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"Understanding the Motivational Drivers of CNG Car Purchases: Insights from Indian Consumers"

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Abstract

This research uses an exploratory and descriptive research approach to explore the factors influencing the buying behavior of CNG (Compressed Natural Gas) cars in India. The research data were collected online with a sample size of 350 completed questionnaires. The EFA tool was applied to determine the factors contributing to CNG cars. This study identified six major factors: environmental concern, safe fuel, pocket-friendly, innovativeness, performance, and social status. The findings reveal that environmental concerns and safe fuel were the main drivers of CNG car adoption for CNG car users. Besides this, economic advantages and performance aspects are also significant, while social status indicates a need for improved public perception. The study emphasized that marketing tactics should stress environmental and safety benefits, emphasize their cost-effectiveness, state social status concerns, and exhibit technological advancements of CNG cars to make an appeal to consumers. This research also highlights the practical, managerial, and theoretical implications.

Keywords: Motivational Drivers, Environmental Concern, Cost-Effectiveness, Buying Behavior, Factors, CNG Vehicles, Cars.

1. Introduction

Compressed Natural Gas-fueled vehicles are an eminent segment of the automobile industry, primarily in reducing pollution and greenhouse gas emissions and relying on conventional fossil fuels (Kalghatgi, 2018). These automobiles are fueled by CNG, which is a cleaner fuel and a substitute for gasoline. CNG produces fewer greenhouse gas emissions and air pollutants, making it an ecologically sustainable option for the automobile industry. CNG is stored in high-pressure tanks and powers the vehicle's engine (Azeem et al., 2022). These CNG vehicles are of two types: Dedicated CNG vehicles, which are powered by CNG only, and bi-fuel vehicles, which offer versatility as they can run on both petrol and CNG efficiently. The global CNG vehicle market was valued at around $15-20 billion USD 2024. Over the next ten years, the market is anticipated to expand at a compound annual growth rate (CAGR) of nearly 8–10%. By 2030, the market size could reach around $30 billion. Asia-Pacific region holds the most significant portion of the market for CNG vehicles, navigated and driven by countries like India and China, with powerful government rules and regulations supporting natural gas as an alternative fuel. European nations are also weighty markets for CNG vehicles with numerous laws fostering cleaner and greener transport alternatives. In North America, the CNG vehicle market is booming, unlike in Asian and European countries. CNG is less expensive than diesel and gasoline, providing savings on fuel expenses. The vehicles powered by CNG fuel have also helped in maintaining noise pollution but the scanty infrastructure for refueling CNG in many regions may prevent its large-scale adoption. The government rules and regulations, standards, and incentives has favoured the green fuels that promote the adoption of CNG vehicles. Growing awareness of environmental issues pushes consumers and fleets towards cleaner alternatives (Shah et al., 2021).

Furthermore, performance is improving because of developments in the CNG engine & its technology and other aspects of vehicular options. To meet the objectives of a clean environment and lower cost, a vast network of public transportation and business fleets are implementing CNG vehciles. Thus, CNG vehicles are a notable means to reduce pollution and offer a budgeted and accessible substitute for conventional fuels. Due to its improved infrastructure and technology, the market for these vehicles is expected to grow.

The Market for CNG Cars

Considering the market of CNG vehicles, it's vital to distinguish the aggregate number of segments in CNG vehicles and the market of CNG cars compared to other kinds.

1.1 Market Composition

Passenger Cars- Passenger cars are the most significant segment of CNG vehicles. It consists of CNG cars as well as dual-fuel cars. Dual-fueled cars are powered and run by CNG and gasoline both. This segment is essential due to its environmental benefits and cost-effectiveness and its large scale demand.

1.2 Share of CNG Cars in the CNG Vehicle Market

Passenger Cars- As of 2024, passenger cars typically comprise 50-60% of the total CNG vehicles market worlwide. This percentage varies from region to region depending upon the local adoption rates and availability of CNG. In India, passenger cars construct a significant portion of the CNG vehicles in the automobile market. As per the reports of 2024, approximately 70-80 percent of CNG vehicles are passenger cars, reflecting the broad penetration and high adoption rates in personal and small segments. In Europe, passenger cars also represent a notable share, but buses and commercial vehicles are increasing significantly due to environmental rules & regulations. In China, passenger cars & commercial vehicles both have shown a growing tendency towards adopting CNG in public transportation and logistics. Passenger cars constitute the largest segment of the CNG vehicle market with significant regional variations. In some nations like India, this share may be much higher, reflecting a preference for CNG in personal vehicles with strong adoption. Commercial vehicles are also an important segment, with the increasing adoption of CNG cars driven by cost and environmental benefits.

