

Performance and satisfaction level of customers: A study among CNG Vehicle Users

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Abstract

CNG vehicles as an environmentally friendly and cost-effective alternative to traditional fossil fuel-based vehicles, there is a lack of understanding about the factors that influence customer satisfaction towards this vehicles. However, the success of CNG vehicles depends on the performance and customer satisfaction, which is influenced by various factors, including safety, fuel efficiency, maintenance costs, environmental concerns, and other features. This study aims to investigate the factors that influence customer satisfaction towards CNG vehicles and identify areas for improvement to enhance customer satisfaction and suggest to promote the adoption of CNG vehicles by analyzing performance and user benefits.

Key Words: CNG, CNG Vehicle, Customer satisfaction

Date of Submission: 28-09-2025

Date of acceptance: 08-10-2025

I. INTRODUCTION

Customer satisfaction is a critical aspect of any business, and the automotive industry also. It not only influences customer loyalty and retention but also plays a significant role in shaping the reputation of a brand. This study aims to investigate the performance and level of customer satisfaction towards CNG vehicles.

Compressed Natural Gas (CNG), which has drawn attention for its potential to lower carbon emissions, has emerged as an attractive alternative fuel in the search for ecologically friendly and sustainable transportation alternatives. As the demand for CNG vehicles continues to rise, it is essential to understand the level of satisfaction among customers who have adopted this technology. Exploring the key factors that influence their satisfaction and identifying areas for improvement. By understanding the needs and expectations of CNG vehicle owners, manufacturers and policymakers can work towards enhancing the overall ownership experience, promoting the adoption of cleaner transportation technologies, and contributing to a more sustainable environment. Additionally, the study seeks to explain the features that CNG vehicle owners consider. These benefits whether they be lower greenhouse gas emissions, financial savings, or operational advantages have a major impact on user happiness. Examining these advantages provides a greater understanding of the concrete advantages that motivate people to choose CNG technology when considering their daily mobility requirements.

II. REVIEW OF LITERATURE

Anderson & Brown (2019), in their article published in the Automotive Engineering Journal, highlighted that consumers often perceive Compressed Natural Gas (CNG) vehicles as having lower performance compared to traditional gasoline-powered vehicles. This perception is particularly evident in terms of acceleration, where CNG vehicles are seen as less responsive or slower. This difference in perception could be attributed to the inherent characteristics of CNG engines, which may have different torque and power delivery profiles compared to gasoline engines.

Green et al. (2021), in their article published in Renewable and Sustainable Energy Reviews, highlight that while environmental benefits are a significant factor in the adoption of renewable energy technologies, they are frequently balanced against practical considerations such as cost and performance. This suggests that for renewable energy solutions to be widely adopted, they must not only demonstrate environmental advantages but also be economically viable and perform effectively in comparison to conventional energy sources.

Kim et al. (2022), in their study published in Renewable Energy Focus, compared Compressed Natural Gas (CNG) vehicles with electric and hybrid vehicles. The findings highlighted that CNG vehicles are often

favoured due to their lower upfront costs and the established technology associated with them. This suggests that, despite the growing popularity of electric and hybrid vehicles, CNG vehicles remain a competitive option, particularly in markets where cost and technological familiarity are significant factors.

Singh & Gupta (2021) published in Energy Policy that explores regional variations in Compressed Natural Gas (CNG) vehicle preferences. The study highlights that CNG vehicle adoption rates are higher in regions where government policies are supportive of such initiatives. This could include incentives like subsidies, tax breaks, infrastructure development (e.g., CNG refueling stations), or regulatory measures promoting cleaner fuels.

Wilson et al. (2021), in their study published in the Journal of Marketing Management, emphasized the critical role of public awareness campaigns in addressing misconceptions about Compressed Natural Gas (CNG) vehicle safety and performance. Their research highlights that despite the environmental and economic benefits of CNG vehicles, public adoption is often hindered by widespread misunderstandings regarding their safety and operational efficiency.

III. OBJECTIVES OF THE STUDY

- 1) To identify the satisfaction level of CNG vehicle users.
- 2) To find out the features of CNG vehicles.
- 3) To analyze the performance of CNG vehicle.
- 4) To identify the current and future market situation of CNG vehicles.

CNG

Compressed Natural Gas, is a fossil fuel primarily made up of methane, with small amounts of other gases. It's a cleaner-burning fuel than gasoline or diesel, producing fewer pollutants and emissions. CNG helps reduce dependence on oil and is typically cheaper than gasoline and diesel, making it a cost-effective alternative. Additionally, by producing lower levels of Carbon Monoxide, Particulate matter, and Nitrogen Oxides, CNG contributes to better air quality and environmental sustainability.

Definition of CNG vehicle

CNG vehicles are those that use Compressed Natural Gas as a fuel source instead of traditional gasoline or diesel. They are considered a more environmentally friendly option due to lower emissions compared to conventional fuel vehicles. They use specialized engine and fuel system designed to handle the high-pressure gas.

