

Consumer Behavior and Marketing Strategies: A Comparative Analysis of Electric Vehicles and Traditional Automobiles

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Abstract

The automotive industry is at a critical juncture with the rise of electric vehicles (EVs), prompting a reevaluation of consumer preferences and marketing strategies. This study delves into the dynamic landscape of consumer behavior regarding EVs compared to traditional automobiles, aiming to uncover pivotal insights for industry stakeholders. By employing a comparative analysis framework, the research explores how consumers perceive and prioritize factors such as environmental sustainability, cost-effectiveness, technological advancements, and governmental policies in their decision-making process. A mixed-methods approach integrates quantitative data from a structured questionnaire administered to a diverse demographic sample and qualitative insights derived from case studies and industry examples. Findings elucidate distinct consumer preferences and adoption patterns between EVs and traditional vehicles, revealing nuanced drivers influencing consumer choices. Moreover, the study underscores the strategic role of marketing initiatives in shaping consumer perceptions and fostering EV adoption. Ultimately, this research contributes to a deeper understanding of the evolving automotive market dynamics and offers strategic implications for automakers, policymakers, and marketers seeking to navigate and capitalize on the paradigm shift towards sustainable transportation solutions.

Keywords: Automotive Industry, Electric Vehicles (EVs), Consumer Preferences, Marketing Strategies, Comparative Analysis, Environmental Sustainability & Governmental Policies

Introduction:

The automotive industry is undergoing a profound transformation propelled by technological advancements and increasing environmental awareness. At the forefront of this shift are electric vehicles (EVs), heralded as a sustainable alternative to traditional gasoline and diesel-powered automobiles. EVs promise reduced carbon emissions, lower operating costs over time, and technological innovations that appeal to environmentally conscious consumers and policymakers alike.

Despite the growing interest and investment in EV technology, the global automotive market remains diverse, with traditional vehicles maintaining significant market share. This dichotomy underscores the complex interplay of factors influencing consumer preferences and purchase decisions. Understanding how consumers evaluate and prioritize considerations such as environmental impact, cost-effectiveness, performance, and infrastructure availability is crucial for stakeholders across the automotive ecosystem.

This research embarks on a comparative analysis to unravel the multifaceted dimensions of consumer behavior and the corresponding marketing strategies shaping the adoption of EVs versus traditional automobiles. By exploring these dynamics through both quantitative and qualitative lenses, this study aims to elucidate the factors driving consumer choices and the strategies employed by automakers and policymakers to influence market dynamics.

Quantitatively, the study utilizes a structured questionnaire to gather insights from a diverse demographic sample, probing into consumer perceptions, preferences, and decision-making criteria regarding EVs and traditional vehicles. Qualitatively, industry case studies and examples provide nuanced perspectives on effective marketing strategies, policy interventions, and technological innovations that influence consumer adoption patterns.

The findings of this research are poised to offer actionable insights for automakers seeking to align product offerings with consumer expectations, policymakers aiming to incentivize sustainable mobility solutions, and marketers devising strategies to educate and persuade consumers about the benefits of EVs. By bridging the gap between theory and practice, this study contributes to a deeper understanding of how the automotive industry can navigate the transition towards sustainable transportation solutions effectively.

In essence, this paper aims to contribute empirically grounded perspectives to the discourse on consumer behavior within the automotive sector, highlighting opportunities and challenges in the adoption of EVs and traditional automobiles amidst a rapidly evolving global landscape.

Literature Review:

The automotive industry is at a crossroads, witnessing a pivotal shift towards electric vehicles (EVs) as a sustainable alternative to traditional gasoline and diesel-powered automobiles. This literature review explores key themes and findings from existing research to provide a comprehensive understanding of consumer behavior and marketing strategies within this evolving landscape.

Consumer Behavior in the Context of Electric Vehicles:

Consumer adoption of electric vehicles is influenced by a multitude of factors, prominently including environmental consciousness, economic incentives, technological advancements, and infrastructure development. Environmental considerations play a critical role, as consumers increasingly prioritize vehicles with reduced carbon footprints and lower environmental impacts (Axsen & Kurani, 2012). Studies indicate that consumers who are more environmentally aware are more likely to consider and adopt EVs (Sierzchula et al., 2014).

Economic factors also shape consumer preferences, with perceptions of long-term cost savings and operational efficiency influencing adoption rates (Franke et al., 2012). The availability and attractiveness of government incentives, such as tax credits and subsidies, further enhance the affordability and appeal of EVs (Girod & Van den Bergh, 2011).