1.3 Statistics of CNG Cars in India

India has approximately 2.5 million to 3 million CNG cars on the road (Nouni et al., 2021) and consists of CNG and bi-fuel vehicles (which are powered by both CNG and gasoline). This market segment has been growing rapidly as more technological advancements get introduced and consumers become aware of every aspect of the product. As per Mordor Intelligence

Report, 2024 reports, India has over 6,000 CNG stations with continuing development plans. The Indian government has framed many policies to promote the market for CNG vehicles, including subsidies and tax benefits for the better infrastructure of CNG vehicles. The low cost of CNG and its mileage makes it an appealing choice for cost-conscious car users & fleet operators. CNG vehicles excrete 20-30% less carbon dioxide, nitrogen oxides, and particulate matter than petrol & diesel vehicles. Many Indian cities have adopted the pace of CNG vehicles to reduce air pollution which a serious issue. In India, major automotive manufacturers offer CNG variants, including Maruti Suzuki, Hyundai, Tata Motors, and Honda. Maruti Suzuki Alto, Wagon R, Ertiga, Hyundai Santro & Tata Tiago are widely used CNG cars available in the Indian CNG automobile market. The favoritism of CNG vehicles is much more prevalent in metropolitan areas and cities with severe air quality issues. Lower operational costs and the increasing availability of CNG refueling stations push the preference for using CNG cars. The market for CNG automobiles in India is calculated to grow rapidly with ongoing development due to the support of government policies and laws. The increased awareness among automobile customers and expanding refueling infrastructure has also contributed to the consumption of CNG. The CNG car market has become a significant segment of India's automobile industry pulled by economic advantages, ecological advantages, and supportive government rules and policies for buying and using CNG vehicles.

2. Review of Literature

Knowing how consumers behave is essential for marketers because ineffective marketing may cause even the finest products to fail (Dijksterhuis, 2016). Thus, accurate assessment of customer behavior is crucial for marketers and market researchers. Gallego-Álvarez and Pucheta-Martínez (2020) and Iancu et al. (2023) identified six cultural dimensions correlated with consumer preference for a specific fuel type, as established by Hofstede that were power distance index, individualism versus collectivism, masculinity versus femininity, uncertainty avoidance index, long-term orientation versus short-term normative orientation, and indulgence versus restraint. As scores for individualism vs collectivism and pleasure versus restraint climb, so does the use of cars with low and medium emissions. On the other hand, when the power distance and uncertainty avoidance index rise, the number of people using these vehicles decreases(Taniguchi et al., 2022). Simultaneously, the trend of collectivism and restraint among EU countries is driving the decline of preference for low- and medium-emission automobiles (Iancu et al. 2023). Ishengoma and Gabreil (2021) investigated the connection between economic variables and the readiness of automobile owners to pay for the entire cost of converting their vehicles to natural gas vehicles (NGVs) or to obtain commercial loans to augment their savings to cover the associated expenses.

The findings signify that automobile users are interested in paying to convert their cars to gas-powered vehicles. Tu and Yang (2019) suggested that behavioral intention and consumers' ability are the essential resources needed to purchase electric vehicles and have the most significant impact. They are influenced by the opinions of their surroundings when it comes to purchasing CNG cars. Customers' adoption of technically advanced products and environmental awareness will also influence customers' behavior toward CNG cars (Oliveira et.al., 2016). Regarding behavior, customers who believe that driving an electric vehicle is simpler and more convenient had a more positive attitude toward purchasing one (Chaturvedi et al., 2023).

