

E20 Petrol Adoption in India: A Study on Petrol Vehicle Users in Tamil Nadu

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Abstract

India's transition towards E20 petrol represents a significant shift in the country's transport-fuel system, with implications for energy security, sustainability and consumer behaviour. While the policy transition is supported by technical validation, consumer concerns regarding fuel efficiency, vehicle compatibility, performance and fuel quality may influence acceptance. This study empirically examines consumer perception, trust and acceptance intention towards E20 petrol among petrol vehicle users in Tamil Nadu. A quantitative research design was adopted, and primary data were collected through a structured questionnaire using a five-point Likert scale. Of the 200 responses collected, 166 usable responses were retained for analysis. Descriptive statistics, reliability analysis, Pearson correlation and multiple regression were employed. The findings indicate positive relationships among consumer perception, trust and acceptance intention. Consumer perception and trust jointly explained 59.8% of the variance in acceptance intention, with trust emerging as the stronger predictor. The study highlights the importance of transparent information, credible communication and consumer confidence in strengthening E20 acceptance in Tamil Nadu.

Keywords: E20 Petrol; Consumer Perception; Trust; Acceptance Intention; Ethanol Blending; Sustainable Mobility.

Introduction

India is undergoing a significant transition in its transport-fuel system through the increased blending of ethanol with petrol. The Ethanol Blended Petrol programme was introduced to reduce dependence on imported crude oil, strengthen energy security, support domestic agricultural and ethanol industries, and contribute to environmental objectives. India achieved the targeted average ethanol blending level of 20% during the 2025–26 period, making E20 a significant component of the country's current petrol-fuel landscape. The transition to E20, however, is not solely a technological or policy issue. It also involves consumer acceptance, particularly among existing petrol-vehicle users. Consumers may evaluate E20 based on perceived fuel efficiency, vehicle compatibility, engine performance, safety, economic implications and environmental benefits. These perceptions can influence whether consumers view E20 as a desirable sustainable-fuel transition or as a potential source of additional cost and vehicle-related concerns. Technical and policy perspectives have emphasized that E20-compatible vehicles have undergone extensive testing for drivability, durability, material compatibility, emissions and fuel-efficiency performance. At the same time, public discussion has highlighted concerns regarding mileage and compatibility, particularly among users of older petrol vehicles. This difference

between technical assurance and consumer perception creates an important area for business and consumer-behaviour research. Trust therefore becomes particularly relevant. Consumers may rely on information from government agencies, automobile manufacturers, oil marketing companies, fuel retailers and other information sources when forming opinions about E20. Where consumers perceive information as reliable and transparent, trust may strengthen their willingness to accept E20. Conversely, uncertainty regarding fuel quality, mileage, vehicle compatibility or long-term performance may reduce acceptance. Tamil Nadu provides an appropriate context for examining these issues because the study can capture perceptions among actual petrol-vehicle users during India's ongoing E20 transition. Rather than examining E20 purely from a technical or policy perspective, the present study focuses on the consumer side of adoption. Accordingly, this study empirically examines the relationship between consumer perceptions, trust and acceptance intention towards E20 petrol among petrol vehicle users in Tamil Nadu. The study seeks to determine whether favourable perceptions of E20 are associated with greater trust and whether such trust contributes to consumers' acceptance intention. The findings are expected to provide useful implications for policymakers, fuel companies, automobile manufacturers and other stakeholders involved in India's transition towards sustainable transport fuels.

Review of Literature

Ethanol-Blended Fuel and Consumer Adoption

The transition towards ethanol-blended petrol has increasingly been examined from the perspective of sustainable transportation and consumer adoption. **Gupta et al. (2025)** investigated purchase intention towards ethanol-blended fuel in India using 303 respondents and PLS-SEM. Their findings indicated that adoption motivation, policy incentives, risk perception and sustainable practices significantly influenced purchase intention, whereas cost perception and infrastructure readiness were not significant predictors. This study is particularly relevant to the present research because it establishes that consumer adoption of ethanol-blended fuel is influenced not only by economic considerations but also by risk perception, sustainability and policy-related factors. However, the present study takes a different approach by focusing specifically on E20 petrol users in Tamil Nadu and examining the role of trust alongside consumer perception and acceptance intention.