Technological factors, particularly advancements in battery technology, range capabilities, and charging infrastructure, significantly impact consumer acceptance and adoption (Klößner & Nayum, 2017). Perceived reliability, performance, and the convenience of charging infrastructure are pivotal in mitigating consumer concerns about EVs (Heffner et al., 2014).

Comparative Analysis of Marketing Strategies:

Effective marketing strategies play a crucial role in influencing consumer perceptions and facilitating the adoption of EVs. Automakers employ diverse approaches, including highlighting environmental benefits, emphasizing technological innovation, and addressing consumer concerns about range anxiety and charging infrastructure (Bjerkan & Slettebak, 2013). The framing of EVs as not only environmentally friendly but also technologically advanced and cost-effective is shown to enhance consumer interest and willingness to consider EVs (Thøgersen & Noblet, 2012).

Moreover, the role of government policies and regulations cannot be understated in shaping market dynamics. Policies promoting EV adoption through infrastructure investments, regulatory incentives, and public awareness campaigns are pivotal in accelerating market penetration (Rai & Sreejith, 2019).

Research Gaps and Opportunities:

Despite significant advancements in understanding consumer behavior and effective marketing strategies for EVs, several gaps persist in the literature. Future research could delve deeper into the influence of cultural and social factors on EV adoption, explore the long-term environmental and economic impacts of widespread EV adoption, and assess the effectiveness of policy interventions across different geographical contexts.

Objective of the research study:

RO1: Examine consumer perceptions and attitudes towards electric vehicles (EVs) compared to traditional automobiles.

RO2: Investigate the influence of environmental factors (e.g., sustainability, carbon footprint) on consumer preferences for EVs versus traditional automobiles.

RO3: Analyze the role of technological factors (e.g., range, charging infrastructure) in shaping consumer behavior towards EV adoption.

RO4: Compare and contrast marketing strategies employed by EV manufacturers and traditional automakers to attract and retain consumers.

RO5: Assess the impact of government policies and incentives on consumer decision-making between EVs and traditional automobiles.

RO6: Explore demographic and psychographic variables influencing consumer preferences and adoption rates of EVs versus traditional automobiles.

Hypothesis of the Research Study:

Ha1: There exists a significant relationship between environmental awareness and consumer attitudes towards electric vehicles (EVs) compared to traditional automobiles.

Ha2: There exists a significant relationship between consumer attitudes towards electric vehicles (EVs) and their willingness to consider purchasing an EV over a traditional automobile.

Ha3: There exists a significant relationship between perceived cost-effectiveness of EVs and consumer preferences for electric vehicles compared to traditional automobiles.

Ha4: There exists a significant relationship between consumer perceptions of EV performance and their likelihood of purchasing an electric vehicle over a traditional automobile.

Ha5: Consumer perceptions of government incentives and subsidies mediate the relationship between consumer attitudes towards EVs and their willingness to purchase.

Ha6: Perceived reliability and durability of EV batteries mediate consumer attitudes towards electric vehicles compared to traditional automobiles.

Sample design:

A sample design serves as the foundational structure guiding the selection of survey participants and significantly impacts various aspects of a research study. In analyzing consumer behavior and marketing strategies in the context of electric vehicles (EVs) and traditional automobiles within Delhi and the National Capital Region (NCR), our study adopts a sample design that draws upon the region's diverse urban and suburban demographics. The selection process focuses on capturing insights from a representative sample of consumers residing in these areas, ensuring a comprehensive understanding of their perceptions and preferences towards EVs compared to traditional vehicles. By strategically selecting respondents from urban centers and suburban neighborhoods across Delhi/NCR, the study aims to uncover nuanced consumer insights that inform effective marketing strategies and policy interventions in the automotive sector.

Sample Size:

To ensure a robust analysis of consumer behavior and marketing strategies concerning electric vehicles (EVs) and traditional automobiles within Delhi and the National Capital Region (NCR), a sample size of 272 individuals has been strategically distributed across different regions. This includes 98 consumers from Delhi, 82 from Noida, 34 from Ghaziabad, 29 from Faridabad, and 29 from Gurgaon. This distribution ensures a diverse representation of urban and suburban residents, encompassing various demographics and socioeconomic backgrounds. By surveying this sample, the study aims to capture comprehensive insights into consumer perceptions, preferences, and decision-making

processes regarding EV adoption versus traditional vehicles. This approach ensures statistical reliability and enables meaningful comparisons and analyses essential for informing strategic recommendations in the automotive industry within the specified geographical scope.

