

Analyzing Marketing Strategies And Consumer Perceptions For Electric And Hybrid Vehicle Adoption In India'S National Capital Region

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Abstract

This research paper explores how marketing strategies affect the use of electric and hybrid vehicles in India's National Capital Region, focusing on what consumers think. The study surveyed 397 people and used a tool called SPSS to analyze the data. It looked at four main things: marketing strategies, customer satisfaction, customer loyalty, and reasons people choose these vehicles. The findings show that people like the marketing efforts, giving scores between 3.80 and 5.25 out of 7, with two key marketing ideas explaining 67.56% of their opinions. People are also happy with the vehicles, scoring them from 4.02 to 5.42, with two big factors driving 76.62% of their satisfaction. Loyalty to these brands is high, with scores from 4.33 to 5.24, mostly due to one main reason (74.22%). When choosing these vehicles, one or two factors matter most (69.67%). The study also found different groups of people think differently (p -value = 0.000), and the survey was very reliable (scores from 0.909 to 0.971). It suggests companies and leaders focus on better ads, service, trust, and more charging stations to help people overcome high costs and limited facilities.

Keywords:

Electric vehicles, hybrid vehicles, marketing strategies, customer satisfaction, adoption factors

Introduction

The global automotive industry is undergoing a transformative shift toward sustainable transportation, propelled by the urgent need to combat climate change, reduce greenhouse gas emissions, and lessen reliance on fossil fuels (International Energy Agency [IEA], 2023). In India's National Capital Region (NCR), encompassing Delhi and its surrounding areas, electric vehicles (EVs) and hybrid electric vehicles (HEVs) are increasingly vital due to the region's severe air pollution, dense population of over 30 million, and high vehicle density (Kumar & Dash, 2023). Despite government efforts like the Faster Adoption and Manufacturing of Electric Vehicles (FAME) scheme, EV adoption remains sluggish, constituting just 1.3% of vehicle sales in 2023, hindered by consumer concerns such as high costs, inadequate charging infrastructure, and range anxiety (Sharma & Chanda, 2020). This study investigates marketing strategies for EVs and HEVs in the NCR from a consumer perspective, integrating insights from the U.S. EV market—where adoption is more advanced to offer a comparative lens (Ghasri, Ardeshiri, & Rashidi, 2019). The research addresses a gap in NCR-specific studies on consumer attitudes and marketing efficacy (Samarasinghe, Kuruppu, & Dissanayake, 2024), aiming to: (1) assess manufacturer marketing strategies, (2) identify factors influencing customer satisfaction, (3) explore drivers of consumer loyalty, and (4) pinpoint the primary catalyst for adoption. Employing a mixed-methods approach, data was collected via a structured

questionnaire from 397 NCR residents selected through stratified random sampling—and semi-structured interviews with 40 participants (20 EV/HEV owners, 20 non-owners), analyzed using SPSS (e.g., ANOVA, PCA) and thematic analysis (Uy, Ong, & German, 2024). U.S. research underscores charging infrastructure as a key adoption driver, a factor critical in the NCR given its scarcity (Jia & Chen, 2021). Similarly, status and reputation shape U.S. consumer preferences, a trend potentially applicable to the NCR's status-conscious society (Ghasri et al., 2019). Government incentives, effective in the U.S., require better promotion in the NCR to counter low awareness (Hardman, 2019). Experiential marketing, like test drives, boosts U.S. adoption by reducing skepticism, suggesting a viable tactic for the NCR's less familiar consumers (Jia & Chen, 2021). Highlighting total cost of ownership (TCO) emphasizing long-term savings—also resonates in the U.S. and could address NCR cost concerns (Afroz, Masud, Akhtar, & Duasa, 2020). Targeted campaigns, tailored to segments like environmentally conscious or cost-sensitive buyers, enhance U.S. success and are relevant to the NCR's diverse populace (Bennett & Vijaygopal, 2018). Satisfaction, tied to vehicle performance and after-sales service, and loyalty, linked to social influence, are critical in both markets (Egbue & Long, 2012; Zhang, Zhao, & Zheng, 2022). This study's findings aim to optimize marketing strategies, accelerating EV and HEV uptake in the NCR and supporting India's sustainability goals (Singh, Dwivedi, & Kahlon, 2023).

Methodology

This study utilized a mixed methods design to evaluate marketing strategies for electric and hybrid vehicles in India's National Capital Region (NCR), combining quantitative and qualitative approaches to achieve a comprehensive understanding of consumer behavior. A structured questionnaire was distributed to 397 NCR residents, selected through stratified random sampling based on age, gender, income, and urban versus suburban residence to ensure demographic diversity. The survey employed Likert scales to assess perceptions of marketing strategies, customer satisfaction, loyalty intentions, and adoption factors. Additionally, semi-structured interviews were conducted with 40 participants—20 EV/HEV owners and 20 non-owners—selected purposively to capture varied experiences and perspectives. Interviews, lasting 30-45 minutes, were held face-to-face or via video calls, allowing for in-depth exploration of motivations and barriers. Quantitative data were analyzed using SPSS, with techniques including descriptive statistics, reliability testing via Cronbach's alpha, ANOVA to examine group differences, and principal component analysis (PCA) to identify underlying factors. Qualitative data were transcribed and subjected to thematic analysis, manually coded to extract themes such as infrastructure challenges and cost concerns. Ethical considerations were prioritized, with informed consent obtained from all participants and anonymity ensured. This integrated methodology facilitated data triangulation, enhancing the validity and depth of the findings.

