

Perception of Non-Owners on Jeep Vehicles: Factors Influencing Brand Image and Purchasing Intentions

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Abstract

This study examines the perceptions of non-owners regarding Jeep vehicles, focusing on factors that influence brand image and purchasing intentions within the Ernakulam district of Kerala, India. Employing a descriptive research design with convenience sampling, data was collected from 120 respondents through a structured questionnaire and analyzed using percentage analysis and exploratory factor analysis. The findings reveal that Jeep enjoys a generally favourable brand image, with design, quality, and reliability receiving the most positive ratings from respondents. However, a notable gap exists between brand awareness and actual purchase consideration, as many respondents remained neutral about purchasing a Jeep in the near future, indicating that awareness alone does not translate into purchase intent. Factor analysis identified six key dimensions influencing consumer perceptions: vehicle attributes (safety, technology, after-sales service, fuel efficiency, price, brand history, and off-road capability), brand perception and quality, transactional and promotional factors, personal and familiarity factors, demographic factors, and barriers to purchase. Safety concerns and design apprehensions emerged as primary deterrents, while environmental impact received comparatively lower positive ratings, suggesting a potential vulnerability for the brand in an increasingly eco-conscious market. The study recommends targeted marketing strategies emphasizing value and reliability, enhanced safety features, technological advancements, and improved after-sales services to convert positive perceptions into tangible purchasing outcomes. These findings provide actionable insights for Jeep to strengthen its market position and appeal to potential buyers in the competitive automotive landscape.

Keywords: Brand Perception, Purchasing Intentions, Jeep Vehicles, Consumer Behaviour, Brand Image

1. INTRODUCTION

In today's highly competitive automotive market, understanding consumer perceptions is crucial for brands aiming to enhance their market presence and drive sales. Jeep, known for its distinctive brand identity and robust off-road capabilities, operates in a dynamic environment where consumer opinions significantly impact brand success. As Jeep seeks to expand its customer base, it becomes essential to explore how non-owners perceive the brand and what factors influence their purchasing intentions.

This study investigates the perception of non-owners regarding Jeep vehicles, focusing on the factors that shape their views on the brand and their likelihood of considering a Jeep for future purchases. Jeep's brand image, characterized by its heritage, design, innovation, and environmental impact, plays a significant role in shaping consumer attitudes. By examining these factors, the study aims to uncover the key drivers behind non-owners' perceptions and their impact on purchasing decisions.

The significance of understanding non-owners' perceptions cannot be overstated. Consumers who do not currently own a Jeep may still influence brand success through their purchasing choices and word-of-mouth recommendations. Positive perceptions can lead to increased interest and potential sales, while negative perceptions may pose challenges for the brand. This research will provide valuable insights into how Jeep can enhance its appeal and align its marketing strategies with consumer expectations to attract new customers.

1.1 Problem Statement

In the highly competitive automotive industry, understanding consumer perceptions is essential for brands seeking to expand their market share and attract new customers. Jeep, despite its strong brand identity and reputation for off-road capability and rugged design, faces challenges in converting non-owners into actual buyers. While the brand enjoys recognition and a generally favourable image, there exists a gap between consumer awareness and purchasing intentions among potential customers. Non-owners may hold perceptions influenced by factors such as vehicle attributes, brand image, environmental concerns, pricing, and demographic characteristics, which collectively shape their likelihood of considering a Jeep for future purchase. However, limited research has comprehensively examined the specific factors that influence non-owners' perceptions and purchasing intentions toward Jeep vehicles, particularly within the Indian context.