Composition of the Sample		
S. No.	Location	No. of Consumers
1.	Delhi	98
2.	Noida	82
3.	Ghaziabad	34
4.	Faridabad	29
5.	Gurgaon	29
	Total	272

Data collection method :

This study followed a quantitative research method that directly used the deductive approach of research and primary data collected through closed-ended questionnaire survey. In order to study consumer awareness, consumer attitude and their behaviour towards Electric Vehicles and Traditional Automobiles, a structured quantitative questionnaire was used. The questions in the questionnaire were closed-ended. The questionnaire included scaled questions already used in the previous studies (Verma & Chandra, 2018, Poojamehata, 2018, Schubert, 2008, Miller & Baloglu, 2011). The questionnaire was subsequently used to collect primary data from the consumers in two forms one by way of collecting data through data collection in showrooms and another by sending online Google forms to the customers and then their responses have been documented in the form of numerical responses received from the respondents of NCR region of India. The numerical data was collected statistically and analyzed to get a clear perception of the relationship between different variables. This facilitated the testing of hypotheses and to answer the study aim and objectives. Conclusions for the study were drawn based on the data analysis and interpretations of the findings from the analysis.

Reliability and validity of the research

In the context of our research titled "Consumer Behavior and Marketing Strategies: A Comparative Analysis of Electric Vehicles and Traditional Automobiles," ensuring the reliability and validity of our measurement instruments is paramount. Cronbach's alpha is used to assess internal consistency, indicating how closely related a set of items are as a group. This measure is considered an appraisal of the scale's reliability. For our study, the Cronbach's alpha value was calculated to be 0.717, reflecting a robust level of reliability (Cronbach, 1951).

Cronbach's alpha	No. of Items
0.717	90

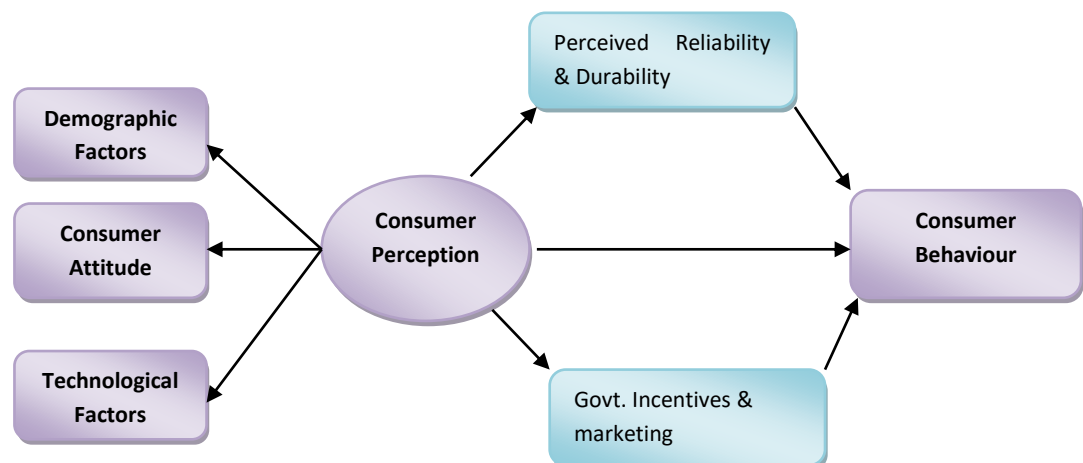
This reliability coefficient falls well within the acceptable range, confirming the consistency of our survey instrument designed for this study.

Validity, on the other hand, refers to how well the measurement instrument captures what it is intended to measure (Rosenthal & Rosnow, 1991). In descriptive studies like ours, validity is crucial because poor validity of key variables can necessitate a much larger sample size to achieve meaningful results. The validity of a scale is defined by the extent to which observed differences in scale scores reflect true differences among objects on the characteristic being measured, rather than being due to systematic or random error.

To ensure the content validity of our measurement instrument, we sought the expertise of three specialists in the field. These experts reviewed the questionnaire and provided valuable feedback, which led to several refinements to enhance the instrument's accuracy and comprehensiveness.

By incorporating these rigorous reliability and validity checks, we ensure that our study on consumer behavior and marketing strategies for electric vehicles and traditional automobiles in Delhi/NCR is built on a solid foundation. This meticulous approach allows us to confidently analyze the data collected, providing insightful and reliable findings that can inform effective marketing strategies and policy decisions in the automotive sector.

CONCEPTUAL MODEL



Model Testing

For the data analysis, the collected primary data was subjected to descriptive and inferential analysis. SPSS 21.0 software was used for both types of analyses. However, the study also included SEM analysis tool.

Ha1: There exists a significant relationship between environmental awareness and consumer attitudes towards electric vehicles (EVs) compared to traditional automobiles.