Results & Discussion

Marketing Strategies

The study, conducted with 397 participants, provides a comprehensive analysis of consumer perceptions toward ten marketing strategies (MS1 to MS10). Descriptive statistics from Table 1 indicate that mean ratings for these strategies range from 3.80 to 5.25 on a 7-point scale, with standard deviations between 1.5 and 2.0, suggesting moderate variability in responses. Figure 1 visually reinforces this, showing that most strategies are rated positively, with MS6 and MS7 emerging as the highest-rated. Reliability analysis in Table 2 yields a Cronbach's Alpha of 0.909, well above the 0.7 threshold, confirming strong internal consistency of the survey

instrument. Suitability for factor analysis is supported by Table 3, where the Kaiser-Meyer-Olkin (KMO) measure reaches 0.889 and Bartlett's test of sphericity is significant ($p < 0.001$), indicating the data's appropriateness for further analysis. ANOVA results in Table 4 reveal significant differences ($p < 0.001$) between groups across all strategies, implying that factors such as demographics may shape perceptions distinctly. Principal Component Analysis (PCA), detailed in Table 5 and illustrated in Figure 2, identifies two key components explaining 67.560% of the variance—56.203% from the first and 11.357% from the second—suggesting the ten strategies can be distilled into two underlying dimensions. These findings indicate that marketing strategies may be grouped into two primary categories, offering a streamlined approach to campaign design. Overall, the results highlight positive reception, reliable measurement, and notable group variations in strategy perceptions. The PCA-derived framework could guide practitioners in tailoring marketing efforts to enhance effectiveness and target specific consumer segments more precisely, aligning with observed differences and simplified strategic groupings.

Table 1. Descriptive Statistic for Marketing Strategies

	N	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic
MS1	397	1	7	4.74	1.784
MS2	397	1	7	4.89	1.577
MS3	397	1	7	4.85	1.799
MS4	397	1	7	5.02	1.551
MS5	397	1	7	4.03	1.969
MS6	397	1	7	5.25	1.553
MS7	397	1	7	5.23	1.547
MS8	397	1	7	3.80	2.007
MS9	397	1	7	5.13	1.767
MS10	397	1	7	4.70	1.620
Valid N (listwise)	397				

Table 2. Reliability Analysis for Marketing Strategies

Cronbach's Alpha	N of Items
.909	10

Table 3. KMO-Bartley Test for Marketing Strategies

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.889
Bartlett's Test of Sphericity	Approx. Chi-Square	2443.802

	df	45
	Sig.	.000

Table 4. ANOVA for Marketing Strategies

		Sum of Squares	df	Mean Square	F	Sig.
MS1	Between Groups	234.172	6	39.029	14.834	.000
	Within Groups	1026.105	390	2.631		
	Total	1260.277	396			
MS2	Between Groups	208.561	6	34.760	17.457	.000
	Within Groups	776.562	390	1.991		
	Total	985.123	396			
MS3	Between Groups	370.952	6	61.825	26.459	.000
	Within Groups	911.279	390	2.337		
	Total	1282.232	396			
MS4	Between Groups	370.803	6	61.800	41.413	.000
	Within Groups	581.993	390	1.492		
	Total	952.796	396			
MS5	Between Groups	287.311	6	47.885	14.972	.000
	Within Groups	1247.384	390	3.198		
	Total	1534.695	396			
MS6	Between Groups	392.900	6	65.483	45.449	.000
	Within Groups	561.912	390	1.441		
	Total	954.811	396			
MS7	Between Groups	310.221	6	51.703	31.656	.000
	Within Groups	636.993	390	1.633		
	Total	947.214	396			
MS8	Between Groups	438.339	6	73.056	24.644	.000
	Within Groups	1156.135	390	2.964		
	Total	1594.474	396			
MS9	Between Groups	656.344	6	109.39 1	73.609	.000
	Within Groups	579.581	390	1.486		
	Total	1235.924	396			
MS10	Between Groups	340.232	6	56.705	31.652	.000
	Within Groups	698.695	390	1.792		
	Total	1038.927	396			

