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# Scenario-Based Analysis of High-End New Energy Vehicle User Demands

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## ABSTRACT

With the rise in global environmental awareness and the rapid development of new energy technologies, high-end new energy vehicles (NEV) have become an important direction for the automotive industry. Consumer demand is evolving from merely seeking a means of transportation to desiring a comprehensive experience across various scenarios, emphasizing high quality, high performance, and environmental friendliness. Understanding the characteristics and trends of high-end NEV users' demands is crucial for car manufacturers in formulating market strategies, product design, and service improvement. However, current focus is often on policies and product design, lacking analysis of actual usage scenarios. To address this gap, this article employs scenario research methods to delve into the needs of high-end NEV users, selecting typical scenarios such as urban commuting, long-distance travel, and business operations. The research indicates that high-end NEV users are primarily young, highly educated, middle-to-high income individuals who exhibit rational consumption habits. Their most common usage scenarios include commuting to work, transporting family members, and shopping. In these contexts, there is a pronounced demand for vehicle safety performance, ride comfort, and intelligent features, each showing differentiated characteristics across various user groups. For instance, female users demonstrate a particularly strong preference for comfort-related configurations, whereas married users with children have the highest demand for spacious and convenient features. Based on these insights, this paper offers targeted recommendations from the perspectives of product design and marketing.

## KEYWORDS

High-End New Energy Vehicles; Usage Scenarios; User Demands; User Experience

## 1. INTRODUCTION

With the rise in global environmental awareness and the rapid development of new energy technologies, high-end NEV have garnered significant attention as an important direction for the automotive industry. Concurrently, amidst consumption upgrading, consumer demand for cars has evolved from basic transportation needs to comprehensive experiences across various scenarios, increasingly emphasizing high quality, high performance, and environmental friendliness. High-end NEV, which focus on technological innovation, luxury positioning, intelligence, and green sustainability, are showing strong growth momentum, driving the automotive industry towards a more sustainable and intelligent future. Traditional car design focused more on performance and safety, while modern consumers' expectations have shifted from single functionality to comprehensive experiences, including comfort, convenience, and entertainment. This shift requires manufacturers to pay more attention to actual usage scenarios and user experiences in design and technological innovation. More and more car companies realize that they not only need to focus on the product

itself but also need to meet users' experiential demands in various scenarios. A good user experience can significantly enhance consumer loyalty to the brand and increase market competitiveness, becoming a new focus of competition for car companies.

## 2. RESEARCH BACKGROUND

In the field of NEV user research, existing literature extensively discusses various aspects such as user demographics, purchasing preferences, and user satisfaction. In terms of user demographics and purchasing preferences, Zhu Yongsheng et al. (2017) found that younger groups prefer hybrid vehicles, while female or highly educated groups tend to favor plug-in hybrid vehicles; conversely, older, low-income, or less educated groups prefer pure electric vehicles. Wang Xing et al. (2023) found that demographic characteristics of private NEV users are closely related to their vehicle purchase, usage, and charging behaviors. Liu Rong et al. (2020) focused on the impact of user experience on the acceptance of pure electric vehicles, revealing that factors such as battery life, range, low noise, and low emissions play critical intermediary roles. On the level of user satisfaction, Gu Hongjian et al. (2019) deeply analyzed the basic characteristics, purchasing habits, and vehicle usage behaviors of different user groups, and provided forward-looking predictions on future user demands and market trends. Fan Huangjian (2022) revealed that user dissatisfaction with NEV mainly centers around range, battery performance, charging convenience, vehicle design, interior quality, and vehicle performance. Dejin Su et al. (2020) empirically pointed out that NEV user satisfaction is influenced by practicality, ease of use, total cost, range, and infrastructure completeness. These studies not only provide in-depth insights into the characteristics of NEV market users but also offer valuable references for car manufacturers and policymakers. However, the scope of existing research subjects is relatively broad, and there is no specific study on high-end NEV users.

In terms of NEV user demand, current research widely employs diverse channels such as online reviews and complaint data to capture user demand dynamics and explore the influencing factors of NEV user demands. For instance, Yuan Xiandong (2023) focused on extracting keywords from user comments on NEV appearance, interior, space, configuration, and other functional performance dimensions to gain insights into users' psychological needs and interests. Li Qiaoxing et al. (2023) and Wang Xiaoguang et al. (2023) proposed an innovative user demand mining method, using deep mining of online review sentiments and complaint information classifications to understand user focus and satisfaction with various product attributes, identifying key pain points in user feedback. The study found that NEV users particularly emphasize service and quality. Yu Shuxiu et al. (2022) deeply analyzed the impact of fiscal subsidies and new charging infrastructure policies on NEV consumer demands. However, these studies mainly focus on NEV support policies and product design, with insufficient analysis of actual usage scenarios.