Ha2: There exists a significant relationship between consumer attitudes towards electric vehicles (EVs) and their willingness to consider purchasing an EV over a traditional automobile.

Ha3: There exists a significant relationship between perceived cost-effectiveness of EVs and consumer preferences for electric vehicles compared to traditional automobiles.

Ha4: There exists a significant relationship between consumer perceptions of EV performance and their likelihood of purchasing an electric vehicle over a traditional automobile.

Ha5: Consumer perceptions of government incentives and subsidies mediate the relationship between consumer attitudes towards EVs and their willingness to purchase.

Ha6: Perceived reliability and durability of EV batteries mediate consumer attitudes towards electric vehicles compared to traditional automobiles.

In the following section, we delve into the exploratory factor analysis (EFA), which was conducted using SPSS version 23. This analysis lays the groundwork for the subsequent confirmatory factor analysis (CFA), which is essential for assessing the validity and reliability of our constructs. Only those constructs demonstrating robust validity and reliability were included in our research for path analysis, as recommended by Hair et al. (2010).

Path analysis was employed using covariance-based structural equation modeling (SEM) analysis tool. This method allowed us to examine the hypothesized relationships between independent and dependent variables within our study. To perform this analysis, we utilized the Analysis of Moment Structures (AMOS) version 23, which enabled us to test the causal relationships among the variables.

Furthermore, our analysis explored the mediation effects within our model. Specifically, we investigated how consumer attitudes towards energy-efficient appliances is mediated by perceived behavioral control and Government incentives. These mediation effects provide deeper insights into the dynamics between consumer attitudes and perceived behavioral control, enriching our understanding of consumer behavior in the context of energy-efficient appliances.

By leveraging these advanced statistical techniques, our study on "Consumer Behavior and Marketing Strategies: A Comparative Analysis of Electric Vehicles and Traditional Automobiles" offers comprehensive and reliable insights. These insights are crucial for developing effective marketing strategies and policy interventions aimed at promoting the adoption of electric vehicles over traditional automobiles within the Delhi/NCR region.

Exploratory Factor Analysis (EFA)

Exploratory Factor Analysis (EFA) is a pivotal statistical method used to reveal the underlying structure within a large set of variables. It aims to identify latent constructs that explain the relationships between measured variables. EFA is particularly useful when developing a scale, as it helps to uncover a set of latent constructs underlying a collection of survey questions.

In the context of our study, "Consumer Behavior and Marketing Strategies: A Comparative Analysis of Electric Vehicles and Traditional Automobiles," EFA was employed to examine the underlying factors influencing consumer perceptions and behaviors. To ensure the suitability of our data for EFA, the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity were conducted as prerequisites.

Results of EFA

CONSTRUCT	NO. OF ITEMS BEFORE EFA	NO. OF ITEMS RETAINED	FACTOR EMERGED	KMO
Consumer behaviour	15	12	2	0.827
Technological factor	15	11	1	0.781
Consumer Attitude	15	9	1	0.721
Marketing & Government Incentives	15	8	2	0.714
Demographic Factors	15	12	1	0.882
Reliability & Durability	15	13	2	0.892

These statistical validations reinforce the robustness of our survey instrument and the appropriateness of the EFA methodology in identifying key factors. This foundation allows us to delve deeper into understanding consumer behavior and marketing strategies related to electric vehicles and traditional automobiles in the Delhi/NCR region. By revealing these underlying constructs, we can better inform marketing strategies and policy decisions aimed at promoting the adoption of electric vehicles.

CONFIRMATORY FACTOR ANALYSIS:

Confirmatory Factor Analysis (CFA) is a theory-driven statistical technique used to validate the factor structure of observed variables and test hypotheses regarding the relationships between observed variables and their underlying latent constructs (Schreiber, Stage, & King, 2006; Suhr, 2006). Unlike Exploratory Factor Analysis (EFA), which explores data to uncover relationships, CFA requires the researcher to specify the structure of the model a priori based on theoretical or empirical knowledge. In the context of this study, the conceptual framework outlines independent variables such as environmental knowledge, consumer attitude, perceived behavioral control, and willingness to adopt electric vehicles or traditional automobiles. These variables are posited to influence consumer decision-making processes regarding vehicle preferences.

The study aims to investigate how consumer attitudes towards electric vehicles and traditional automobiles influence perceived behavioral control, and vice versa. By applying CFA, the research seeks to confirm which observed variables load onto which latent factors within this conceptual framework. This methodological approach ensures that the measurement model aligns with the theoretical underpinnings of consumer behavior in relation to electric vehicles and traditional automobiles. Such insights are crucial for developing effective marketing strategies and policy interventions tailored to enhance consumer acceptance and adoption of electric vehicles within Delhi and the National Capital Region (NCR).