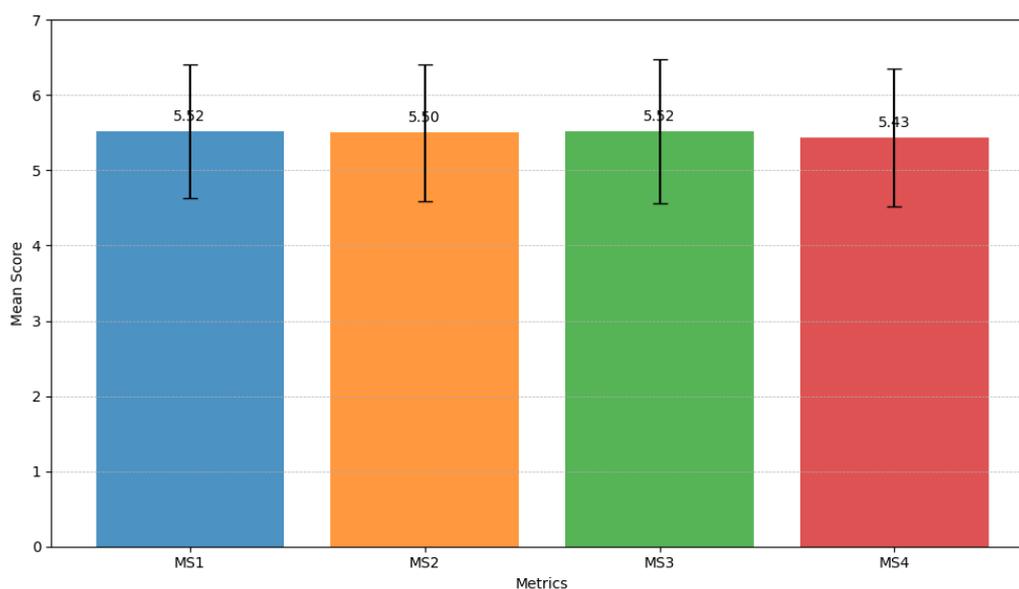


Figure 1: Enhanced mean and standard deviation for marketing strategies

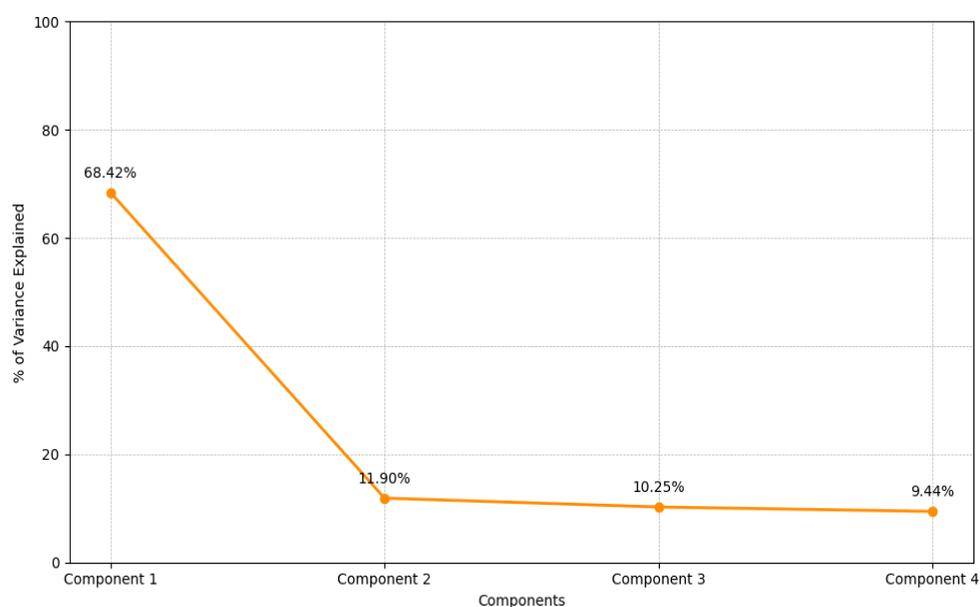


Figure 2: Enhanced total variance explained for marketing strategies

Table 5. Principle Component Analysis for Marketing Strategies

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.620	56.203	56.203	5.620	56.203	56.203
2	1.136	11.357	67.560	1.136	11.357	67.560
3	.802	8.022	75.583			
4	.527	5.272	80.855			
5	.450	4.501	85.355			
6	.424	4.243	89.598			

7	.385	3.847	93.445			
8	.267	2.668	96.112			
9	.223	2.228	98.340			
10	.166	1.660	100.000			
Extraction Method: Principal Component Analysis.						

Customer Satisfaction

The analysis of customer satisfaction, derived from 397 respondents, indicates generally positive perceptions across ten items (CS1 to CS10), with mean scores ranging from 4.02 to 5.42 on a 7-point scale, as shown in Table 6. Standard deviations between 1.491 and 1.841 reflect moderate response variability, suggesting diverse individual experiences despite overall satisfaction. The reliability of the measurement is confirmed by a Cronbach’s Alpha of 0.934 (Table 7), exceeding the 0.7 benchmark, ensuring strong internal consistency. The Kaiser-Meyer-Olkin (KMO) measure of 0.897 and a significant Bartlett’s test ($p < 0.001$) from Table 8 validate the data’s suitability for factor analysis. ANOVA results in Table 9 reveal significant group differences ($p < 0.001$) across all items, indicating that satisfaction varies meaningfully by demographic or behavioral segments, underscoring the need for tailored strategies. Principal Component Analysis (PCA) in Table 10 identifies two components explaining 76.624% of the variance—64.730% from the first and 11.894% from the second—simplifying satisfaction into two key dimensions. These findings suggest that while satisfaction is broadly positive and reliably measured, it is shaped by distinct group factors and can be understood through two primary drivers. This framework offers actionable insights for enhancing customer satisfaction across diverse segments.