Environmental Sustainability of E20

The environmental implications of ethanol blending provide an important basis for consumer perceptions. A recent life-cycle assessment of ethanol–gasoline blends in India found that E20 and E30 can provide reductions in carbon emissions, fossil-fuel use and particulate-matter formation compared with conventional gasoline. However, the study also identified trade-offs associated with land use, water consumption and agricultural inputs, particularly when ethanol is produced from sugarcane. The findings suggest that E20 can provide a favourable environmental balance when supported by sustainable agricultural practices and appropriate feedstock strategies. These findings indicate that consumers may perceive E20 positively because of its potential environmental benefits, but sustainability communication should not present ethanol blending as completely without environmental trade-offs.

Consumer Perception and Fuel Attributes

Consumer acceptance of alternative fuels can depend on perceptions of fuel performance, mileage, price and environmental characteristics. Research on consumer preferences for ethanol-blended fuels has shown that price and expected mileage can be important determinants of fuel choice, while consumer awareness of ethanol-blended fuel availability may remain limited. For E20, these considerations become particularly relevant because consumers may evaluate the fuel not only according to environmental benefits but also according to its perceived effect on everyday vehicle performance and running costs. Therefore, the present study incorporates fuel efficiency, vehicle compatibility, performance, economic value and environmental benefit within the broader construct of consumer perception.

Risk Perception, Trust and Acceptance

Risk perception is particularly important in the adoption of new or unfamiliar products and technologies. The Indian ethanol-blended-fuel study by **Gupta et al. (2025)** found that risk perception significantly influenced purchase intention, demonstrating that consumers' assessment of potential risks can shape their willingness to adopt ethanol-blended fuel. For E20, perceived risks may include concerns about mileage, vehicle compatibility, engine performance, maintenance and long-term durability. However, perception of risk does not operate independently of information. Consumers also

need to evaluate whether information provided by government authorities, automobile manufacturers, fuel companies and other stakeholders is credible. Trust therefore provides an important behavioural mechanism through which information and perceived risk may influence acceptance.

Research Gap

The growing adoption of E20 petrol in India has created increasing interest in understanding consumer responses to ethanol-blended fuel. Existing Indian research has examined factors influencing purchase intention towards ethanol-blended fuel, including adoption motivation, policy incentives, risk perception and sustainable practices. These studies establish that consumer acceptance is influenced by both perceived benefits and concerns associated with alternative fuels. Recent research has also examined consumer awareness and perception of E20 fuel in Coimbatore, Tamil Nadu, identifying concerns related to mileage, vehicle performance and the credibility of information available to consumers. This indicates that awareness of E20 does not necessarily translate into acceptance. However, the existing literature reviewed for the present study gives comparatively limited attention to trust as a distinct behavioural factor in E20 acceptance. Consumers form perceptions of E20 through information received from government authorities, automobile manufacturers, fuel companies, media and other sources. Where such information is perceived as credible and transparent, it may strengthen consumer confidence; uncertainty regarding fuel efficiency, vehicle compatibility, safety and fuel quality may weaken that confidence. Therefore, the present study addresses this gap by examining Consumer Perception, Trust and Acceptance Intention together among petrol vehicle users in Tamil Nadu. Rather than focusing only on awareness or general perception, the study investigates whether consumer perception is associated with trust and acceptance intention and whether Consumer Perception and Trust significantly influence Acceptance Intention.

Objectives of the Study

1. To assess the consumer perception towards E20 petrol among petrol vehicle users in Tamil Nadu.
2. To examine the level of trust of petrol vehicle users towards E20 petrol, including its quality, safety, vehicle compatibility and supporting information.
3. To analyze the relationship between consumer perception, trust and acceptance intention towards E20 petrol.
4. To determine the influence of consumer perception and trust on the acceptance intention towards E20 petrol among petrol vehicle users in Tamil Nadu.

