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CONSUMER PERCEPTION OF ELECTRIC VEHICLES: A SYSTEMATIC REVIEW

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ABSTRACT
The adoption of electric vehicles (EVs) is vital for reducing carbon emissions and combating climate change. This systematic review examines consumer perceptions of EVs, focusing on environmental, economic, technological, and social dimensions. It highlights key barriers such as financial constraints, infrastructure challenges, and knowledge gaps, while providing insights for policymakers, manufacturers, and marketers to improve EV adoption rates.

Keywords:
Electric Vehicles, Consumer Perception, Adoption Barriers, Environmental Awareness, Economic Concerns, Technological Challenges, Infrastructure, Sustainability

1. INTRODUCTION

1.1. Background and Rationale

The global transition to sustainable energy sources has elevated the significance of electric vehicles (EVs) in mitigating climate change and reducing dependence on fossil fuels. Despite the rapid advancements in EV technology and growing policy support, the adoption rates remain inconsistent across different regions and demographic groups. A key determinant in this disparity is consumer perception, encompassing their attitudes, knowledge, and readiness to embrace this alternative mode of transportation. Understanding consumer perception is therefore crucial for policymakers, manufacturers, and marketers aiming to foster widespread EV adoption.

1.2. Objectives

The primary objective of this study is to conduct a systematic review of existing literature to identify, classify, and synthesize insights regarding consumer perceptions of EVs. By categorizing consumer attitudes into thematic domains, this review seeks to provide a comprehensive understanding of the factors that encourage or impede the adoption of EVs.

1.3. Methodology Overview

This study employs a systematic review methodology to ensure a robust and unbiased synthesis of the literature. Articles were identified using structured keyword searches across multiple academic databases. The analysis emphasizes thematic classification and quantitative representation, providing visual and analytical insights into the distribution and significance of different consumer perception themes.

2. METHODOLOGY

2.1. Literature Search Strategy

The literature was sourced using a structured search protocol that incorporated keywords such as “electric vehicles,” “consumer perception,” “adoption barriers,” and “market drivers.” Searches were conducted across leading academic databases, including Scopus, Web of Science, and PubMed, to ensure comprehensive coverage. The timeframe was restricted to studies published between 2010 and 2025 to capture recent trends and technological developments.

2.2. Inclusion and Exclusion Criteria

The review included peer-reviewed journal articles, conference papers, and systematic reviews that directly addressed consumer perceptions of EVs. Exclusion criteria were applied to studies focusing exclusively on technical aspects of EVs, such as battery performance, without addressing consumer attitudes. Studies written in non-English languages or without full-text access were also excluded.

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2.3. Data Extraction and Analysis

Key data elements, including study design, regional focus, and consumer perception themes, were extracted and categorized. To provide a structured analysis, thematic coding was employed to classify perceptions into categories such as environmental awareness, cost considerations, and technological apprehensions. Quantitative visualizations were generated to illustrate the prevalence and interrelation of these themes.

3. CLASSIFICATION OF CONSUMER PERCEPTIONS

3.1. Environmental Perception

Environmental consciousness plays a pivotal role in shaping positive consumer attitudes towards EVs. Many studies highlight how consumers view EVs as a solution to air pollution and greenhouse gas emissions. However, knowledge gaps regarding the environmental impact of battery production and disposal persist, influencing the overall perception.

3.2. Economic Considerations

Economic factors are often the most significant barriers to EV adoption. High upfront costs, limited resale value, and uncertainties surrounding maintenance expenses deter potential buyers. Subsidies and financial incentives have been shown to alleviate these concerns, yet their effectiveness varies across regions.

3.3. Technological Factors

Range anxiety, battery longevity, and the perceived lack of technological maturity remain prominent concerns. While recent advancements in EV technology have addressed many of these issues, consumer apprehensions persist due to misinformation or lack of awareness.

3.4. Social and Cultural Influences

Social and cultural contexts also shape consumer perceptions. For instance, individuals in urban areas may be more inclined to adopt EVs due to access to charging infrastructure, while rural consumers may prioritize traditional vehicles due to their perceived reliability. Peer influence, societal norms, and marketing campaigns significantly impact these dynamics.

Theme	*Key Focus*	*Percentage of Studies (%)*
Environmental Perception	*Awareness of environmental benefits and concerns about battery disposal*	*35%*
Economic Considerations	*Initial cost, subsidies, and long-term financial implications*	*30%*
Technological Factors	*Range anxiety, battery efficiency, and lack of technological maturity*	*25%*
Social and Cultural Influences	*Peer influence, societal norms, and urban vs rural preferences*	*10%*

Table 1: Classification of Consumer Perceptions

4. BARRIERS TO ADOPTION IDENTIFIED IN LITERATURE

4.1. Financial Barriers

High initial purchase costs remain a significant deterrent for many consumers, even in regions offering subsidies. Concerns over long-term costs, including battery replacement and charging expenses, exacerbate this barrier. Financial constraints are particularly pronounced among middle- and low-income consumers.