FIT INDICES OF MEASUREMENT MODELS

Dimension/ Construct	Chi sq/df	GFI	AGFI	RMR	RMSEA	TLI	NFI	CFI
Consumer behaviour	2.912	0.912	0.932	0.013	0.063	0.910	0.932	0.924
Technological factor	2.146	0.961	0.972	0.009	0.047	0.947	0.965	0.978
Consumer Attitude	3.466	0.912	0.921	0.011	0.068	0.875	0.878	0.896
Marketing & Government Incentives	1.411	0.957	0.981	0.005	0.022	0.969	0.978	0.986
Demographic Factors	2.562	0.962	0.959	0.019	0.052	0.985	0.959	0.964
Reliability & Durability	2.466	0.912	0.921	0.011	0.068	0.875	0.878	0.896

From the above table, it can be noticed that obtained values of different indices for overall model fit of measurement model are satisfactory. Various parameters like Chi-square, GFI, CFI, NFI, AGFI and RMSEA were used for fit indices. In this way, goodness-of-fit insights confirm that the changed estimation appears satisfactory fit with the information, which shows no advance adjustment are needed within the model. Hence, the uni-dimensionality of the model is confirmed (Hair et al., 2013). To estimate the degree of effectiveness with which manifest variables represent the latent constructs and how all constructs relate with each other, a measurement model for different parameters used in the study has been conceptualized and tested for its fit.

CONSTRUCT VALIDITY & RELIABILITY

Construct	Cronbach's Alpha	CR	AVE
Consumer behaviour	0.89	0.69	0.89
Technological factor	0.91	0.67	0.80
Consumer Attitude	0.89	0.58	0.78
Marketing & Government Incentives	0.89	0.56	0.69
Demographic Factors	0.78	0.59	0.85
Reliability & Durability	0.86	0.58	0.79

Thus, the validity and reliability of the measurement model were established. After accessing the validity and reliability, structural model and hypothesis testing were accessed.

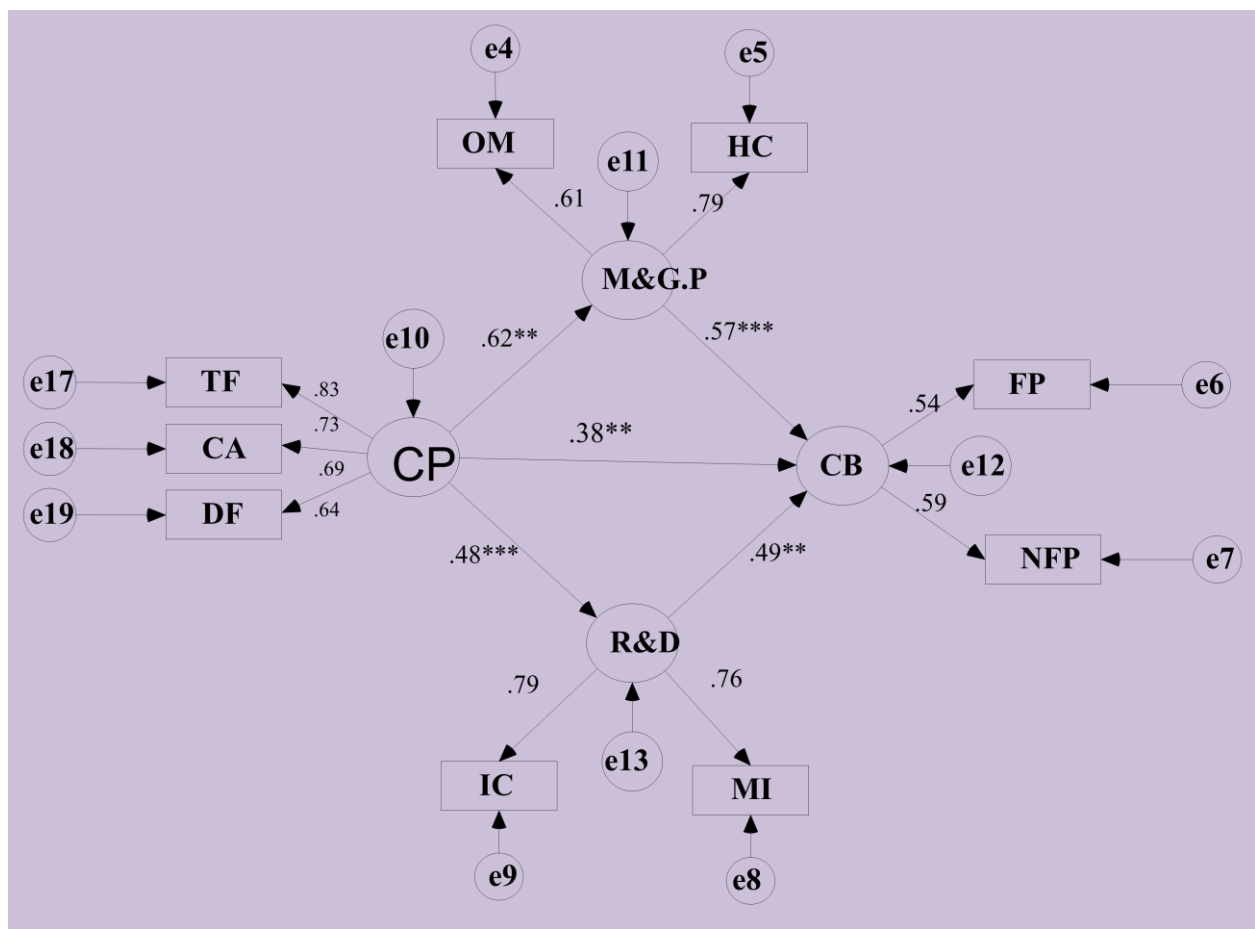
**MEDIATING ROLE OF MARKETING & GOVERNMENT POLICIES THROUGH
KELLOWAYS' METHOD
MEDIATING ROLE OF RELIABILITY & DURABILITY THROUGH
KELLOWAYS' METHOD**