This article aims to deeply explore and analyze the current state and future trends of high-end NEV user demands through scenario-based research methods, accurately capturing users' feelings and needs in actual usage, including but not limited to driving comfort, operational convenience, and riding experience. This study selects multiple typical driving scenarios, such as urban commuting, long-distance travel, and business operations, to study high-end NEV user demands, aiming to gain a comprehensive and in-depth understanding and provide valuable suggestions for the automotive industry to fill the gaps in existing research.

## 3. OBJECTS AND METHODS

### 3.1. Objects

The research objects of this study are owners of high-end NEV. In terms of vehicle selection, the study surveyed 20 high-selling and mainstream high-end NEV models in the market, including 14

pure electric vehicles, 6 plug-in hybrids, and range-extended hybrids, covering all major NEV brands in the market, including domestic brands like Dongfeng Voyah, GAC Trumpchi, SAIC Feifan, Geely Lynk & Co, BYD Denza, Changan Avita, foreign brands like Tesla, BMW, Mercedes-Benz, and internet car-making forces like NIO, Li Auto, Xpeng, AITO, and HiPhi.

In terms of city selection, the study followed the principles of (1) high NEV ownership, (2) wide distribution of NEV types, (3) covering first-tier cities, some new first-tier cities, second-tier cities, and third-tier and above cities. Finally, the study selected 19 cities, including first-tier cities Beijing, Shanghai, Guangzhou, Shenzhen; new first-tier cities Hangzhou, Chengdu, Suzhou, Chongqing, Xi'an; second-tier cities Wuxi, Foshan, Jinhua, Hefei, Jinan; and third-tier and above cities Hohhot, Yangzhou, Linyi, Baoding, and Yinchuan for quantitative research.

In terms of car owner selection, the requirements were: car owners who purchased the car within 3-12 months, were the primary decision-makers, and the main users of the car; aged 22-55, with diverse occupations and industries; had not participated in any market survey within the past 6 months, and were not employees in the automotive or survey-related industries; familiar with the car models, clear-minded, opinionated, expressive, and very interested in the NEV field. A total of 1000 quantitative survey samples were collected, with 18 invalid samples removed, resulting in 982 valid samples and a sample validity rate of 98.2%.

### 3.2. Methods

The survey questionnaire encompassed three primary aspects: user attributes, usage scenarios, and functional configuration demands. User attributes included demographic characteristics, personal values, and vehicle ownership status. Usage scenarios were framed within the "people-car-environment" model, encompassing key usage contexts such as urban commuting, long-distance travel, and business operations, with detailed descriptions for each scenario. Functional configuration demands were categorized into eight areas, including comfort, safety, and intelligent cockpits.Detailed user experience data were gathered through various question types, including rating scales, single-choice, multiple-choice, and open-ended questions. Data analysis was conducted using descriptive statistics and cross-analysis methods to provide comprehensive insights into user preferences and behaviors.

## 4. RESULTS ANALYSIS

### 4.1. High-End NEV User Profile

#### 4.1.1. Age Distribution

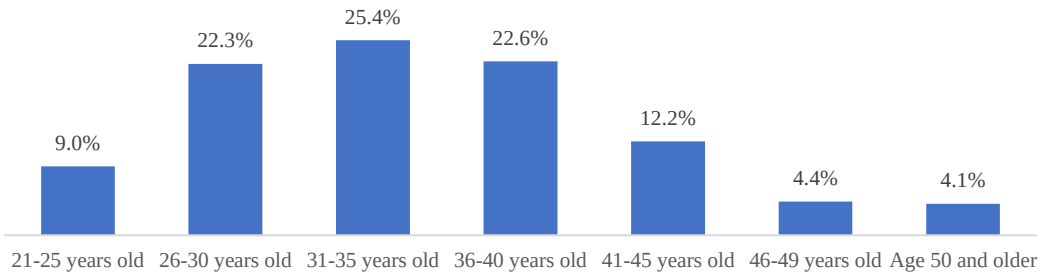


**Figure 1.** Age distribution of high-end NEV users

The results show that high-end NEV users are mainly concentrated in the young and middle-aged groups. Users aged 26-35 account for the highest proportion at 52.4%.