4.2. Infrastructure Challenges

The absence of a widespread and reliable charging infrastructure is one of the most frequently cited barriers. Consumers often report range anxiety due to the perceived inadequacy of charging stations, especially in rural or suburban areas.

4.3. Knowledge Gaps

Misinformation and limited consumer awareness about EV capabilities, environmental benefits, and financial incentives hinder adoption. Addressing these gaps through targeted education and transparent marketing is critical for improving consumer confidence.

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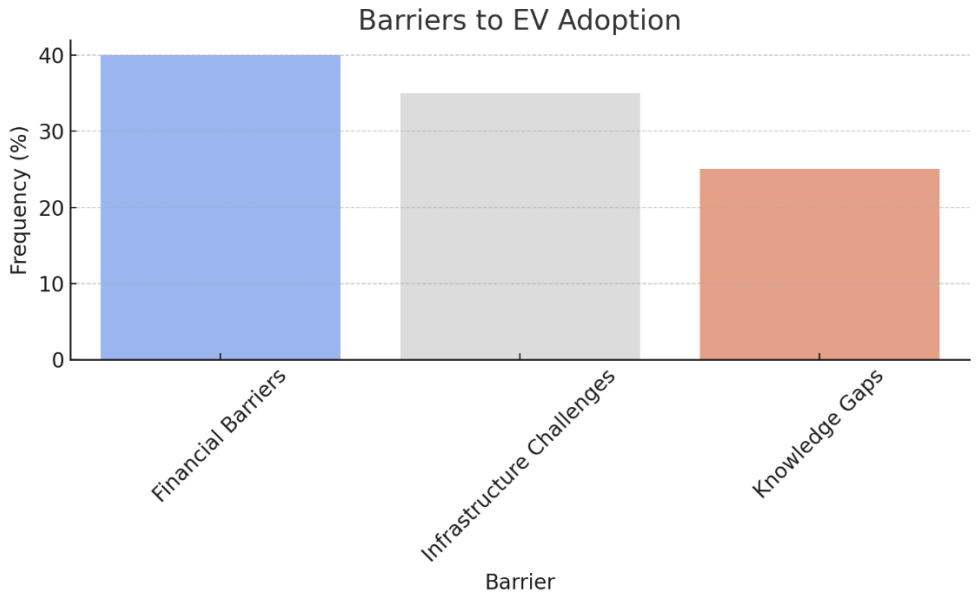
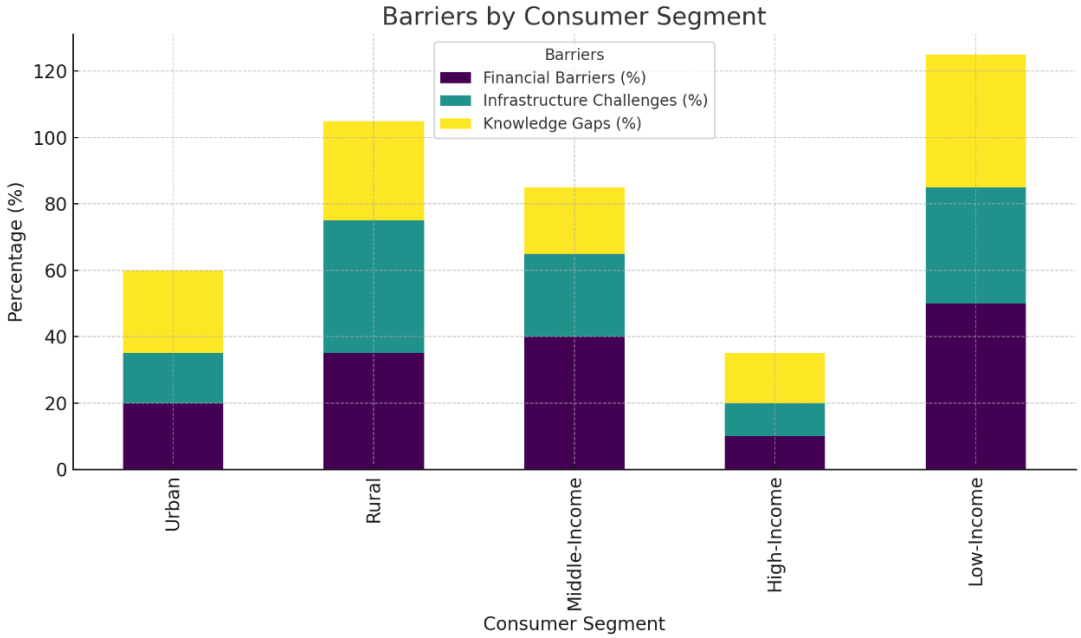


Bar Diagram[1] :Barriers to EV Adoption

The bar chart above illustrates the relative frequency of various barriers to EV adoption as identified in the literature.