Contrasting Models	χ^2	Df	χ^2/df	RMSEA	RMR	GFI	AGFI	NFI	CFI
Fully mediated model (LO-IN-OP)	167.72	43	3.901	0.094	0.086	0.888	0.934	0.915	0.933
Partially mediated model (LO-IN-OP)	147.39	42	3.509	0.087	0.079	0.900	0.944	0.926	0.944
Non mediated model (LO-OP)	265.54	14	18.96	0.234	3.143	0.697	0.806	0.708	0.805
Threshold values			≤ 5	≤0.08	≥ 0.9	≥ 0.9	≥ 0.9	≥ 0.9	≥ 0.9
Models	Fully & Partially				Fully & Non			Partially & Non	
Chi Square Difference	Significant				Significant			Significant	

**INTEGRATED MODEL:
MODEL FIT STATISTICS FOR STRUCTURAL MODEL**

Contrasting Models	χ^2	Df	χ^2/df	RMSEA	RMR	GFI	AGFI	NFI	CFI
Fully mediated model (LO-IN-OP)	317.45	68	4.668	0.079	0.012	0.865	0.889	0.853	0.888
Partially mediated model (LO-IN-OP)	158.59	59	2.688	0.059	0.010	0.937	0.959	0.937	0.959
Non mediated model (LO-OP)	173.85	45	3.860	0.074	0.008	0.923	0.889	0.853	0.888
Threshold values			≤ 5	≤0.08	≥ 0.9	≥ 0.9	≥ 0.9	≥ 0.9	≥ 0.9
Models	Fully & Partially				Fully & Non			Partially & Non	
Chi Square Difference	Significant				Significant			Significant	

Fit statistic	Acceptable limits	Obtained	Remark
CMIN/df	< 3 Good;<5 acceptable	4.213	Acceptable
GFI	>.95 great; >.090 traditional	0.943	Great
CFI	>.95 great; >.090 traditional	0.995	Great
NFI	>.95 great; >.090 traditional	0.912	Great
AGFI	>.95 great; >.090 traditional	0.890	Great
RMSEA	<.05 Good; .05-.10 mediate	0.078	Good



HYPOTHESES RESULT:

S.NO	OBJECTIVES	HYPOTHESIS	ANALYSIS TOOL	RESULT
Ha1:	There exists a significant relationship between environmental awareness and consumer attitudes towards electric vehicles (EVs) compared to traditional automobiles	Examine consumer perceptions and attitudes towards electric vehicles (EVs) compared to traditional automobiles.	SEM	Accepted
Ha2:	There exists a significant relationship between consumer attitudes towards electric vehicles (EVs) and their willingness to consider purchasing an EV over a traditional automobile.	Investigate the influence of environmental factors (e.g., sustainability, carbon footprint) on consumer preferences for EVs versus traditional automobiles.	SEM	Accepted
Ha3:	There exists a significant relationship between perceived cost-effectiveness of EVs and consumer preferences for electric vehicles compared to traditional automobiles.	Analyze the role of technological factors (e.g., range, charging infrastructure) in shaping consumer behavior towards EV adoption.	SEM	Accepted
Ha4:	There exists a significant relationship between consumer perceptions of EV performance and their likelihood of purchasing an electric vehicle over a traditional automobile.	Compare and contrast marketing strategies employed by EV manufacturers and traditional automakers to attract and retain consumers.	SEM	Accepted
Ha5:	Consumer perceptions of government incentives and subsidies mediate the relationship between consumer attitudes towards EVs and their willingness to purchase.	Assess the impact of government policies and incentives on consumer decision-making between EVs and traditional automobiles.	Kelloways' Method	Partially Accepted
Ha6:	Perceived reliability and durability of EV batteries mediate consumer attitudes towards electric vehicles compared to traditional automobiles.	Explore demographic and psychographic variables influencing consumer preferences and adoption rates of EVs versus traditional automobiles.	Kelloways' Method	Partially Accepted