Research Methodology

The study adopted a quantitative, empirical and analytical research design to examine consumer perception, trust and acceptance intention towards E20 petrol among petrol vehicle users in Tamil Nadu. The methodology was structured to assess the respondents' perceptions and determine the relationships and influence among the major study variables.

Sources of Data

The study used both primary and secondary data. Primary data were collected from petrol vehicle users in Tamil Nadu through a structured questionnaire. Secondary data were obtained from government publications, policy documents, research articles and relevant industry sources relating to ethanol blending, E20 implementation, consumer concerns and sustainable mobility.

Population and Sample

The population of the study comprised petrol vehicle users in Tamil Nadu. A total of 200 responses were collected, of which 166 complete and usable responses were retained for the final analysis. Thus, the study achieved a usable response rate of 83.00%. The respondents' vehicle age/manufacturing year was also recorded because vehicle compatibility and perceived fuel-efficiency effects are relevant considerations in the consumer discussion surrounding E20.

Research Instrument

Primary data were collected using a structured questionnaire. The attitudinal statements were measured using a five-point Likert scale, ranging from 1 = Strongly Disagree to 5 = Strongly Agree. The questionnaire covered the respondents' profile and three principal constructs: Consumer Perception, Trust towards E20 and Acceptance Intention. Consumer

Perception included perceived environmental benefits, fuel efficiency, vehicle compatibility, performance and economic considerations. Trust towards E20 covered confidence in fuel quality, government information, technical assurance, fuel providers and information transparency. Acceptance Intention captured willingness to continue using E20, accept E20 as the standard petrol blend and recommend or support its use.

Variables of the Study

The proposed relationships were: **Consumer Perception → Trust, Consumer Perception → Acceptance Intention, Trust → Acceptance Intention**. This structure enables the study to examine whether favourable perceptions of E20 are associated with greater trust and acceptance and whether Consumer Perception and Trust significantly contribute to Acceptance Intention.

Reliability and Statistical Analysis

The internal consistency of the measurement items was assessed using Cronbach's Alpha. Descriptive statistics were used to summarize the respondent profile and major study variables. Pearson's Correlation Analysis was employed to determine the direction and strength of the relationships among Consumer Perception, Trust and Acceptance Intention. Multiple Regression Analysis was used to examine the extent to which Consumer Perception and Trust influence Acceptance Intention. The inferential analyses were evaluated at the 5% level of significance. The statistical analysis was conducted using a structured SPSS-based analytical approach.

Conceptual Framework

The conceptual framework of the study is developed to explain how petrol vehicle users form acceptance intentions towards E20 petrol. The framework focuses on three principal constructs: Consumer Perception, Trust towards E20 and Acceptance Intention. The framework is consistent with the empirical objective of examining whether consumers' perceptions of E20 are associated with their trust in the fuel and whether these factors contribute to acceptance intention.

Consumer Perception

Consumer Perception refers to the overall evaluation of E20 petrol by petrol vehicle users. In the present study, this construct incorporates perceptions relating to environmental benefits, fuel efficiency, vehicle compatibility, vehicle performance and economic considerations. A favourable perception may arise when consumers recognize the environmental and energy-security benefits of ethanol blending and perceive E20 as suitable for their vehicles. Conversely, concerns about mileage, compatibility, performance and economic consequences may result in less favourable perceptions.

Trust towards E20

Trust towards E20 refers to the confidence consumers place in the quality, safety, compatibility, regulation and information associated with E20 petrol. It includes confidence in information communicated by government authorities, automobile manufacturers, fuel companies and other relevant stakeholders. Trust is particularly relevant because consumers may not independently verify the technical characteristics of E20. Their acceptance may therefore depend partly on whether they consider the information and assurances provided by relevant institutions to be credible and reliable.

Acceptance Intention

Acceptance Intention represents the respondents' willingness to accept and use E20 petrol. In this study, it encompasses willingness to continue using E20, use E20 in compatible vehicles, accept E20 as the standard petrol blend, consider E20-compatible vehicles and recommend its use in appropriate vehicles. Acceptance Intention is therefore treated as the dependent variable in the study.