Bar Diagram[2]: Barriers by Consumer Segment

The stacked bar chart reveals how barriers to EV adoption differ by consumer segments, such as urban vs. rural populations and income groups.

5. TRENDS AND INSIGHTS FROM THE REVIEW

5.1. Regional Differences

Consumer perceptions of EVs exhibit significant geographic variation. For example, consumers in developed economies often emphasize environmental and technological factors, whereas those in developing economies prioritize economic considerations and infrastructure availability.

5.2. Temporal Trends

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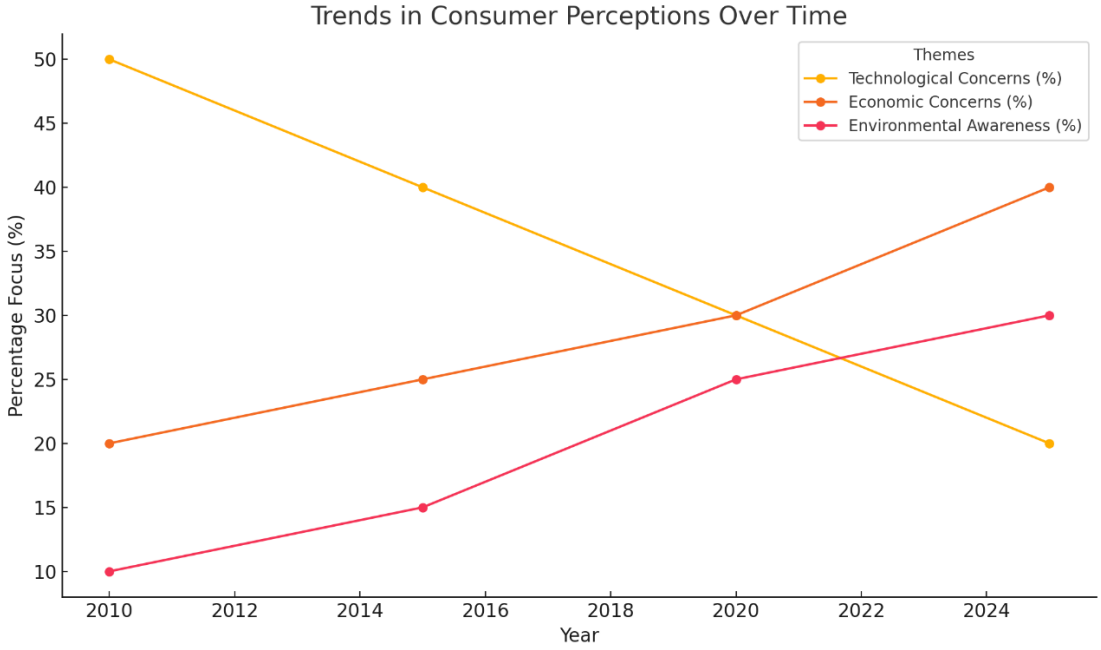
The review identified a clear evolution in consumer attitudes over time. Early studies (2010–2015) predominantly focused on technological apprehensions, while recent literature (2020–2025) reflects increasing consumer awareness and a shift towards economic and environmental considerations.



Line Diagram[1]: Trends in Consumer Perceptions Over Time

The line chart visualizes the evolution of consumer perception themes between 2010 and 2025, highlighting a decline in technological concerns and a rise in economic considerations and environmental awareness.

6. RECOMMENDATIONS FOR STAKEHOLDERS

6.1. Policy Makers

Governments should prioritize expanding charging infrastructure and offering subsidies to reduce financial barriers. Policies that incentivize research and development in battery technology can also address technological apprehensions.

6.2. Manufacturers

Automakers should focus on cost-effective production techniques and enhance battery efficiency to alleviate consumer concerns. Additionally, providing transparent and accessible information about EV benefits can build consumer trust.

6.3. Marketers

Marketing campaigns should emphasize the environmental benefits and long-term cost savings of EVs. Tailored strategies that address regional and cultural differences can further enhance their effectiveness.

7. CONCLUSION

This systematic review synthesizes existing literature to identify key themes in consumer perception of EVs, including environmental awareness, economic considerations, and technological apprehensions. While the review highlights significant barriers to adoption, it also underscores the potential for targeted interventions to improve consumer attitudes. Future research should explore longitudinal changes in perception and assess the impact of policy interventions.

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