1.2 Scope of the Study

The study was conducted within the Ernakulam district of Kerala, India, focusing exclusively on non-owners of Jeep vehicles to examine their perceptions and purchasing intentions. The research encompassed a diverse demographic profile including various age groups, gender categories, income levels, and educational backgrounds, with the sample predominantly comprising young adults aged 18-34 who represent the potential target market for future vehicle purchases. Conceptually, the study examined multiple dimensions including brand image attributes (design, quality, reliability, innovation, and environmental impact), vehicle attributes (off-road capability, safety, fuel efficiency, price, technology, and after-sales services), purchasing intentions (likelihood of purchase, recommendation behaviour, and interest in electric/hybrid models), transactional factors (leasing options and promotional events), demographic and personal factors (age, gender, income, education, vehicle ownership, and brand familiarity), and barriers to purchase (safety concerns, design apprehensions, and pricing issues). Methodologically, the research employed a descriptive research design utilizing convenience sampling, with data collected from 120 respondents through a structured questionnaire and analyzed using SPSS through percentage analysis and exploratory factor analysis. The findings are limited to the Ernakulam district and may not be generalizable to other geographic regions or the broader Indian population, and the sample size of 120 respondents, while adequate for factor analysis, may not fully represent the diversity of potential consumers across different socio-economic and cultural backgrounds.

1.3 Research Objectives

1. To evaluate the key factors influencing non-owners' perceptions of Jeep vehicles, including brand image attributes such as design, quality, reliability, innovation, and environmental impact.
2. To assess the purchasing intentions of non-owners toward Jeep vehicles by examining the relative importance of vehicle attributes and identifying primary deterrents to purchase.

2. LITERATURE REVIEW

2.1 Factors Influencing Non-Owners' Perceptions of Jeep Vehicles

Consumer perception of automobile brands is shaped by a combination of functional, symbolic, and experiential attributes, which together form brand image. Studies indicate that product quality, reliability, design aesthetics, and innovation are among the most influential determinants of brand perception in the automotive sector (Brahmi et al., 2025). These attributes not only define the perceived value of a brand but also contribute to long-term reputation and customer trust.

In particular, brand image is strongly mediated by perceptions of product quality and corporate reputation, highlighting the importance of consistent performance and reliability signals (Brahmi et al., 2025). For SUV brands like Jeep, design elements such as rugged styling and off-road capability act as symbolic cues that influence non-owners' perceptions, even before direct ownership experience.

Recent global automotive studies emphasize that consumers increasingly associate brand perception with trust, transparency, and service quality, rather than just technical specifications (Deloitte, 2026). Brand perception is formed cumulatively over time through interactions, marketing communication, and observed performance, making it especially important for non-owners who rely on indirect information (Mintel, 2026).

Innovation and technological advancement have also emerged as key drivers of perception. Automotive innovation—such as connectivity, AI-assisted features, and electrification—shapes how consumers evaluate modern brands (Braidly et al., 2025). Consumers expect constant improvement and technological differentiation, particularly among premium and SUV segments.

Another critical dimension is environmental impact and sustainability perception. Growing environmental awareness has made carbon emissions, fuel efficiency, and eco-friendly technologies essential components of brand image (IEA, 2024). SUVs, including Jeep vehicles, face heightened scrutiny because they are associated with higher emissions, which can negatively influence perceptions among environmentally conscious consumers.

Additionally, green branding, corporate social responsibility (CSR), and environmental transparency significantly influence how consumers perceive automotive brands. Studies show that environmental claims and sustainability initiatives enhance brand image only when perceived as credible; otherwise, they may result in skepticism and reduced trust (Liao & Wu, 2024). Therefore, environmental authenticity plays a vital role in shaping non-owner perceptions.

2.2 Purchase Intentions and Deterrents among Non-Owners

Purchase intention in the automobile sector is widely recognized as a function of perceived value derived from vehicle attributes, including functional performance, symbolic meaning, and economic feasibility (Wang & Tian, 2023). Research shows that both functional attributes (e.g., reliability, safety, fuel efficiency) and symbolic attributes (e.g., brand prestige, lifestyle fit) significantly influence consumers' willingness to purchase a vehicle.

Empirical findings demonstrate that vehicle attributes such as design, safety, and cost-effectiveness directly affect both brand image and purchase intention, with brand image acting as a mediating variable (Fu et al., 2023). This suggests that non-owners may evaluate Jeep vehicles based on perceived attributes even before forming a purchase decision.

Economic factors remain one of the strongest determinants. Studies consistently find that price affordability, fuel cost, maintenance expenses, and resale value are critical in shaping purchase intentions and often serve as deterrents (Nirmala & Gunasekaran, 2025). Rising vehicle costs globally have intensified price sensitivity, making affordability a primary concern for potential buyers (Deloitte, 2024).