Hypotheses of the Study

1. There is a significant positive relationship between Consumer Perception and Trust towards E20 petrol among petrol vehicle users in Tamil Nadu.
2. There is a significant positive relationship between Consumer Perception and Acceptance Intention towards E20 petrol among petrol vehicle users in Tamil Nadu.

3. There is a significant positive relationship between Trust towards E20 and Acceptance Intention towards E20 petrol among petrol vehicle users in Tamil Nadu.
4. Consumer Perception and Trust towards E20 significantly influence Acceptance Intention towards E20 petrol among petrol vehicle users in Tamil Nadu.

Data Analysis and Interpretation

Demographic and Vehicle Profile of the Respondents

Variable	Category	Frequency	Percentage
Age	Below 25 years	24	14.46
	25–34 years	54	32.53
	35–44 years	43	25.90
	45–54 years	28	16.87
	55 years and above	17	10.24
Gender	Male	108	65.06
	Female	58	34.94
Educational Qualification	Higher Secondary	18	10.84
	Undergraduate	56	33.73
	Postgraduate	64	38.55
	Other	28	16.87
Vehicle Age	Below 5 years	61	36.75
	5–10 years	67	40.36
	Above 10 years	38	22.89
E20 Awareness	Aware	139	83.73
	Not aware	27	16.27
Total		166	100.00

Interpretation

The largest proportion of respondents belonged to the **25–34 years** age group (32.53%), followed by those aged **35–44 years** (25.90%). Male respondents constituted 65.06% of the sample, while female respondents accounted for 34.94%. In terms of educational qualification, postgraduates represented the largest group at 38.55%, followed by undergraduate respondents at 33.73%. With regard to vehicle age, **40.36%** of respondents owned petrol vehicles between five and ten years old, while 36.75% had vehicles less than five years old. The remaining 22.89% possessed vehicles older than ten years. A substantial majority of respondents (**83.73%**) reported awareness of E20 petrol, indicating a relatively high level of awareness among the surveyed petrol vehicle users.

Descriptive Statistics of Consumer Perception, Trust and Acceptance Intention

Variables	N	Mean	Std. Deviation
Consumer Perception	166	3.62	0.58
Trust towards E20	166	3.55	0.62
Acceptance Intention	166	3.67	0.60

Interpretation

The mean score for Acceptance Intention was the highest (3.67), followed by Consumer Perception (3.62) and Trust towards E20 (3.55). The results indicate a generally favourable perception and acceptance tendency towards E20 among the respondents. However, the comparatively lower mean score for trust suggests that confidence in E20 is somewhat less pronounced than overall acceptance intention. The standard deviation values indicate a moderate variation in responses across the three constructs.

Item-wise Analysis of Consumer Perception towards E20 Petrol

Consumer Perception towards E20 Petrol

S. No.	Statements	Mean	Std. Deviation
1	E20 petrol contributes to reducing dependence on fossil fuels.	3.74	0.82
2	E20 petrol provides environmental benefits through reduced dependence on conventional petrol.	3.69	0.86
3	I am concerned that E20 may reduce the mileage of my vehicle.	3.48	1.01
4	E20 is compatible with newer petrol vehicles.	3.61	0.87
5	E20 is unlikely to negatively affect normal vehicle performance when used in compatible vehicles.	3.58	0.89
6	The economic benefits of E20 justify its adoption.	3.55	0.91
7	E20 represents an important step towards sustainable transportation in India.	3.76	0.79
Overall Mean		3.62	0.58

Interpretation

The highest mean score was recorded for the statement that E20 represents an important step towards sustainable transportation in India (3.76), followed by its contribution towards reducing dependence on fossil fuels (3.74). Respondents also showed a favourable perception regarding the environmental benefits of E20. However, the statement concerning possible reduction in vehicle mileage recorded a comparatively lower mean score of 3.48, indicating that fuel efficiency remains an important area of consumer concern. The findings suggest that consumers may recognize the sustainability benefits of E20 while simultaneously considering possible effects on vehicle mileage and performance.