Features of CNG vehicles

- **Fuel Injection Systems:** CNG vehicles use specialized fuel injection systems designed to deliver Compressed Natural Gas to the engine in a controlled manner.
- **Storage Tanks:** CNG vehicles are equipped with high-pressure storage tanks to contain Compressed Natural Gas.
- **Pressure Regulators:** CNG systems include pressure regulators to ensure a consistent and controlled flow of gas from the storage tank to the engine.
- **Government Incentives:** In some regions, government incentives may be available to encourage the adoption of CNG vehicles, providing financial benefits to consumers or fleet operators.
- **Range:** The range of CNG vehicles can vary based on factors like tank capacity and vehicle efficiency. Dual-fuel systems may extend the range by using gasoline when CNG is unavailable.
- **Lightweight Tanks:** Advancements in tank materials contribute to lightweight yet durable storage tanks in CNG vehicles.
- **Bi-Fuel Capability:** Many CNG vehicles have a bi-fuel system, allowing them to run on both CNG and gasoline, providing flexibility in fuel choices.

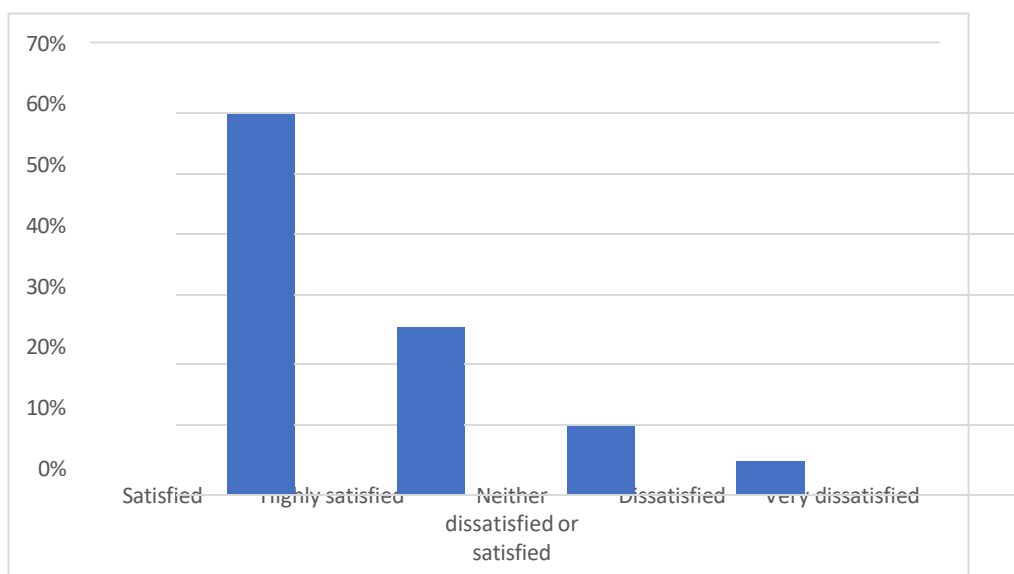
IV. RESEARCH METHODOLOGY

Research methodology is the specific procedures or techniques used to identify, select, process, and analyse information about a topic. This study focuses on the performance and satisfaction level of CNG vehicle users. The study will collect data from owners who have purchased their CNG. A quantitative research approach will be employed, using a survey questionnaire to collect data from a sample of 50 CNG vehicle owners, which will be analyzed using statistical techniques.

V. ANALYSIS AND INTERPRETATION OF DATA

Satisfaction level of users

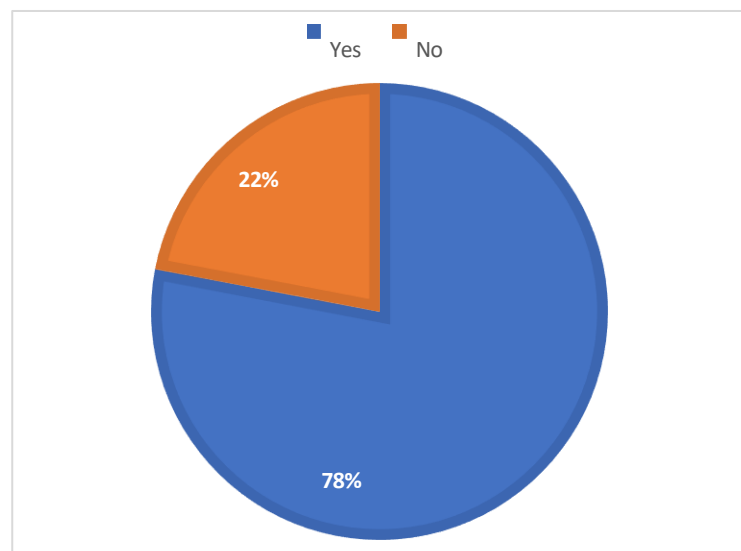
Particular	No. Of respondents	Percentage (%)
Satisfied	30	60%
Highly satisfied	13	26%
Neither dissatisfied or satisfied	5	10%
Dissatisfied	2	4%
Very dissatisfied	0	0%



The above figure shows that 26% of respondents are highly satisfied with CNG vehicles. 60% are satisfied, 10% are neutral, 4% are dissatisfied and 0% are highly dissatisfied.