Another determinant is environmental awareness, which moderates purchase intention. Consumers with higher environmental consciousness are more inclined toward eco-friendly vehicles and may avoid brands perceived as

environmentally harmful (Zamil et al., 2023). For SUVs like Jeep, perceived high emissions may act as a deterrent unless offset by hybrid or electric offerings.

Moreover, design aesthetics and perceived ease of use play a significant role in influencing purchase intention, particularly among younger consumers (Sun & Lee, 2024). Attractive design and user-friendly features enhance perceived usefulness and emotional appeal, thereby increasing purchase likelihood.

Brand-related perceptions such as trust, reliability, and brand association are also crucial drivers. Research indicates that perceived reliability and trustworthiness significantly increase purchase intention, while negative brand associations can deter potential buyers (Nirmala & Gunasekaran, 2025).

Deterrents to purchase are often linked to:

- High initial cost and financing issues
- Concerns about reliability and maintenance
- Negative environmental impact
- Limited innovation compared to competitors
- Weak perceived value relative to alternatives

Additionally, increasing brand-switching tendencies among consumers indicate that non-owners are open to exploring alternative brands if perceived value is higher elsewhere (Deloitte, 2025). This highlights the competitive pressure on brands like Jeep to align product attributes with evolving consumer expectations.

2.3 Conceptual Framework

Based on the literature review, a conceptual framework was developed to guide this study. The framework posits that non-owners' perceptions and purchasing intentions toward Jeep vehicles are influenced by six key dimensions: (1) vehicle attributes (safety, technology, after-sales service, fuel efficiency, price, brand history, off-road capability); (2) brand perception and quality (innovation, quality, design, environmental impact, reliability); (3) transactional and promotional factors (leasing options, recent purchase, sponsored events); (4) personal and familiarity factors (gender, vehicle ownership, brand familiarity); (5) demographic factors (age, income); and (6) barriers to purchase (deterrents, education). These dimensions collectively shape brand image and ultimately influence purchasing intentions among non-owners.

3. METHODOLOGY

This study employed a descriptive research design to systematically investigate the perceptions of non-owners regarding Jeep vehicles and the factors influencing their brand image and purchasing intentions. The descriptive design was appropriate as it allowed for the systematic collection and analysis of data to describe the characteristics of the sample and the relationships among variables.

3.1 Sampling Technique

Data was collected using a structured questionnaire administered to a sample of 120 respondents selected through convenience sampling across the Ernakulam district in Kerala. Convenience sampling was chosen due to its practicality and cost-effectiveness, allowing for the collection of data from readily available respondents within the study area. While this sampling technique has limitations in terms of generalizability, it was deemed appropriate for this exploratory study.

3.2 Data Collection Instrument

The questionnaire was designed to capture data on brand perception, vehicle attributes, purchasing intentions, and demographic details, utilizing Likert scales to measure participant responses. The instrument comprised four sections: (1) demographic information (age, gender, income, education, vehicle ownership); (2) brand perception indicators (overall impression, quality, reliability, design, innovation, environmental impact); (3) vehicle attributes and purchasing intentions (safety, technology, after-sales service, fuel efficiency, price, brand history, off-road capability, leasing options, recent purchase consideration); and (4) barriers to purchase. The Likert scale ranged from 1 (strongly disagree) to 5 (strongly agree) for attribute-related questions, and from 1 (poor/negative) to 5 (excellent/positive) for perception indicators.

3.3 Data Analysis

To analyze the collected data, the study utilized the Statistical Package for the Social Sciences (SPSS). A percentage analysis was first conducted to provide a descriptive overview of the demographic distribution and response patterns within the sample. Subsequently, factor analysis was employed as a data reduction technique to identify the underlying latent dimensions or factors that significantly influence respondents' perceptions and preferences towards Jeep vehicles, effectively grouping correlated variables for a clearer interpretation of consumer attitudes. Prior to conducting factor analysis, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity were computed to assess the suitability of the data for factor analysis. Principal component analysis with Varimax rotation was employed to extract factors, and factors with eigenvalues greater than 1.0 were retained. Factor loadings above 0.35 were considered meaningful for interpretation.