Item-wise Analysis of Trust towards E20 Petrol

Trust towards E20 Petrol

S. No.	Statements	Mean	Std. Deviation
1	I trust the quality of E20 petrol supplied through authorized fuel stations.	3.56	0.89
2	I trust government information regarding E20 petrol.	3.52	0.94
3	I believe E20 petrol is adequately regulated for consumer safety.	3.55	0.88
4	I trust automobile manufacturers regarding information about E20 compatibility.	3.50	0.92
5	Fuel companies provide adequate information about E20 petrol.	3.43	0.96
6	I believe information regarding E20 fuel quality is transparent and reliable.	3.49	0.91
7	I feel confident using E20 in a compatible petrol vehicle.	3.76	0.81
Overall Mean		3.55	0.62

Interpretation

The highest mean score was recorded for confidence in using E20 in a compatible petrol vehicle (3.76). Trust in the quality of E20 supplied through authorized fuel stations also received a favourable mean score of 3.56. However, the relatively lower score for the adequacy of information provided by fuel companies (3.43) indicates that information transparency may require greater attention. The findings suggest that while respondents generally express confidence in E20, trust could be strengthened through clearer and more accessible information regarding fuel quality, vehicle compatibility and performance.

Item-wise Analysis of Acceptance Intention towards E20 Petrol

Acceptance Intention towards E20 Petrol

S. No.	Statements	Mean	Std. Deviation
1	I am willing to continue using E20 petrol.	3.71	0.87
2	I am willing to use E20 in a vehicle certified as E20-compatible.	3.83	0.80
3	I would consider purchasing an E20-compatible petrol vehicle in the future.	3.68	0.91

4	I am willing to accept E20 as the standard petrol blend.	3.59	0.96
5	I would recommend the use of E20 in compatible vehicles.	3.64	0.88
Overall Mean		3.67	0.60

Interpretation

The highest mean score was observed for willingness to use E20 in an E20-compatible vehicle (3.83). This indicates that vehicle compatibility may be an important condition underlying consumer acceptance. Respondents also showed a favourable intention to continue using E20 petrol, with a mean score of 3.71. The relatively lower mean score for accepting E20 as the standard petrol blend (3.59) suggests that some respondents may remain cautious about universal adoption despite being willing to use E20 in compatible vehicles.

Pearson Correlation Analysis

Variables	Consumer Perception	Trust	Acceptance Intention
Consumer Perception	1	0.620**	0.680**
Trust	0.620**	1	0.710**
Acceptance Intention	0.680**	0.710**	1

Note: ** Correlation is significant at the 0.01 level (2-tailed).

Interpretation

The Table shows a positive and significant relationship between Consumer Perception and Trust towards E20 ($r = 0.620$, $p < 0.01$). This indicates that respondents with more favourable perceptions of E20 tend to report greater trust in the fuel. Consumer Perception also exhibited a positive and significant correlation with Acceptance Intention ($r = 0.680$, $p < 0.01$). This suggests that favourable perceptions of E20 are associated with stronger willingness to accept the fuel. The strongest relationship was observed between Trust and Acceptance Intention ($r = 0.710$, $p < 0.01$). This indicates that trust is strongly associated with consumers' willingness to accept E20 petrol. Therefore, H_1 , H_2 and H_3 are supported based on the correlation results.

Multiple Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.773	0.598	0.593	0.383

Predictors: Consumer Perception, Trust towards E20; **Dependent Variable:** Acceptance Intention

Interpretation

The regression model produced an R value of 0.773, indicating a strong combined relationship between Consumer Perception, Trust and Acceptance Intention. The R^2 value of 0.598 indicates that approximately 59.8% of the variation in Acceptance Intention can be explained jointly by Consumer Perception and Trust towards E20. The adjusted R^2 of 0.593 indicates that the explanatory power of the model remains substantial after adjusting for the number of predictors.

ANOVA of the Regression Model

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	35.51	2	17.755	121.24	<0.001
Residual	23.89	163	0.1466		
Total	59.40	165			

Dependent Variable: Acceptance Intention.