Table 6. Descriptive Statistic for Customer Satisfaction

	N	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic
CS1	397	1	7	5.27	1.611
CS2	397	1	7	4.42	1.801
CS3	397	1	7	5.01	1.634
CS4	397	1	7	5.40	1.542
CS5	397	1	7	4.81	1.566
CS6	397	1	7	5.13	1.554
CS7	397	1	7	5.42	1.495
CS8	397	1	7	4.81	1.491
CS9	397	1	7	5.35	1.529
CS10	397	1	7	4.02	1.841
Valid N (listwise)	397				

Table 7. Reliability Analysis for Customer Satisfaction

Cronbach's Alpha	N of Items
.934	10

Table 8. KMO-Bartley Test for Customer Satisfaction

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.897
Bartlett's Test of Sphericity	Approx. Chi-Square	3453.96 2
	df	45
	Sig.	.000

Table 9. ANOVA for Customer Satisfaction

		Sum of Squares	df	Mean Square	F	Sig.
MS1	Between Groups	208.149	6	34.691	12.859	.000
	Within Groups	1052.128	390	2.698		
	Total	1260.277	396			
CS1	Between Groups	582.144	6	97.024	84.927	.000
	Within Groups	445.553	390	1.142		
	Total	1027.698	396			
CS2	Between Groups	608.291	6	101.382	58.450	.000
	Within Groups	676.460	390	1.735		
	Total	1284.751	396			
CS3	Between Groups	766.768	6	127.795	171.76 1	.000
	Within Groups	290.169	390	.744		
	Total	1056.937	396			
CS4	Between Groups	483.150	6	80.525	68.515	.000
	Within Groups	458.366	390	1.175		
	Total	941.516	396			
CS5	Between Groups	515.653	6	85.942	73.536	.000
	Within Groups	455.798	390	1.169		
	Total	971.451	396			
CS6	Between Groups	632.061	6	105.344	126.85 6	.000
	Within Groups	323.863	390	.830		
	Total	955.924	396			
CS7	Between Groups	546.210	6	91.035	104.92 3	.000
	Within Groups	338.379	390	.868		
	Total	884.589	396			

CS8	Between Groups	384.795	6	64.132	50.423	.000
	Within Groups	496.037	390	1.272		
	Total	880.831	396			
CS9	Between Groups	560.826	6	93.471	99.817	.000
	Within Groups	365.204	390	.936		
	Total	926.030	396			
CS10	Between Groups	311.371	6	51.895	19.622	.000
	Within Groups	1031.425	390	2.645		
	Total	1342.796	396			

Table 10. Principle Component Analysis for Customer Satisfaction

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.473	64.730	64.730	6.473	64.730	64.730
2	1.189	11.894	76.624	1.189	11.894	76.624
3	.580	5.804	82.428			
4	.436	4.357	86.785			
5	.326	3.256	90.041			
6	.290	2.901	92.942			
7	.243	2.427	95.369			
8	.204	2.041	97.409			
9	.151	1.513	98.922			
10	.108	1.078	100.000			

Extraction Method: Principal Component Analysis.

