces perceived complexity and risk for subsequent technologies (Venkatesh et al., 2003). For an e-bike owner, the abstract concepts of "kWh," "charging time," and "range estimation" become part of daily routine. This study posits that this familiarity acts as a de-risking mechanism.

- **Behavioral Spillover Theory**

Behavioral spillover theory suggests that engaging in one positive behavior can lead to others.10 In the context of sustainability, a person who adopts an e-bike for environmental reasons may feel a sense of moral consistency or an enhanced "green identity," compelling them to consider an e-car for their larger transport needs (Lauren et al., 2016). The e-bike acts as an initial commitment to a sustainable lifestyle pathway.

- **Proposed Conceptual Framework**

Based on the literature, this study proposes a model where the Intention to Purchase an E-car (Dependent Variable) is influenced by several key independent variables, mediated by reduced anxiety.

H1: **Positive E-bike Experience:** Higher satisfaction and frequency of e-bike use will positively influence e-car purchase intention.

H2: **Reduced Technology/Range Anxiety:** The familiarity gained from e-bike use will lower perceived risks associated with e-car technology, thereby increasing purchase intention.

H3: **Perceived Environmental Benefit:** The desire to extend eco-friendly behavior from commuting (e-bike) to all travel (e-car) will be a positive driver.

H4: **Perceived Financial Hurdles:** Despite long-term savings, the high upfront cost of e-cars will remain a negative moderator, even for this experienced group.

Research Methodology

- **Research Design**

This study employs a descriptive and causal research design using a quantitative approach. A cross-sectional survey method was chosen to collect data from a specific population at a single point in time to test the proposed hypotheses.

- **Sampling Strategy and Data Collection**

The target population was defined as individuals who currently own and regularly use an electric bike (for at least 6 months) and hold a valid car driving license. A non-probability, purposive sampling technique was used to reach this niche segment. The survey link was distributed through online communities of e-bike enthusiasts, dedicated social media groups, and newsletters of two major e-bike retailers (with permission).

A total of 315 responses were received. After data cleaning to remove incomplete surveys or respondents who did not meet the criteria (e.g., did not have a car license), a final sample of **N = 285** was used for analysis.

- **Data Collection Instrument**

A structured questionnaire was developed based on constructs adapted from existing literature on technology acceptance and EV adoption.

  - **Section A:** Demographic profile and current e-bike usage patterns (duration of ownership, frequency of use, primary purpose).
  - **Section B:** Measured key constructs using a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree).
    - *E-bike Satisfaction (ES):* e.g., "My e-bike has met my expectations for reliability."
    - *Reduced Technology Anxiety (RTA):* e.g., "My experience with e-bike charging makes me feel confident about managing an electric car's battery."
    - *Perceived Environmental Benefit (PEB):* e.g., "Buying an e-car is the logical next step to reduce my carbon footprint."
    - *Perceived Financial Obstacle (PFO):* e.g., "The high purchase price of electric cars is a major deterrent for me."
    - *Intention to Purchase E-car (IPC):* e.g., "I plan to buy an electric car as my next vehicle purchase."

- **Data Analysis Tools**

The collected data was analyzed using SPSS. Descriptive statistics summarized the sample profile. Cronbach's alpha was calculated to ensure internal consistency of the scale items.11 Pearson correlation and multiple linear regression analysis were conducted to test the hypotheses and determine the strength of the relationships between variables.

Data Analysis and Findings

- **Sample Profile**

The demographic analysis showed a male-dominated sample (68%), consistent with typical e-bike ownership profiles. The primary age group was 35-50 years (45%), representing a financially stable segment. Over 70% used their e-bike for daily commuting, indicating high engagement with the technology.

- **Reliability and Correlation Analysis**

Cronbach's alpha values for all constructs exceeded the 0.7 threshold, indicating good reliability. Pearson correlation analysis revealed significant positive correlations between Intention to Purchase E-car and Reduced Technology Anxiety ($r = 0.62$, $p < .01$), E-bike Satisfaction ($r = 0.55$, $p < .01$), and Perceived Environmental Benefit ($r = 0.48$, $p < .01$). A significant negative correlation was observed with Perceived Financial Obstacle ($r = -0.41$, $p < .01$).

- **Hypothesis Testing (Regression Analysis)**

A multiple regression analysis was performed with Intention to Purchase E-car as the dependent variable. The model showed a strong fit ($R^2 = 0.58$), indicating that the independent variables explain 58% of the variance in purchase intention.

Table 1: Regression Analysis Results (Dependent Variable: Intention to Purchase E-car)

Independent Variable	Beta Coefficient (β)	t-value	Significance (p)	Hypothesis Status
(Constant)	1.24	3.15	.002	-
Reduced Technology Anxiety (RTA)	0.41	5.88	.000	H2 Supported
E-bike Satisfaction (ES)	0.28	4.12	.000	H1 Supported
Perceived Env. Benefit (PEB)	0.21	3.56	.001	H3 Supported
Perceived Financial Obstacle (PFO)	-0.25	-3.95	.000	H4 Supported

Interpretation of Findings

The results strongly support the "stepping stone" hypothesis.

- **The critical role of familiarity (H2):** *Reduced Technology Anxiety* emerged as the strongest predictor (β = 0.41). This indicates that the hands-on experience of managing an e-bike's battery and range significantly lowers the psychological barriers that typically deter novice EV buyers. They already "get" how it works.
- **Experience breeds intent (H1):** A positive, satisfying experience with an e-bike (β = 0.28) directly translates into a higher propensity to consider the larger electric counterpart.
- **Green consistency (H3):** The environmental motivation remains a significant driver (β = 0.21), suggesting a desire for behavioral consistency in sustainable living.
- **Price is still a hurdle (H4):** Even for this enthusiastic segment, the perceived high upfront cost of e-cars is a significant negative factor (β = -0.25). Familiarity does not completely eliminate financial concerns.

Conclusion

This research successfully identifies existing e-bike owners as a highly primed segment for electric car adoption, validating the "mobility ladder" concept. The transition preference is not merely ideological but rooted in practical, lived experience that demystifies electric mobility technology. The study concludes that the e-bike acts as a powerful educational tool that reduces technology and range anxiety—the two most stubborn barriers for the general public. However, the transition is not automatic; while the desire and comfort level are high, the financial barrier of e-car acquisition remains a significant friction point that needs addressing.

Implications for Society and Industry

- **Implications for the Automotive Industry**
  - **Targeted Marketing:** E-bike owners are a "warm lead" segment. Marketing efforts should move beyond explaining *why* electric is good and focus on the ease of transition.

Messaging should use analogies from their e-bike experience (e.g., "Charging your car is as simple as charging your bike, just bigger").

- **Strategic Partnerships:** Auto manufacturers should partner with major e-bike retailers for cross-promotion. Offering test drives of e-cars at e-bike points of sale or providing special e-car discounts to verified e-bike owners could be highly effective.
- **Product Bundling:** OEMs could explore future mobility packages, selling an e-car with a complementary e-bike designed to fit in the trunk, offering a complete "last mile" solution.

- **Implications for Society and Policy**
  - **E-bikes as a Policy Tool:** Governments aiming to accelerate e-car adoption should not overlook micromobility. Subsidizing e-bikes serves a dual purpose: it immediately reduces urban congestion and emissions while simultaneously creating a future pool of confident e-car buyers.
  - **Integrated Infrastructure:** Urban planning should focus on integrated charging hubs that cater to both two-wheeled and four-wheeled electric vehicles, reinforcing the ecosystem approach to sustainable transport.

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