Predictors: Consumer Perception, Trust towards E20.

Interpretation

The regression model is statistically significant ($F = 121.24, p < 0.001$), indicating that Consumer Perception and Trust jointly provide a significant explanation of variation in Acceptance Intention. The model explains **59.8% of the variance** in Acceptance Intention, while the remaining 40.2% is attributable to factors outside the model and unexplained variation.

Coefficients of Multiple Regression

Model	Unstandardized B	Std. Error	Standardized Beta (β)	t	Sig.
Constant	0.689	0.280	—	2.46	0.015
Consumer Perception	0.403	0.066	0.390	6.15	<0.001
Trust towards E20	0.453	0.061	0.469	7.40	<0.001

Dependent Variable: Acceptance Intention

Interpretation

Consumer Perception has a positive and significant effect on Acceptance Intention ($\beta = 0.390, t = 6.15, p < 0.001$). This indicates that more favourable perceptions of E20 are associated with higher acceptance intention. Trust towards E20 also has a positive and significant influence on Acceptance Intention ($\beta = 0.469, t = 7.40, p < 0.001$). Among the two predictors, Trust has the higher standardized beta coefficient, indicating that it makes the stronger relative contribution to Acceptance Intention. The estimated regression equation is: Acceptance Intention = $0.689 + 0.403$ (Consumer Perception) + 0.453 (Trust). Thus, holding Trust constant, a one-unit increase in Consumer Perception is associated with an estimated 0.403-unit increase in Acceptance Intention. Similarly, holding Consumer Perception constant, a one-unit increase in Trust is associated with an estimated 0.453-unit increase in Acceptance Intention.

Findings of the Study

- Among the 166 respondents, the largest age group was 25–34 years (32.53%), while 65.06% of the respondents were male. About 40.36% owned petrol vehicles between five and ten years old.
- A substantial majority of respondents (83.73%) reported that they were aware of E20 petrol, indicating a relatively high level of awareness among the surveyed petrol vehicle users.
- Consumer Perception recorded an overall mean score of **3.62**, indicating a generally favourable perception of E20. Environmental and sustainability-related aspects received relatively higher scores, while concerns regarding mileage remained evident.

4. Trust recorded an overall mean of **3.55**. Respondents showed relatively greater confidence in using E20 in compatible vehicles, whereas the adequacy and transparency of information provided by fuel companies received comparatively lower scores.
5. Acceptance Intention recorded the highest overall mean of **3.67**. Respondents showed the strongest willingness to use E20 in vehicles certified as E20-compatible.
6. Consumer Perception had a significant positive relationship with Trust ($r = 0.620$, $p < 0.001$), supporting H₁.
7. Consumer Perception was significantly and positively associated with Acceptance Intention ($r = 0.680$, $p < 0.001$), supporting H₂.
8. Trust demonstrated the strongest correlation with Acceptance Intention ($r = 0.710$, $p < 0.001$), supporting H₃.
9. Consumer Perception and Trust jointly explained **59.8% of the variance in Acceptance Intention ($R^2 = 0.598$)**. Both predictors were statistically significant, with Trust ($\beta = 0.469$) making a stronger relative contribution than Consumer Perception ($\beta = 0.390$).
10. All four hypotheses were supported. The results indicate that consumer perception and, particularly, trust are important factors associated with acceptance of E20 petrol among the surveyed petrol vehicle users in Tamil Nadu.

Discussion of Results

The findings indicate that consumer acceptance of E20 petrol is shaped by both Consumer Perception and Trust. The overall mean score for Consumer Perception was 3.62, reflecting a generally favourable evaluation, particularly regarding sustainable transportation and reduced dependence on fossil fuels. However, the comparatively lower score for mileage indicates that fuel efficiency remains an important consumer concern. Trust recorded a mean of 3.55 and showed a strong positive relationship with Acceptance Intention ($r = 0.710$, $p < 0.001$), while also emerging as the stronger predictor ($\beta = 0.469$) compared with Consumer Perception ($\beta = 0.390$). This suggests that acceptance depends not only on favourable perceptions but also on confidence regarding fuel quality, vehicle compatibility, safety, and the credibility of information. The significant relationship between Consumer Perception and Trust ($r = 0.620$, $p < 0.001$) further demonstrates their interconnected nature. The relatively lower mean for information provided by fuel companies (3.43) highlights the need for clearer and more accessible consumer communication. The stronger willingness to use E20 in E20-compatible vehicles also indicates that acceptance is conditional on confidence regarding compatibility. Overall, the findings suggest that successful E20 adoption requires more than technical validation and policy implementation; it also requires transparent, credible, and accessible communication that addresses consumer concerns regarding mileage, compatibility, safety, and long-term vehicle performance.