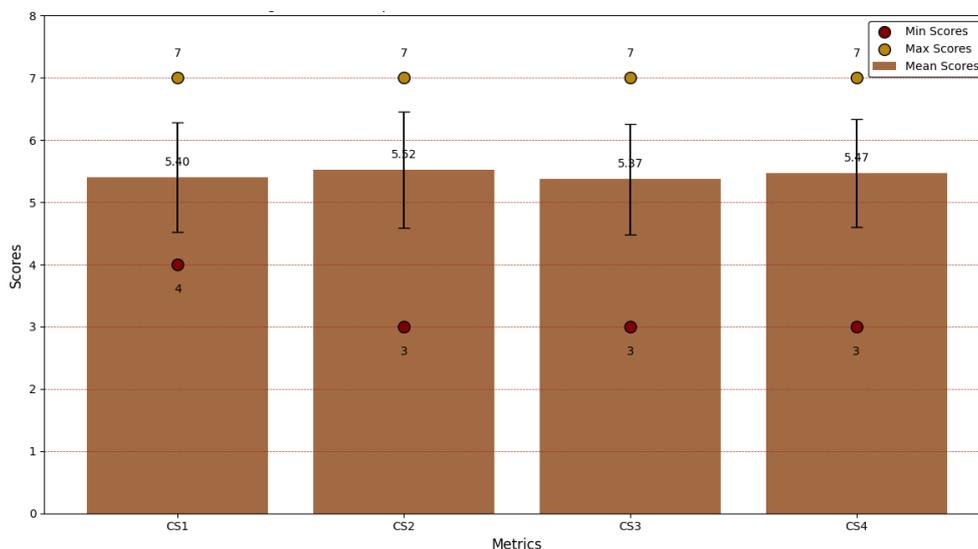


Figure 3: Descriptive statistics for customer satisfaction metrics

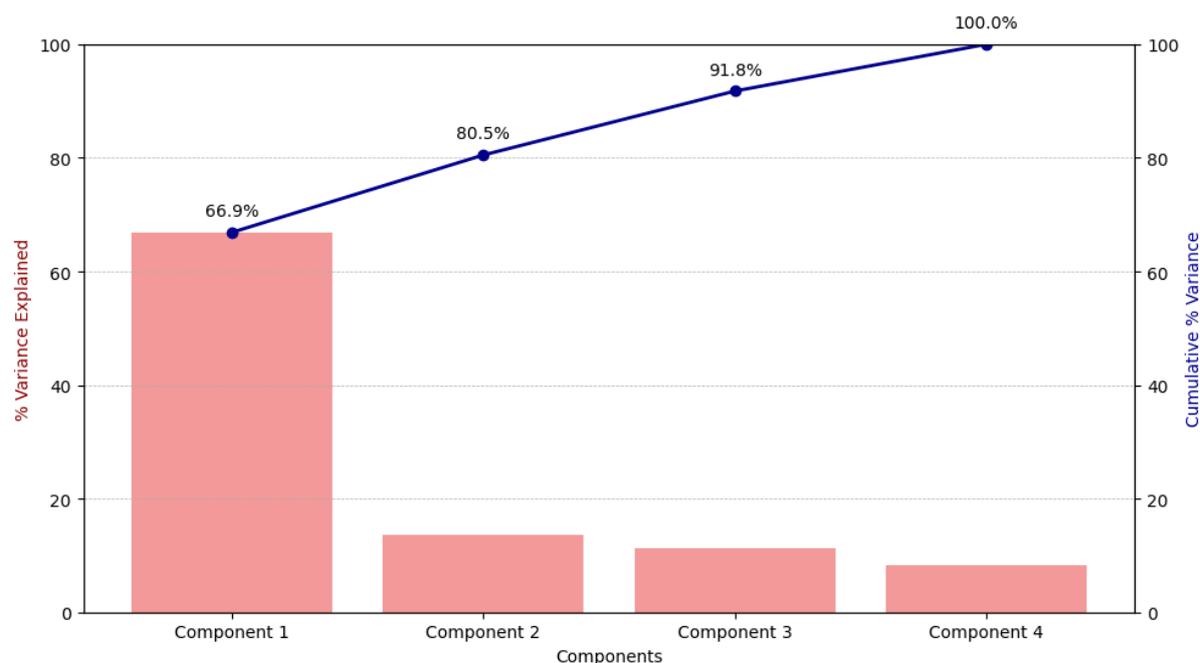


Figure 4: Total and cumulative variance explained for customer satisfaction

Customer Loyalty

The analysis of customer loyalty, based on responses from 397 participants, reveals moderate levels of loyalty across ten items (CL1 to CL10), with mean scores ranging from 4.33 to 5.24 on a 7-point scale and standard deviations between 1.554 and 1.884, indicating some variability in loyalty perceptions (Table 11). This suggests that while customers generally exhibit loyalty, there is room for improvement, and individual experiences may differ. The reliability of the loyalty scale is exceptionally high, with a Cronbach's Alpha of 0.971 (Table 12), confirming strong internal consistency and indicating that the scale is a robust measure of loyalty. The Kaiser-Meyer-Olkin (KMO) measure of 0.948 and a significant Bartlett's test ($p < 0.001$) from Table 13 demonstrate the data's suitability for factor analysis, ensuring that the underlying structure of loyalty can be effectively explored. ANOVA results in Table 14 show significant differences ($p < 0.001$) across groups for all loyalty items, suggesting that loyalty levels vary meaningfully by demographic or behavioral segments. This highlights the importance of understanding and addressing the specific needs and preferences of different customer groups to enhance loyalty. Principal Component Analysis (PCA) in Table 15 identifies a single dominant component explaining 74.217% of the variance, indicating that customer loyalty is largely unidimensional. This is visually reinforced by Figure 6, which likely illustrates the substantial contribution of the first component. The unidimensionality of loyalty implies that efforts to improve loyalty can be streamlined by focusing on a core set of factors that drive this single dimension, rather than addressing multiple, potentially conflicting aspects. Furthermore, the significant group differences underscore the need for tailored loyalty strategies that account for the unique characteristics of each segment. Overall, these findings provide valuable insights for both researchers and practitioners, offering a reliable and simplified framework for understanding and enhancing customer loyalty across diverse customer bases.

Table 11. Descriptive Statistic for Customer Loyalty

	N	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic

CL1	397	1	7	5.12	1.706
CL2	397	1	7	5.06	1.707
CL3	397	1	7	4.79	1.877
CL4	397	1	7	4.33	1.884
CL5	397	1	7	4.97	1.687
CL6	397	1	7	5.15	1.690
CL7	397	1	7	5.24	1.776
CL8	397	1	7	5.15	1.598
CL9	397	1	7	5.03	1.612
CL10	397	1	7	4.98	1.554
Valid N (listwise)	397				

Table 12. Reliability Analysis for Customer Loyalty

Cronbach's Alpha	N of Items
.971	10

Table 13. KMO-Bartley Test for Customer Loyalty

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.948
Bartlett's Test of Sphericity	Approx. Chi-Square	5142.718
	df	55
	Sig.	.000

Table 14. ANOVA for Customer Loyalty

		Sum of Squares	df	Mean Square	F	Sig.
MS1	Between Groups	264.069	6	44.012	17.230	.000
	Within Groups	996.208	390	2.554		
	Total	1260.277	396			
CL1	Between Groups	398.792	6	66.465	34.371	.000
	Within Groups	754.160	390	1.934		
	Total	1152.952	396			
CL2	Between Groups	371.711	6	61.952	30.908	.000
	Within Groups	781.715	390	2.004		
	Total	1153.426	396			