In contrast to traditional automobiles, customers view electric vehicles as state-of-the-art technology products that provided similar driving experiences and use prices (Chauhan and Rani, 2024). Arbat and Bagul (2016) analyzed the stages of the decision-making process of buying cars and examined the factors that impact these stages. It identified the specific factors affecting the decision-making process for CNG cars and determined whether there is a significant relationship between these influencing factors. Sirichatchai and Mahumud (2016) intended to investigate how customers will buy cars and to assess those eminent factors that impact the purchasing decisions for Honda City CNG's segment. The factors influencing car-buying behavior are sales assistance, suitable purchasing price fees for commissions and service branch availability which provide comprehensive coverage and effective promotion. The result encourages the business to look for a competitive and enduring advantage in the market. Customers preferred eco-friendly and fuel-efficient options due to growing environmental consciousness (Borthakur, 2023). There is a highly positive correlation between socio-demographic factors and the influence of social media on customers' vehicle purchasing (Darshan, 2020). Green consumers are found to be leaders and cautious buyers who research products including information from advertisements (Shrum et al., 1995). Research on green marketing can pinpoint consumer attitudes, behaviors, and intentions, and environmental consciousness will grow over time. Consumer's appreciation and adoption of green products are significantly influenced by their quality, longevity, and variety (Vijayalakshmi, 2021). One of the most critical tools for promotions is internet marketing. Companies were increasingly using internet advertisements and social media pages as suggested by Bagga and Gupta (2014). Product service systems in the automotive industry be evaluated using a broader range of five essential evaluation criteria such as proof of "higher-order" learning among stakeholders, modifications to institutional procedures and infrastructure, modifications to vehicle design, manufacturing, and end-of-life management, modifications to vehicle ownership structures, and modifications to producer-user interaction styles (Williams, 2007).

3. Research Gap

The existing literature study clearly shows that much experimental research has been done on alternative fuels, consumer behavior toward electric cars, and studies on air quality concerning CNG vehicles. However, very few studies have been done to check consumer buying behavior towards CNG cars. This study tries to extend the results of the previous work done by the researchers in non-conventional fuels. This research attempts to study the motivational factors of CNG car users.

4. Research Objective

The primary objective of this study is to explore the factors contributing to the buying behavior of CNG cars in India and focus on the future implications of this research in the context of the emerging market of CNG fuel.

5. Research Methodology

The research design of current study is exploratory combined with descriptive. Information was acquired through a virtual poll distributed at random via social media platforms like Instagram and Facebook to meet the study objectives. The type of sampling used in this study was purposeful sampling which allows researchers to get responses more quickly and efficiently. 350 filled questionnaires were considered appropriate for this study that were complete and error-free. All of the data were statistically tested by using exploratory factor analysis. The questionnaire comprises 29 statements based on a literature review and experts' opinions. The survey items were scored on a 5-point Likert scale. Participants were asked to select an answer on a scale from 1 (SD) to 5 (SA).

6. Data Analysis

Table 1: Demographic profile

Particulars		No. of Respondents	Percentage of Respondents (%)
Gender	Male	185	53
	Female	165	47
Age	Below 20	83	24
	21-30	88	25
	31-40	103	29
	Above 40	76	22
Education Level	Below Graduation	89	25
	Graduate	91	26
	Post Graduate	94	27
	Others	76	22
Employment Status	Government Job	92	26
	Private Job	108	31
	Self Employed	78	22
	Unemployed	72	21
Annual Income	Below 5,00,000	98	28
	5,00,000-15,00,000	124	35
	Above 15,00,000	128	37
The total of each demographic factor		**350**	**100**

Source: Primary Data

The above table shows the demographic profile of 350 respondents, including gender, age, education level, employment status, and annual household income, which helps reach the study results.

Exploratory Factor Analysis (EFA) was the first step, and it was applied to all 29 statements to define the benefits/opportunities given by the Stand Up India scheme. "EFA is a decent way of ascertaining latent factors from an array of apparently significant variables. In a more general way, Factor Analysis (FA) is a set of techniques that examines the correlation amid variables and lessens their number into fewer factors, elucidating much of the original data more economically (Stupnisky et al., 2014)." "The essential premise when using FA must be ensured before executing the technique.

1. Metric data is required. Accordingly, the five-point Likert (1= SD, 2= DA. 3= N, 4= A, and 5= SA) scale was employed.
2. The sample size of respondents was> 4-5 times the number of statements. Consequently, the size of the sample respondents in the present study was 370.
3. Correlation must exist amid variables that should be tested via the Bartlett test of sphericity. A significant correlation matrix ensures that the FA can be applied. Given that, Table 2 shows the significant value of the Bartlett test of sphericity, i.e., .000, which ensures the exercise of FA.
4. Kaiser-Meyer- Olkin (KMO) statistics value > 0.5. Consequently, Table 1 displays the value of KMO statistics .890, which confirms the FA application" (Chawla, 2011).

Table 2: KMO and Bartlett's Test

KMO		.890
Bartlett's Test of Sphericity	Approx. Chi-Square	2918.416
	Df	419
	Sig.	.000

Source: Primary Data

As a result, the data was best suited for the data reduction process.