4. RESULTS AND DISCUSSION

4.1 Demographic Characteristics of Respondents

Demographic Variable	Category	Percentage
Age	18-24	85%
	25-34	7%
	35-44	2%
	45-54	1%
	55-64	1%
Gender	Under 18	4%
	Male	65%
Income Level	Female	35%
	Under 25,000	70%
	25,000-50,000	12%
	50,000-75,000	4%
Education	75,000-100,000	6%
	Bachelor's Degree	53%
	Master's Degree	31%
	High School or less	9%
	Doctorate	4%
Vehicle Ownership	Other	3%
	No	53%
	Yes	47%

Table 1. Demographic Characteristics of Respondents (N=120)

The demographic analysis of the 120 respondents, as shown in Table 1, proves that the majority of participants were young adults, with 85% falling within the 18-24 age category. This was followed by 7% in the 25-34 age group, while only 4% were under 18 years of age. The gender distribution indicated a predominance of male respondents, comprising 65% of the sample, compared to 35% female respondents. Regarding income levels, a substantial majority (70%) reported earning under 25,000, with only 12% in the 25,000-50,000 bracket and 6% in the 75,000-100,000 range. In terms of educational attainment, over half of the respondents (53%) held a Bachelor's Degree, followed by 31% with a Master's Degree, while only 9% had a high school education or less. Notably, vehicle ownership was nearly evenly split, with 53% of respondents not owning a vehicle and 47% owning one. These findings suggest that the sample predominantly consists of young, educated males with lower income levels, many of whom are potential first-time vehicle buyers. The predominance of younger respondents (18-24 years) is consistent with the sampling approach that targeted easily accessible university students and young professionals in the Ernakulam district.

4.2 Brand Perception Indicators

Attribute	Excellent/Positive	Good	Average	Poor/Negative
Overall Impression	35%	40%	20%	5%
Quality	44%	35%	15%	6%
Reliability	41%	38%	16%	5%
Design/Aesthetics	49%	32%	14%	5%
Innovation	37%	35%	20%	8%
Environmental Impact	35%	30%	25%	10%

Table 2. Brand Perception Indicators

The brand perception analysis revealed in Table 2 shows predominantly positive attitudes toward Jeep vehicles across all measured attributes. Design and aesthetics emerged as the strongest attributes, with 49% of respondents rating it as excellent, followed by quality (44% excellent) and reliability (41% excellent). Overall impression was rated positively by 75% of respondents (35% very positive and 40% positive), indicating a generally favourable view of the Jeep brand. Innovation was perceived positively by 72% of respondents (37% very innovative and 35% innovative), while environmental impact received the most mixed responses, with 35% rating it positively, 25% neutral, and 10% negatively. The relatively lower positive rating for environmental impact (35%) suggests this may be an area of concern for potential buyers. These findings collectively indicate that Jeep is perceived favourably in terms of design, quality, and reliability, which are critical factors in automotive purchase decisions, though environmental considerations may require greater attention in brand positioning strategies. The positive design perception aligns with Jeep's distinctive styling and rugged aesthetic, which has been consistently emphasized in the brand's marketing communications.

4.3 Exploratory Factor Analysis of Factors Influencing Non-Owners' Perceptions and Purchasing Intentions Toward Jeep Vehicles

Before conducting factor analysis, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity were computed to assess the suitability of the data for factor analysis. The KMO value was 0.817, which exceeds the recommended threshold of 0.60, indicating that the sample size was adequate and the variables shared sufficient common variance for factor analysis. Bartlett's Test of Sphericity yielded a significant result (Approx. Chi-Square = 2317.275, df = 300, $p < .001$), rejecting the null hypothesis that the correlation matrix is an identity matrix. This confirms that the variables are sufficiently correlated to proceed with factor analysis, as the significant chi-square value indicates that the correlation matrix is not random.