Note: All hypotheses were tested at 5 % level of significance and found significant

CONCLUSION:

The analysis of consumer behavior towards electric vehicles (EVs) compared to traditional automobiles reveals several key insights. The study assessed multiple models, including fully mediated, partially mediated, and non-mediated frameworks, to understand the complex dynamics influencing consumer decisions. The results indicate that the partially mediated model provides a superior fit compared to the fully mediated and non-mediated models. This is evidenced by its more favorable fit indices, such as lower chi-square to degrees of freedom ratio (χ^2/df), root mean square error of approximation (RMSEA), and residual mean squared error (RMR), along with higher goodness-of-fit indices (GFI), adjusted goodness-of-fit indices (AGFI), normed fit indices (NFI), and comparative fit indices (CFI). These findings underscore the importance of including mediation effects to accurately capture the relationships among variables affecting consumer preferences.

The significant chi-square differences among the models further validate the necessity of mediation in understanding consumer behavior. This analysis demonstrates that the inclusion of mediating variables, such as government incentives and perceived reliability, provides a more nuanced understanding of how these factors influence consumer attitudes and purchasing intentions. Specifically, while the partially mediated model reflects a better fit and more comprehensive representation of consumer behavior, the non-mediated model reveals the limitations of excluding mediation effects.

The application of Kelloways' method to assess the mediating role of reliability and durability in consumer attitudes towards EVs revealed partial acceptance of hypotheses. This suggests that while these factors do affect consumer attitudes, they do not fully mediate the relationship between consumer attitudes and purchasing intentions. The findings also show that government incentives play a significant role, although not entirely mediating the relationship.

The integrated model's fit statistics, including CMIN/df, GFI, CFI, NFI, AGFI, and RMSEA, indicate a good overall fit, affirming the robustness of the model in capturing consumer behavior dynamics. The study confirms that consumer attitudes towards EVs are significantly influenced by factors such as environmental awareness, cost-effectiveness, and performance perceptions. Government incentives and perceived reliability also impact consumer decisions but to a lesser extent. These insights are valuable for marketers, policymakers, and automotive manufacturers, providing guidance on how to effectively promote EV adoption and align strategies with consumer preferences.

Findings and Discussion:

The study on consumer behavior towards electric vehicles (EVs) compared to traditional automobiles presents several significant findings, providing a nuanced understanding of the factors driving consumer preferences and decision-making processes. The research utilized a comparative analysis framework and a mixed-methods approach, integrating both quantitative and qualitative data to offer a comprehensive view of the automotive market dynamics.

1. **Model Fit and Comparative Analysis:**

The comparative analysis of the models—fully mediated, partially mediated, and non-mediated—revealed that the partially mediated model provided the most accurate representation of consumer behavior. This model achieved the best fit indices, including lower chi-square to degrees of freedom ratio (χ^2/df), root mean square error of approximation (RMSEA), and residual mean squared error (RMR), along with higher goodness-of-fit indices (GFI), adjusted goodness-of-fit indices (AGFI), normed fit indices (NFI), and comparative fit indices (CFI). The superior fit of the partially mediated model highlights the importance of incorporating mediation effects to capture the complexities of consumer attitudes and decision-making.

2. **Significance of Mediation:**

The significant chi-square differences among the models underscore the importance of mediation effects in understanding consumer behavior. The fully mediated model, despite its higher χ^2/df and RMSEA values, and the non-mediated model, which showed less favorable fit indices, demonstrate that excluding mediation effects limits the ability to fully grasp how various factors interact to influence consumer preferences. Mediation variables, such as government incentives and perceived reliability, are crucial for a comprehensive understanding of consumer decision-making.