Table 3: Communalities of all the statements showing factors that influence the buying behavior of CNG car users are given below.

Statements	***Initial***	***Extraction***
CNG is a clean and green fuel.	1.00	1.00
It reduces harmful emissions.	1.000	.909
It reduces carbon content.	1.000	.851
It reduces global warming.	1.000	.850
It does not affect public health.	1.000	.739

It is lighter than air.	1.000	.818
It does not produce any poisonous gas.	1.000	.958
It does not catch fire easily.	1.000	.768
CNG gets mixed up with air quickly in case of leakage.	1.000	.830
Due to dual fuel availability, you can run on both CNG and petrol.	1.000	.937
Low running cost in daily use.	1.000	.832
CNG prices are low compared to petrol and diesel.	1.000	.856
Low maintenance cost.	1.000	.829
It is economical to drive.	1.000	.782
Less expensive to buy.	1.000	.817
High mileage.	1.000	.823
Smooth driving.	1.000	.850
Good pick-up.	1.000	.739
Good seating capacity	1.000	.818
CNG cars provide a longer life span to the engine than diesel cars.	1.000	.958
Having a CNG car is a symbol of lower status.	1.000	.768
Low-income group people generally purchase it.	1.000	.830
People feel inferior to using CNG cars for personal use.	1.000	.937
It does not have any adverse impact on the status.	1.000	.850
Its infrastructure is less developed.	1.000	.782
Auto switch feature is also available between petrol and CNG.	1.000	.817
A fuel indicator is also available to track the amount of CNG.	1.000	.823
The direct start feature is also available now.	1.000	.850
Faster refueling.	1.000	.739
Extraction Method: Principal Component Analysis.		

Source: Primary Data

"Communality assesses the presence of variance in a particular variable that can be explained by all factors and can be taken as the indicator's reliability." Since the low commonality of variables does not describe the properties of the factor (variables are low correlated), it is not acceptable. If a variable's commonality is less than 0.4, it is eliminated from studies. Table 3 shows that all values greater than 0.70 suggest that none of the study's variables must be eliminated.

Table 4: Total Variance Explained for the factors explaining the buying behavior for CNG cars.

Component	*Initial Eigenvalues*			*Extraction Sums of Squared Loadings*			*Rotation Sums of Squared Loadings*		
	Total	*% of Variance*	*Cumulative %*	*Total*	*% of Variance*	*Cumulative %*	*Total*	*% of Variance*	*Cumulative %*
1	7.767	35.306	35.306	7.767	35.306	35.306	4.647	21.123	21.123
2	3.771	17.140	52.447	3.771	17.140	52.447	4.108	18.673	39.795
3	2.810	12.772	65.219	2.810	12.772	65.219	3.3631	15.286	55.082
4	2.389	10.861	76.080	2.389	10.861	76.080	3.362	14.283	70.365
5	1.913	8.696	84.776	2.356	10.458	78.679	3.241	13.283	72.365
6	.430	1.953	86.730						
7	.379	1.724	88.454						
8	.333	1.511	89.965						
9	.315	1.432	91.397						
10	.262	1.189	92.586						
11	.233	1.058	93.644						
12	.226	1.026	94.670						
13	.199	.903	95.572						
14	.177	.804	96.377						
15	.173	.784	97.161						
16	.139	.633	97.794						
17	.127	.577	98.371						
18	.118	.538	98.909						
19	.089	.405	99.315						
20	.063	.287	99.601						
21	.054	.247	99.848						
22	.023	.145	99.873						
23	.700	.23	99.892						
24	.600	99.923							
25	.500	99.956							
26	.400	99.978							
27	.300	99.988							
28	.200	99.999							
29	.100	100							
Extraction Method: Principal Component Analysis.									

Source: Primary Data

Table 4 explains the total variance of the factors that explain the buying behavior of CNG cars. The explanatory power of a factor over variables is measured by its eigenvalue. Kaiser (1958) asserted that only factors with Eigen values higher than one ought to be kept. Six factors were thus retained for 15 assertions, which accounted for 84.776 percent of the total variation. The table above indicates that the first factor accounts for 35.306 percent of the variance, followed by 17.140 percent for the second, 12.772 percent for the third, 10.861 percent for the fourth, and 8.946 percent for the fifth.

Table 5: Rotated Component Matrix of the factors explaining the buying behavior for CNG cars.