Variables	Component					
	1	2	3	4	5	6
1. Safety	0.782					
2. Technology	0.765					
3. After-Sales	0.743					
4. Fuel Efficiency	0.721					
5. Price	0.698					
6. Brand History	0.654					
7. Off-Road	0.632					
8. Innovation		0.789				
9. Quality		0.765				
10. Design		0.743				
11. Environmental Impact		0.712				
12. Reliability		0.698				
13. Leasing Options			0.823			
14. Recent Purchase			0.798			
15. Sponsored Events			0.754			
16. Gender				0.812		
17. Vehicle Ownership				0.789		
18. Brand Familiarity				0.743		
19. Age					0.821	
20. Income					0.798	
21. Deterrents						0.845
22. Education						0.712
Eigen values	8.983	3.167	2.346	1.663	1.295	1.084
Percentage of total variance	35.933	12.666	9.38	6.651	5.182	4.337

Table 3. Pattern Component Matrix, Eigen Values and Total Variance Percentage for Components obtained by Principal Component Analysis with Varimax Rotation Method

Note: Factor loadings <.35 have been omitted from the table.

The rotated component matrix shown in Table 3, employing Varimax rotation with Kaiser Normalization, revealed a clear six-factor structure with all variables loading substantially (>.632) on their respective components. The total variance explained by the six factors was 74.149%, indicating a robust factor solution.

Factor 1: Vehicle Attributes – This component demonstrated strong loadings from seven variables including Safety (.782), Technology (.765), After-Sales (.743), Fuel Efficiency (.721), Price (.698), Brand History (.654), and Off-Road capability (.632). This factor, accounting for 35.933% of the variance, represents the core functional attributes that consumers consider when evaluating Jeep vehicles. The dominance of this factor suggests that practical considerations regarding vehicle performance, cost, and service form the foundation of consumer evaluations.

Factor 2: Brand Perception and Quality – This component comprised five variables with loadings ranging from .698 to .789: Innovation (.789), Quality (.765), Design (.743), Environmental Impact (.712), and Reliability (.698). This factor explained 12.666% of the variance and reflects the perceptual and qualitative dimensions that shape brand image. The inclusion of environmental impact within this factor, alongside traditional quality indicators, indicates that sustainability perceptions are increasingly integrated into overall brand evaluations.

Factor 3: Transactional and Promotional Factors – This component included Leasing Options (.823), Recent Purchase (.798), and Sponsored Events (.754), accounting for 9.380% of the variance. This factor captures the influence of transaction-related considerations and promotional activities on consumer engagement. The high loadings for leasing options suggest that flexible financing arrangements may be particularly important for the predominantly young, lower-income sample.

Factor 4: Personal and Familiarity Factors – This component demonstrated loadings from Gender (.812), Vehicle Ownership (.789), and Brand Familiarity (.743), explaining 6.651% of the variance. This factor highlights the role of individual characteristics and prior exposure in shaping perceptions. The gender loading suggests that male and female respondents may evaluate Jeep vehicles differently, possibly due to differing perceptions of the brand's masculine-oriented marketing.

Factor 5: Demographic Factors – This component included Age (.821) and Income (.798), contributing 5.182% to the variance, indicating the importance of life stage and economic standing in purchase considerations. The strong loading for age reflects the predominance of young adults in the sample and their potentially different purchasing priorities.

Factor 6: Barriers and Educational Factors – This component comprised Deterrents (.845) and Education (.712), explaining 4.337% of the variance and representing obstacles to purchase and the influence of educational background on consumer attitudes. The high loading for deterrents suggests that safety concerns, design apprehensions, and pricing issues significantly impact purchase decisions.

4.4 Discussion

The findings of this study provide meaningful insights into the perceptions of non-owners regarding Jeep vehicles, revealing a complex interplay of factors that shape brand image and influence purchasing intentions. The demographic profile of respondents, predominantly consisting of young, educated males with lower income levels, suggests that Jeep's potential customer base among non-owners is concentrated in a demographic segment that values affordability, technological innovation, and contemporary design. This observation aligns with the broader automotive market trends where younger consumers increasingly prioritize value propositions that combine functionality with aesthetic appeal. The near-even split between vehicle owners and non-owners in the sample further indicates a substantial market opportunity for Jeep to capture first-time buyers who may be more receptive to brand messaging that emphasizes distinctive attributes and competitive positioning.