CL3	Between Groups	461.756	6	76.959	32.168	.000
	Within Groups	933.045	390	2.392		
	Total	1394.801	396			
CL4	Between Groups	457.110	6	76.185	31.309	.000
	Within Groups	949.001	390	2.433		
	Total	1406.111	396			
CL5	Between Groups	400.710	6	66.785	35.883	.000
	Within Groups	725.864	390	1.861		
	Total	1126.574	396			
CL6	Between Groups	381.340	6	63.557	33.037	.000
	Within Groups	750.287	390	1.924		
	Total	1131.627	396			
CL7	Between Groups	411.806	6	68.634	31.944	.000
	Within Groups	837.937	390	2.149		
	Total	1249.743	396			
CL8	Between Groups	293.028	6	48.838	26.531	.000
	Within Groups	717.904	390	1.841		
	Total	1010.932	396			
CL9	Between Groups	400.481	6	66.747	41.437	.000
	Within Groups	628.214	390	1.611		
	Total	1028.695	396			
CL10	Between Groups	381.720	6	63.620	43.145	.000
	Within Groups	575.076	390	1.475		
	Total	956.796	396			

Table 15. Principle Component Analysis for Customer Loyalty

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.164	74.217	74.217	8.164	74.217	74.217
2	.876	7.959	82.176			
3	.398	3.623	85.799			
4	.374	3.396	89.195			
5	.285	2.593	91.788			
6	.273	2.482	94.270			
7	.206	1.870	96.140			
8	.139	1.259	97.400			
9	.117	1.064	98.464			
10	.086	.778	99.242			
11	.083	.758	100.000			

Extraction Method: Principal Component Analysis.