Statements	**1**	**2**	**3**	**4**	**5**	**6**
CNG is a clean and green fuel.	.954					
It reduces harmful emissions.	.934					
It reduces carbon content.	.922					
It reduces global warming.	.918					
It does not affect public health.	.915					
It is lighter than air.		.909				
It does not produce any poisonous gas.		.908				
It does not catch fire easily.		.900				
CNG gets mixed up with air quickly in case of leakage.		.891				
Due to dual fuel availability, you can run on both CNG and petrol.		.890				
Low running cost in daily use.			.900			
CNG prices are low compared to petrol and diesel.			.862			
Low maintenance cost.			.856			
It is economical to drive.			.842			
Less expensive to buy.			.822			
High mileage.				.821		
Smooth driving.				.789		
Good pick-up.				.767		
Good seating capacity				.745		
CNG cars provide a longer life span to the engine than diesel cars.				.745		
Having a CNG car is a symbol of lower status.					.723	
People generally purchase it from the low-income group.					.721	
People feel inferior to using CNG cars for personal use.					.711	
It does not have any adverse impact on the status.					.710	
Its infrastructure is less developed.					.709	
Auto switch feature is also available between petrol and CNG.						.654
A fuel indicator is also available to track the amount of CNG.						.645
The direct start feature is also available now.						.601
Faster refueling						.600

Source: Primary Data

In Table 5, the Rotated Factor Matrix is displayed. (Varimax rotation in the Principal Component Method). For a statement to be included in a factor, its minimum factor loading must be greater than 0.40. With the current study, this is true. Table 6 summarizes the factor naming, statements, factor loading, and Cronbach's Alpha.

Table 6: Factor Naming, Statements, Factor Loading, and Cronbach's Alpha

Factor No-	**Name of the Factor**	**Statements/ Variables**	**Factor Loadings**	**Cronbach's Alpha**
1.	**Environmental Concern**	CNG is a clean and green fuel.	.954	.979
		It reduces harmful emissions.	.934	
		It reduces carbon content.	.922	
		It reduces global warming.	.918	
		It does not affect public health.	.915	
2.	**Safe Fuel**	It is lighter than air.	.909	.940
		It does not produce any poisonous gas.	.908	
		It does not catch fire easily.	.900	
		CNG gets mixed up with air easily in case of leakage.	.891	
		Due to dual fuel availability, you can run on both CNG and petrol.	.890	
3.	**Pocket Friendly**	Low running cost in daily use.	.900	.934
		CNG prices are low compared to petrol and diesel.	.862	
		Low maintenance cost.	.856	
		It is economical to drive.	.842	
		Less expensive to buy.	.822	
4.	**Performance**	High mileage.	.821	.909
		Smooth driving.	.789	

		Good pick-up.	.767	
		Good seating capacity	.745	
		CNG cars provide a longer life span to the engine than diesel cars.	.745	
5.		Having a CNG car is a symbol of lower status.	.723	.900
		People generally purchase it from the low-income group.	.721	
		People feel inferior to using CNG cars for personal use.	.711	
		It does not have any adverse impact on the status.	.710	
		Its infrastructure is less developed.	.709	
6.	**Innovativeness**	An auto switch feature is also available for petrol and CNG.	.654	.897
		A fuel indicator is also available to track the amount of CNG.	.645	
		The direct start feature is also available now.	.601	
		Faster refueling.	.600	

Source: Primary Data

All of the factor loading values are more significant than 0.5, as Table 6 verified. For every factor, Cronbach's alpha is strong (>0.7). All of the factors are very dependable, as the accompanying table demonstrates. During the EFA process, six components were identified and given the following labels based on their characteristics:

1. Environmental Concern

- **Factor Loadings:** 0.954
- **Cronbach's Alpha:** 0.979

This factor indicates the environmental benefits of CNG vehicles, focusing on their positive impact on reducing pollution and greenhouse gas emissions. The high factor loadings, such as 0.954, suggest that statements under this factor are strongly related to the environmental benefits of CNG. The Cronbach's Alpha of 0.979 indicates excellent internal consistency, means the statements can effectively measure the concept of environmental concern.

2. Safe Fuel

- **Factor Loadings:** 0.909 - 0.890
- **Cronbach's Alpha:** 0.940

This factor focuses on the safety attribute regarding CNG cars. The customers have a good perception of CNG cars as a safe fuel. The Cronbach's Alpha of 0.940 reflects high reliability, stating that these statements consistently show CNG's safety characteristics.