Managerial and Policy Implications

Since Trust emerged as the stronger predictor of Acceptance Intention, government agencies and fuel companies should provide clear, consistent and evidence-based information regarding E20 composition, vehicle compatibility, fuel efficiency and safety. Information should be communicated in simple language through fuel stations, official websites and consumer-awareness programmes. Fuel retailers can strengthen consumer confidence by clearly displaying E20-related information at dispensing points, including ethanol content and compatibility guidance. Clear communication can reduce uncertainty and help consumers make informed fuel choices. Mileage concerns received relatively weaker perception scores. Automobile manufacturers and fuel companies should therefore communicate realistic information about the expected performance of E20 rather than relying only on general sustainability claims. Vehicle-specific guidance can be particularly useful for owners of older petrol vehicles. Automobile manufacturers should make information regarding E20 compatibility, recommended fuel specifications and vehicle manufacturing-year considerations easily accessible. This can reduce uncertainty and strengthen consumer confidence. The environmental benefits of E20 should be communicated alongside practical information about compatibility, performance and usage. Overly promotional communication may weaken trust if consumers subsequently experience differences in mileage or performance. The government should focus not only on achieving ethanol-blending targets but also on consumer confidence and information transparency. A successful energy transition requires both policy implementation and consumer acceptance. Overall, the findings suggest that trust-building should be treated as an important component of E20 adoption strategy, alongside technical standards, infrastructure and sustainability objectives.

Limitations and Scope for Future Research

The study has certain limitations that should be considered while interpreting its findings. First, the study is based on 166 usable responses from petrol vehicle users in Tamil Nadu and therefore the findings should not be treated as representative of all petrol vehicle users in India. Second, the study uses a cross-sectional research design and captures respondents' perceptions and acceptance intention at a particular point in time. Third, the study relies on self-reported responses, which may be influenced by individual experiences, awareness and access to information about E20. Future research may employ a larger and geographically wider sample covering different states of India to compare regional differences in E20 acceptance. Longitudinal studies could examine whether consumer trust and acceptance change as E20 becomes more established. Future researchers may also compare older and newer petrol vehicles, examine actual fuel-efficiency experiences alongside perceived mileage, and investigate whether trust mediates the relationship between consumer perception and acceptance intention. Comparative studies involving E10, E20 and other alternative fuels could further contribute to understanding consumer responses to India's sustainable-fuel transition.

Conclusion

The study examined consumer perception, trust and acceptance intention towards E20 petrol among petrol vehicle users in Tamil Nadu. Based on 166 usable responses, the findings indicate a generally favourable perception of E20, along with positive levels of trust and acceptance intention. Consumer perception was significantly associated with both trust and acceptance intention, while trust demonstrated the strongest relationship with acceptance intention. The regression results further showed that consumer perception and trust significantly influenced acceptance intention, jointly explaining 59.8% of its variance, with trust emerging as the stronger predictor. The findings indicate that E20 acceptance extends beyond awareness of ethanol blending or its environmental benefits. Consumer confidence in fuel quality, vehicle compatibility, safety and the credibility of information is an important component of acceptance. Therefore, policymakers, fuel companies and automobile manufacturers should support the E20 transition through clear, consistent and accessible consumer information. The study concludes that strengthening trust alongside positive consumer perceptions can contribute to greater acceptance of E20 petrol, supporting a smoother transition towards sustainable transport fuels in Tamil Nadu.

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