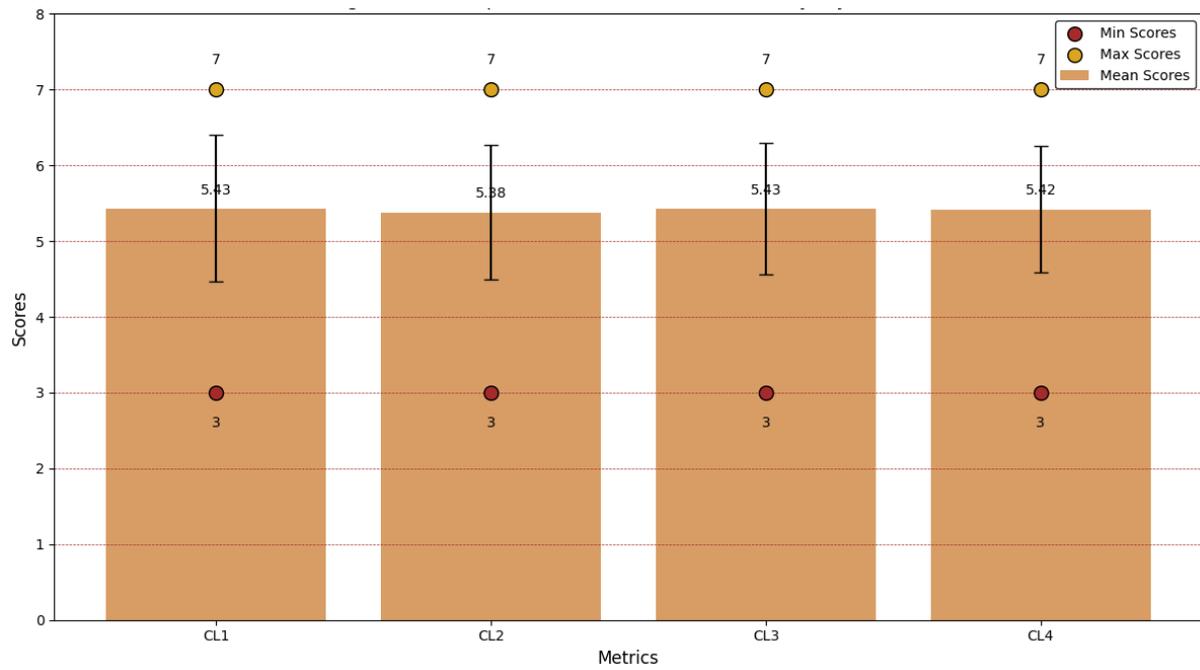


Figure 5: Descriptive statistics for customer loyalty metrics

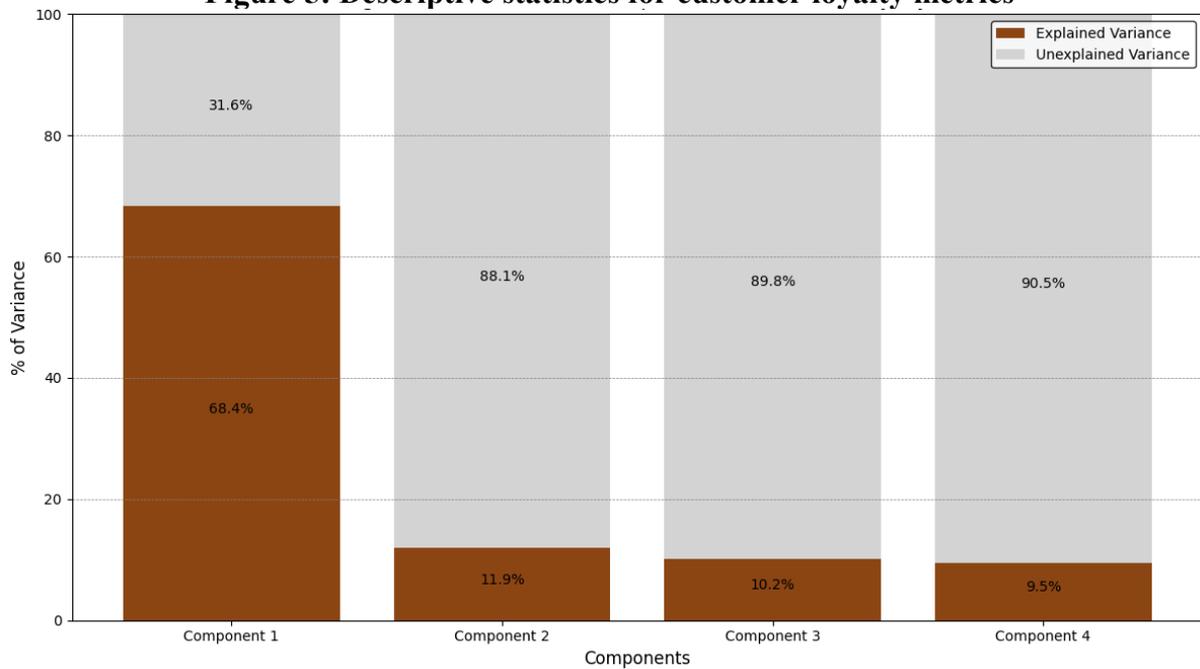


Figure 6: Stacked variance explained for customer loyalty

Adoption Factors

The analysis of adoption factors, based on responses from 397 participants, reveals generally positive perceptions across ten items (AF1 to AF10), with mean scores ranging from 4.37 to 5.38 on a 7-point scale and standard deviations between 1.533 and 1.862, indicating moderate variability in responses (Table 16). The reliability of the adoption factors scale is confirmed by a high Cronbach’s Alpha of 0.938 (Table 17), ensuring strong internal consistency. The Kaiser-Meyer-Olkin (KMO) measure of 0.923 and a significant Bartlett’s test ($p < 0.001$) from Table 18 validate the data’s suitability for factor analysis. ANOVA results in Table 19 show significant differences ($p < 0.001$) across groups for all adoption factors, suggesting that

perceptions vary meaningfully by demographic or behavioral segments. Principal Component Analysis (PCA) in Table 20 identifies a single dominant component explaining 61.616% of the variance, indicating that the adoption factors are largely unidimensional. This is visually reinforced by Figure 7, which likely illustrates the substantial contribution of the first component. The unidimensionality implies that efforts to enhance adoption can focus on a core set of factors. Additionally, the significant group differences, possibly depicted in Figure 8, highlight the need for tailored strategies to address the unique needs of different segments. Furthermore, the high reliability and the identification of a single dominant component suggest that the adoption factors can be effectively measured and targeted through focused interventions. These insights offer valuable guidance for both researchers and practitioners in designing and implementing strategies to enhance adoption across diverse populations.

Table 16. Descriptive Statistic for Adoption Factors

	N	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic
AF1	397	1	7	4.37	1.726
AF2	397	1	7	4.37	1.862
AF3	397	1	7	5.34	1.824
AF4	397	1	7	5.26	1.717
AF5	397	1	7	4.70	1.728
AF6	397	1	7	5.35	1.533
AF7	397	1	7	5.30	1.613
AF8	397	1	7	5.38	1.775
AF9	397	1	7	5.36	1.778
AF10	397	1	7	5.14	1.642
Valid N (listwise)	397				

Table 17. Reliability Analysis for Adoption Factors

Cronbach's Alpha	N of Items
.938	10

Table 18. KMO-Bartley Test for Adoption Factors

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.923
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Bartlett's Test of Sphericity	Approx. Chi-Square	3286.02 3
	df	55
	Sig.	.000

Table 19. ANOVA for Adoption Factors

		Sum of Squares	df	Mean Square	F	Sig.
AF1	Between Groups	270.443	6	45.074	19.326	.000
	Within Groups	909.597	390	2.332		
	Total	1180.040	396			
AF2	Between Groups	279.512	6	46.585	16.626	.000
	Within Groups	1092.795	390	2.802		
	Total	1372.307	396			
AF3	Between Groups	368.753	6	61.459	25.266	.000
	Within Groups	948.657	390	2.432		
	Total	1317.411	396			
AF4	Between Groups	168.171	6	28.029	10.935	.000
	Within Groups	999.622	390	2.563		
	Total	1167.793	396			
AF5	Between Groups	271.663	6	45.277	19.378	.000
	Within Groups	911.264	390	2.337		
	Total	1182.927	396			
AF6	Between Groups	140.922	6	23.487	11.599	.000
	Within Groups	789.708	390	2.025		
	Total	930.630	396			
AF7	Between Groups	148.789	6	24.798	10.978	.000
	Within Groups	880.939	390	2.259		
	Total	1029.728	396			
AF8	Between Groups	352.320	6	58.720	25.587	.000
	Within Groups	895.005	390	2.295		
	Total	1247.325	396			
AF9	Between Groups	318.153	6	53.025	22.164	.000
	Within Groups	933.056	390	2.392		
	Total	1251.209	396			
AF10	Between Groups	139.746	6	23.291	9.792	.000
	Within Groups	927.634	390	2.379		
	Total	1067.380	396			

Table 20. Principle Component Analysis for Adoption Factors

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.778	61.616	61.616	6.778	61.616	61.616
2	.886	8.053	69.669			

3	.759	6.900	76.569			
4	.554	5.034	81.603			
5	.531	4.829	86.432			
6	.408	3.711	90.143			
7	.283	2.575	92.719			
8	.246	2.241	94.960			
9	.235	2.138	97.097			
10	.177	1.609	98.706			
11	.142	1.294	100.000			
Extraction Method: Principal Component Analysis.						