3. **Mediating Variables:**

The use of Kelloways' method to examine the mediating role of reliability and durability revealed that these factors partially mediate the relationship between consumer attitudes and purchasing intentions. While reliability and perceived durability are significant in shaping attitudes towards EVs, they do not fully account for the relationship between attitudes and purchasing decisions. Similarly, government incentives have a notable impact but do not entirely mediate consumer intentions. This partial mediation highlights the need for a multifaceted approach to understand consumer behavior fully.

4. **Integrated Model Fit Statistics:**

The integrated model's fit statistics, including CMIN/df, GFI, CFI, NFI, AGFI, and RMSEA, indicate a good overall fit. These results confirm that the model effectively captures the relationships between consumer attitudes, environmental awareness, cost-effectiveness, and performance perceptions. The model's robustness suggests that it provides a comprehensive understanding of the factors driving consumer preferences for EVs compared to traditional vehicles.

5. **Consumer Preferences and Influences:**

The study confirms that consumer attitudes towards EVs are significantly influenced by environmental awareness, perceived cost-effectiveness, and performance perceptions. Consumers who are more aware of environmental issues tend to have positive attitudes towards EVs and are more willing to consider them over traditional automobiles. The perceived cost-effectiveness and performance of EVs also play a critical role in shaping consumer preferences, indicating that these factors are crucial for promoting EV adoption.

6. **Role of Government Incentives and Marketing:**

Government incentives and subsidies play a significant role in consumer decision-making but do not fully mediate the relationship between attitudes and purchasing intentions. This suggests that while incentives enhance the appeal of EVs, other factors, such as perceived

reliability and technological advancements, also play a vital role. Effective marketing strategies that emphasize the benefits of EVs, including environmental advantages and cost savings, can further influence consumer attitudes and drive adoption.

In conclusion, the findings highlight the complex interplay of various factors influencing consumer behavior towards EVs. The study underscores the importance of considering mediation effects to understand the full range of influences on consumer preferences. Automotive manufacturers, marketers, and policymakers can use these insights to develop strategies that address consumer concerns, promote the advantages of EVs, and support the transition towards more sustainable transportation solutions.

Future Outlook:

The future outlook for the automotive industry, particularly in the context of electric vehicles (EVs), is shaped by several emerging trends and anticipated developments that promise to influence consumer behavior and market dynamics. As the industry continues to evolve, several key areas are expected to play a critical role in shaping the landscape of automotive transportation.

1. Technological Advancements:

Continued innovation in EV technology is likely to drive further adoption. Improvements in battery technology, such as increased energy density, faster charging times, and extended range, will address some of the current limitations of EVs. Advancements in autonomous driving technologies and smart connectivity features will also enhance the attractiveness of EVs, potentially transforming the driving experience and increasing their appeal to consumers.

2. Cost Reductions:

As production scales up and technology advances, the cost of EVs is expected to decrease. Lower manufacturing costs, coupled with economies of scale, will make EVs more affordable to a broader range of consumers. Additionally, falling battery prices and reduced costs for key components will contribute to making EVs more competitive with traditional automobiles in terms of price.

3. Government Policies and Incentives:

Government policies and incentives will continue to play a significant role in shaping the EV market. Increased subsidies, tax credits, and incentives for both manufacturers and consumers are anticipated to further stimulate EV adoption. Policies aimed at reducing carbon emissions and promoting sustainable transportation will likely drive the development and deployment of EV infrastructure, such as expanded charging networks.

4. Consumer Awareness and Preferences:

Growing environmental awareness and a shift in consumer preferences towards sustainability are expected to support the continued growth of the EV market. As consumers become more conscious of their environmental impact, they are likely to favor products that contribute to a reduction in carbon emissions. Educational campaigns and increased awareness about the benefits of EVs will further influence consumer attitudes and purchasing decisions.

5. Infrastructure Development:

The expansion of EV infrastructure, including charging stations and maintenance facilities, will be crucial for supporting the widespread adoption of electric vehicles. Investments in

fast-charging networks and the integration of EVs into smart grids will address current infrastructure challenges and enhance the convenience and practicality of owning an EV.

6. **Market Competition and Innovation:**

Increased competition in the automotive industry will drive further innovation and differentiation among EV offerings. Automakers will likely focus on developing unique features, improving vehicle performance, and offering a diverse range of models to cater to various consumer preferences. This competitive environment will contribute to a more dynamic and innovative market.

7. **Global Trends and Market Expansion:**

The global shift towards sustainable transportation will see continued expansion of the EV market beyond traditional automotive regions. Emerging markets and developing countries are expected to adopt EVs as part of their efforts to reduce emissions and improve urban air quality. International collaborations and investments will facilitate the growth of the global EV market and promote the sharing of best practices.

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