### 4.1.2. Education Level

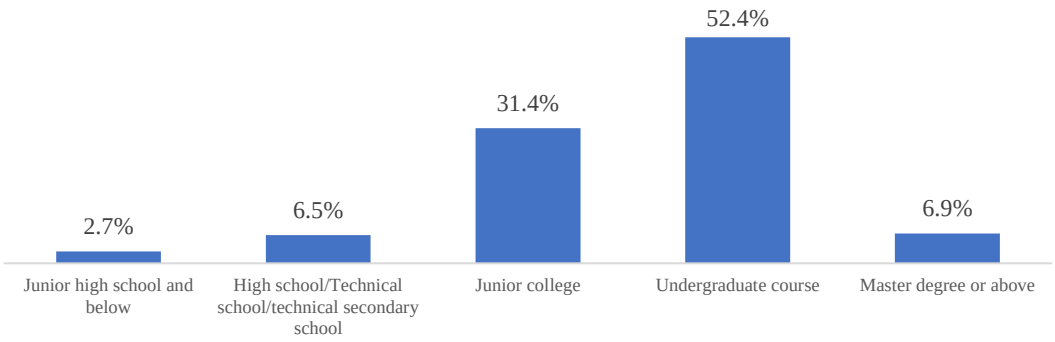


**Figure 2.** Education level of high-end NEV users

In terms of education level, high-end NEV users generally have a higher educational background. Users with a bachelor's degree or higher account for 66.6% (bachelor's degree 41.0%, master's degree or higher 25.6%), significantly higher than the social average. This indicates that high-end NEV users are more receptive to new technologies and concepts, with strong environmental awareness and social responsibility.

### 4.1.3. Gender and Marital Status


**Figure 3.** Gender of high-end NEV users

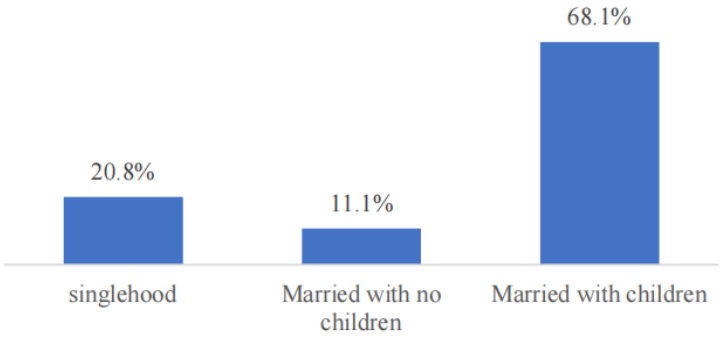


**Figure 4.** Marital status of high-end NEV users

In terms of gender distribution, male users dominate among high-end NEV users. In terms of marital status, users who are married with children account for a higher proportion (20.8%), indicating that these users may pay more attention to the convenience and environmental friendliness of family travel.

### 4.1.4. Personal and Household Income Characteristics

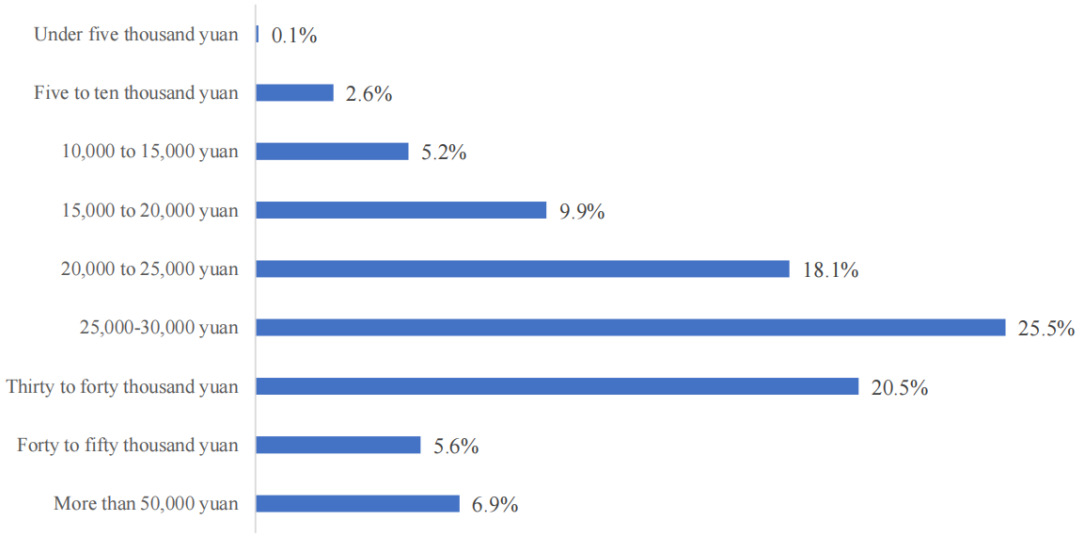


**Figure 5.** Monthly household income of high-end

In terms of monthly household income, the characteristics show a middle-to-high income level. The proportion of households with a monthly income of 15,000-18,000 RMB is 16.6%, 18,000-20,000 RMB is 12.4%, 20,000-25,000 RMB is 8.5% + 18.1%, 25,000-30,000 RMB is 25.5% + 2.7%, 30,000-40,000 RMB is 20.5%, and the proportion in higher income brackets is also relatively high.