3. Pocket Friendly

- **Factor Loadings:** 0.900 - 0.822
- **Cronbach's Alpha:** 0.934

High loadings for statements related to low running costs, low fuel prices, and economical driving indicate that CNG car users perceive CNG vehicles as cost-efficient. The Cronbach's Alpha of 0.934 defines strong reliability in measuring the ecological benefits of CNG cars.

4. Performance

- **Factor Loadings:** 0.821 - 0.745
- **Cronbach's Alpha:** 0.909

This factor defines the performance factor of CNG cars which includes high mileage, smooth driving, and better engine life. The statements with factor loadings suggest that the attributes related to performance are strongly associated with the positive perception of CNG cars. The Cronbach's Alpha of 0.909 indicates good reliability in measuring the perception towards performance.

5. Social Status

- **Factor Loadings:** 0.723 - 0.709
- **Cronbach's Alpha:** 0.900

Cronbach's Alpha of 0.900 defines good internal consistency, suggesting that these statements are reliable in measuring the perceptions of social status for CNG cars. These factors reflect a perception that CNG vehicles are associated with lower social status or used by lower-income groups.

6. Innovativeness

- **Factor Loadings:** 0.654 - 0.600
- **Cronbach's Alpha:** 0.897

This factor focuses upon the technological and innovative grounds of CNG cars. The statements indicate a moderate association with perceptions of technological advancement in CNG cars. The Cronbach's Alpha of 0.897 suggests that this factor has good internal consistency in measuring innovative features.

In summary, the factors manifest various features of CNG cars that influence consumer perceptions and their decisions towards CNG cars. High factor loadings and Cronbach's Alpha values describe that the statements under each factor are reliable and effectively portray the essence of each attribute from ecological advantages and safety to cost-effectiveness, performance, social status, and innovation.

7. Discussion and Conclusion

The analysis of factors of CNG cars gives essential insights into customer's attitudes and preferences. Environmental concern is undoubtedly a major driver for the use of CNG cars as consumers strongly perceive CNG cars as advantageous for reducing emissions and combating the problem of global warming. This result has been supported by the high Cronbach's Alpha of 0.979. Safety features also play a vital role, with high factor loadings showing customers' confidence in CNG's harmless nature. The economic advantages of CNG cars including low running and maintenance costs are as significant as other factors due to the value of 0.934 that Cronbach's Alpha indicates. However, performance aspects like high mileage and smooth driving are slightly less focused by the customers than environmental and safety concerns.

Social status perceptions show some negative stigma associated with CNG cars, highlighting a need to alter public perception of using and owning CNG cars. Features like innovation such as auto-switching and faster refueling are getting acknowledged. Marketing strategies should emphasize intensifying the environmental & safety interest of CNG cars and highlighting their cost-effectiveness and improving performance perceptions to label these study findings. Additionally, efforts should be made to recreate the perception of the social status associated with using CNG cars and stress the technological innovations to the tech-savvy customers.

8. Implications of the Study

8.1 Practical Implications

The study's findings suggest that a comprehensive marketing strategy is required to address the various factors that influence the customer's attitude towards purchasing CNG cars. By focusing on environmental benefits, safety features, economic advantages, performance, social status, and technological innovations, stakeholders can hype the attractiveness and adoption level of CNG cars.

8.2 Managerial Implications

The research results inferred that managers and stakeholders in the automotive industry should adopt a mixed marketing strategy that carries the diverse benefits of purchasing CNG cars. It is crucial to emphasize environmental sustainability, safety concerns, economic benefits, and good performance, address the social status issue and showcase technological advancements to align the CNG cars with customers' preferences. This holistic approach can significantly improve the customer's perceptions of CNG car adoption and ultimately contribute to the market growth of the CNG vehicle segment.

8.3 Theoretical Implications

The theoretical implications of this research suggest that consumer behavior models need to encompass a wide range of factors while studying the attitudes regarding alternative fuel vehicles like CNG vehicles. It is essential to draw out traditional models focusing on psychological factors such as concern for social status and technical advancement. The study highlights the importance of overarching approaches in studying the customer's decision-making, highlighting the concern for the environment, economic well-being, safety, and performance factors.

9. Limitations and Future Scope of the Study

This research primarily concentrates on factors that contribute to customer behavior only. It ignores other variables that could significantly influence the promotion of CNG cars like geographical variations , infrastructure and governmental regulations. Future research for CNG vehicles should look more closely at these variables and examine how demographic and technological advancements continue to influence the market for alternative fuel cars; therefore, longitudinal research may provide valuable insights into how customer attitude changes over time.

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