The factor analysis revealed that vehicle attributes, including safety, technology, after-sales service, fuel efficiency, and price, constitute the most significant dimension influencing consumer perceptions, accounting for the largest portion of explained variance. This finding underscores the pragmatic considerations that dominate purchase decisions among potential buyers, suggesting that while brand heritage and off-road capability remain important, consumers ultimately evaluate vehicles based on their functional utility and overall value proposition. The emergence of brand perception and quality as the second most important factor highlights the critical role of innovation, design, and reliability in shaping favorable attitudes toward Jeep. The relatively lower positive perception of environmental impact indicates a potential vulnerability for the brand in an increasingly eco-conscious market, where consumers are progressively more attentive

to sustainability considerations. The identification of transactional factors, personal characteristics, demographic variables, and barriers to purchase as additional influencing dimensions collectively demonstrates that non-owners' purchasing intentions are shaped by a multifaceted set of considerations that extend beyond product attributes alone, necessitating a holistic marketing approach that addresses both rational and emotional decision-making drivers.

The gap between positive brand perception and actual purchase intention warrants particular attention. Despite 75% of respondents expressing a favourable overall impression of Jeep, a substantial proportion remained neutral about purchasing one in the near future. This suggests that while the brand has successfully established a positive image, barriers such as pricing concerns, safety apprehensions, and perceived environmental impact impede conversion to actual purchase. The high loading of deterrents in Factor 6 confirms that these barriers significantly influence purchasing decisions.

5. CONCLUSION

This study examined the perceptions of non-owners regarding Jeep vehicles, revealing that purchasing intentions and brand image are shaped by a complex interplay of vehicle attributes, brand perception, and demographic factors. While Jeep enjoys a generally favourable brand image characterized by positive perceptions of design, quality, and reliability, a notable gap exists between brand awareness and actual purchase consideration. The dominance of vehicle attributes as the primary influencing factor underscores the pragmatic nature of consumer decision-making, where safety, technology, fuel efficiency, and price take precedence over emotional associations. The identification of specific deterrents, particularly safety concerns and design apprehensions, provides actionable insights for addressing barriers to purchase. Future research should consider employing probability sampling techniques to enhance generalizability. Comparative studies examining perceptions across different geographic regions and cultural contexts would provide a more comprehensive understanding of brand positioning strategies. Longitudinal research tracking changes in perceptions over time would reveal the impact of marketing initiatives and product developments.

REFERENCES

- [1] Braidy, A., Pokharel, S., & ElMekkawy, T. Y. (2025). Research Perspectives On Innovation In The Automotive Sector. *Sustainability*, 17(7), 2795.
- [2] Brahmi, M., Hussain, Z., Majeed, M. U., Khan, A., Qureshi, M. A., & Bansal, R. (2025). Corporate Social Responsibility's Influence On Brand Image In The Automotive Sector. *Administrative Sciences*, 15(4), 121.
- [3] Deloitte. (2023). Global automotive consumer study 2023.
- [4] Deloitte. (2024). Global automotive consumer study 2024.
- [5] Deloitte. (2025). Global automotive consumer study 2025.
- [6] Deloitte. (2026). Global automotive consumer study 2026.
- [7] Fu, Z., Jung, J.-S., Niu, S., & Yi, L. (2023). The Influence Of Electric Vehicle Attributes On Brand Image And Purchase Intention. *Journal of Global Business and Trade*, 19(3), 1–23.
- [8] International Energy Agency (IEA). (2024). SUVs Are Setting New Sales Records Each Year—And So Are Their Emissions.
- [9] Liao, Y., & Wu, L. (2024). The Influence Of Brand Greenwashing On EV Purchase Intention. *World Electric Vehicle Journal*, 15(7), 313.

- [10] Mintel. (2026). US perceptions of auto brands.
- [11] Nirmala, D. V., & Gunasekaran, N. (2025). Factors Influencing Consumers' Purchase Intentions For Passenger Cars.
- [12] Sun, Z., & Lee, B. (2024). Exploring Factors Influencing Electric Vehicle Purchase Intentions. *Vehicles*, 6(3), 1513–1544.
- [13] Wang, Y., & Tian, Y. (2023). The Impact Of New Energy Vehicle Product Attributes On Consumer Purchase Intention. *Sustainability*, 15(3), 1989.
- [14] Zamil, A. M. A., Ali, S., Akbar, M. A. M., Zubr, V., & Rasool, F. (2023). Consumer purchase intention toward hybrid electric cars. *Frontiers in Environmental Science*, 11.