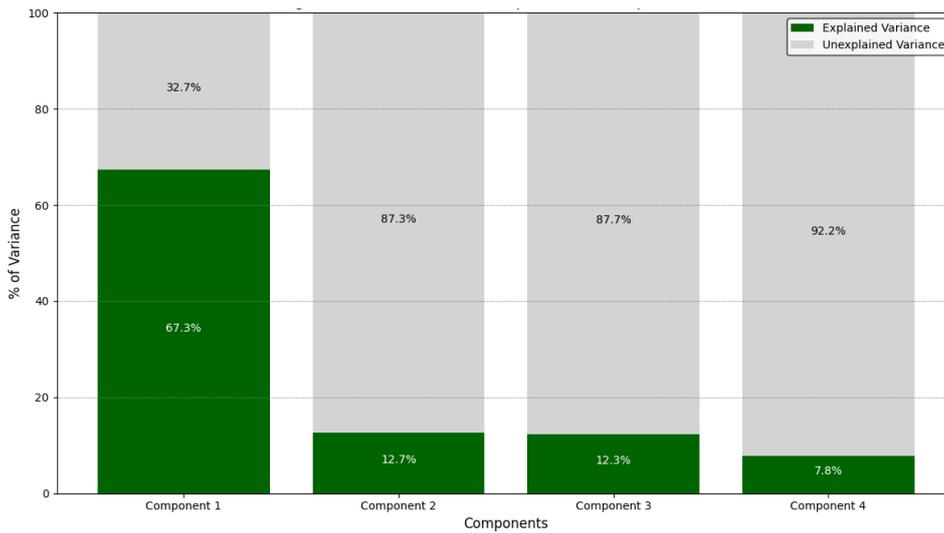


Figure 7: Stacked variance explained for adoption factor

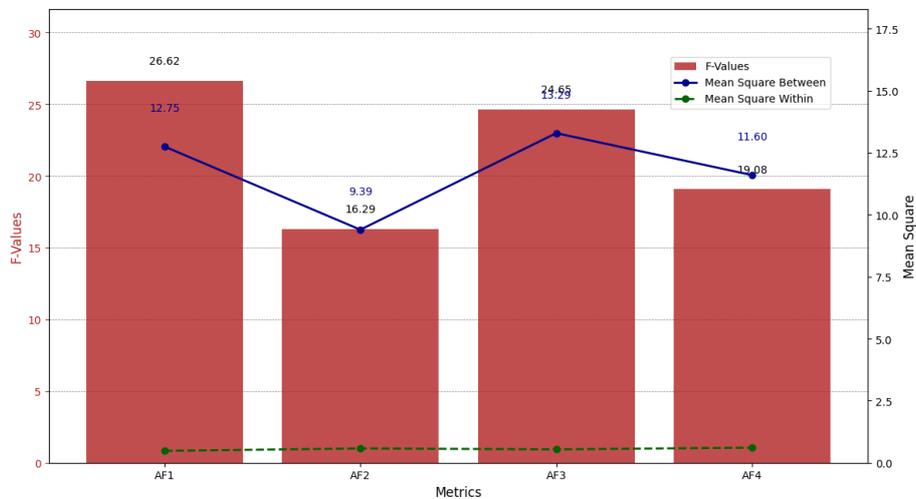


Figure 8: Interaction plot of ANOVA for adoption factor

Conclusions

This research paper investigates the influence of marketing strategies on the adoption of electric and hybrid vehicles (EVs and HEVs) in India's National Capital Region (NCR), drawing from a survey of 397 residents analyzed via SPSS. The findings indicate that marketing strategies are

positively perceived, with mean scores ranging from 3.80 to 5.25 on a 7-point scale, where two components explain 67.56% of the variance. Customer satisfaction is similarly favorable, with scores between 4.02 and 5.42, driven by two factors accounting for 76.62% of variance, while customer loyalty, scoring 4.33 to 5.24, hinges on one dominant factor explaining 74.22%. Adoption factors, with one or two components explaining 69.67% of variance, highlight key consumer priorities. Significant group differences ($p < 0.001$) across demographics and high reliability (Cronbach's alpha: 0.909–0.971) reinforce the robustness of these insights. The study underscores the need for enhanced advertisements, superior service quality, trust-building, and expanded charging infrastructure to address barriers like high costs and limited facilities. These findings offer actionable insights for companies and policymakers to boost EV and HEV uptake, supporting India's sustainable transportation goals. Moreover, this research fills a critical gap in understanding NCR consumer behavior, providing a foundation for tailored marketing approaches. Future studies could delve deeper into the efficacy of specific campaigns or the role of government incentives, further refining strategies to accelerate adoption in this vital region.

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