Safety

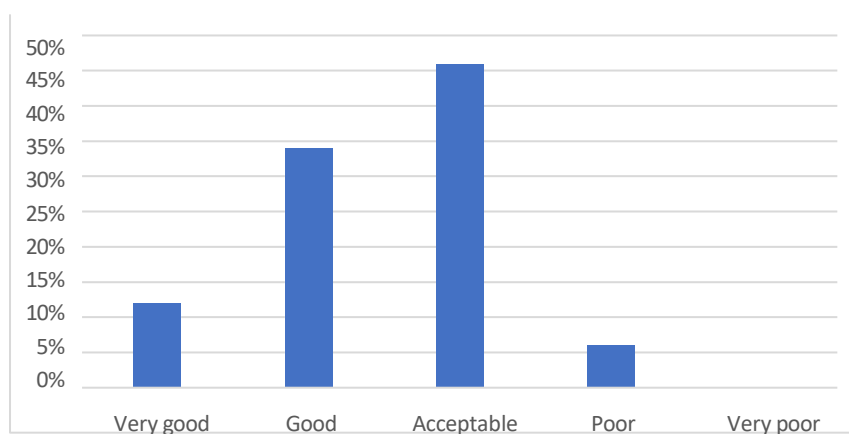
Particular	No. Of respondents	Percentage (%)
Yes	39	78%
No	11	22%



The analysis regarding the safety reveals 78% of respondents agree with safety of CNG vehicle And 22% disagreed.

Service level

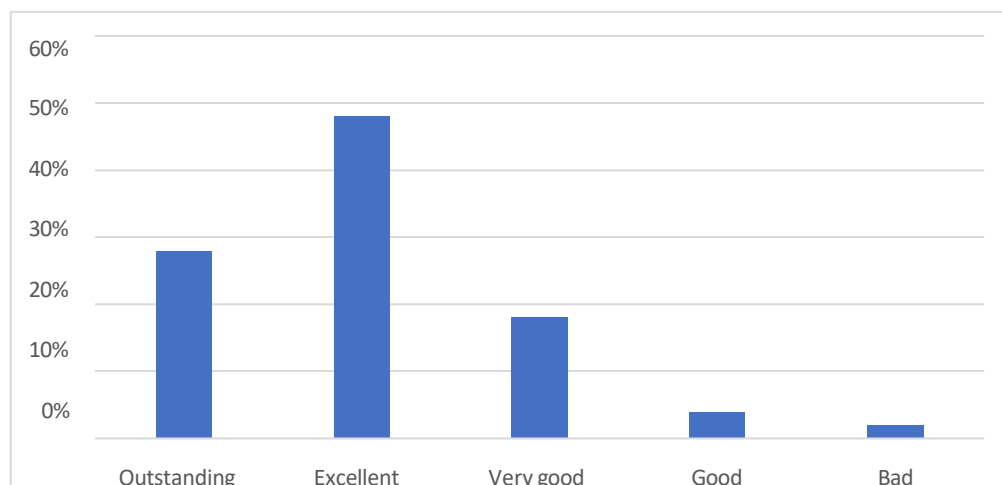
Particular	No. of respondents	Percentage (%)
Very good	6	12%
Good	17	34%
Acceptable	24	48%
Poor	3	6%
Very poor	0	0%



The analysis shows that 12% of the respondents rated very good service level, 34% rated good service level and 48% rated acceptable and 6% rated poor service level and 0% rated very poor rating

Overall performance and satisfaction level

Particular	No. Of respondents	Percentage (%)
Outstanding	14	28%
Excellent	24	48%
Very good	9	18%
Good	2	4%
Bad	1	2%



The above analysis shows 28% of the respondents rated outstanding on the performance & satisfaction rate of CNG vehicle. 48% rated excellent, 18% on very good and 4% on good and 2% on bad

VI. FINDINGS

- From the study most respondents are male 82%.
- Most respondents are using CNG vehicle in below one year 54%.
- 60 percentage of respondent are very satisfied with driving experience in CNG vehicle.
- It clearly understood most respondents are agreed CNG vehicle fuel efficiency is better than other vehicles.
- 42 percentage respondents have lack of availability of CNG refueling stations.
- In this study 50% of people are facing maintenance issues rarely.
- It clearly understood the most respondents have challenging to find spare parts in very difficulty.
- 78 percentage respondents are agreed in case of safety.
- In this study have clearly understood the future market of CNG vehicles will increase.
- 76 percentage of respondents are agreed in CNG vehicles is less expensive than other vehicles.
- 48 percentage of respondents have acceptable rating in services level.

VII. SUGGESTIONS

- The CNG vehicle companies should provide more advertisement and promotional activities through newspaper and internet.
- The government should take more policies to promote CNG vehicles and provide support and make subsidies to the manufactures, producers and consumers of CNG vehicles.
- The companies should make strategies to attract more customers especially women customers and should modify existing price strategy to induce women customers.
- Companies can introduce exhibitions and conduct free trials to inform the public about the features of CNG vehicles.
- The companies should contain on the sale promotion activities to influence customers.

- The government should take action to develop infrastructure facilities to promote the CNG vehicles sector and set up more refueling stations.

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