### 4.1.5. Vehicle Function Demand Characteristics

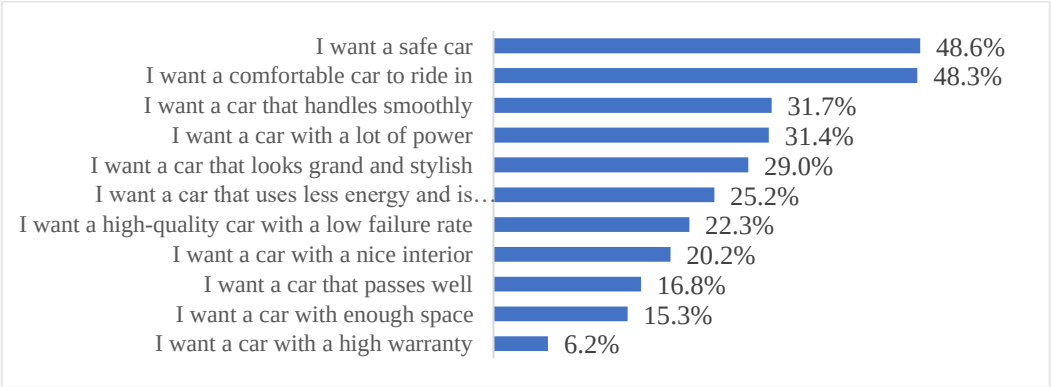


**Figure 6.** High-End NEV User Vehicle Function Demand

In terms of vehicle function demand, the primary focus is on safety performance and ride comfort. High-end NEV users have a significant demand for vehicle safety performance (48.6%) and ride comfort (48.3%). Additionally, there is a coexisting demand for smooth handling and power. The need for powerful performance (31.4%) is also evident. Exterior design (31.4%) as an additional function demand is equally important to high-end NEV users.

### 4.1.6. Emotional Demand Characteristics

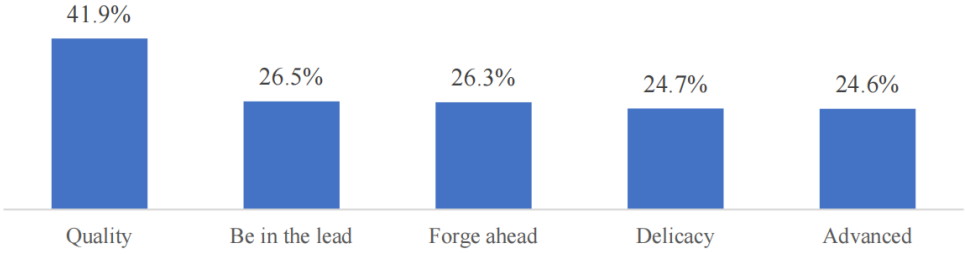


**Figure 7.** High-End NEV User Emotional Demand

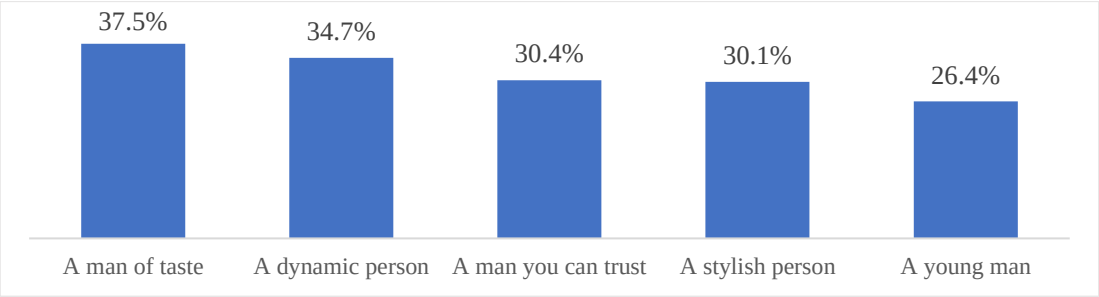


**Figure 8.** Top 5 Personal Images Users Want to Project through Their Cars

High-end NEV users exhibit diverse emotional demands, which can be broadly categorized into a comprehensive pursuit of quality, leadership, innovation, and exquisite design. These users tend to project personal images through their vehicles that emphasize qualities such as sophistication, vitality, trustworthiness, fashion, and youthfulness. This self-identity and pursuit of excellence are clearly reflected in their choice of NEVs, aligning their vehicle preferences with their personal values and lifestyle aspirations.

#### 4.1.7. Consumption Style

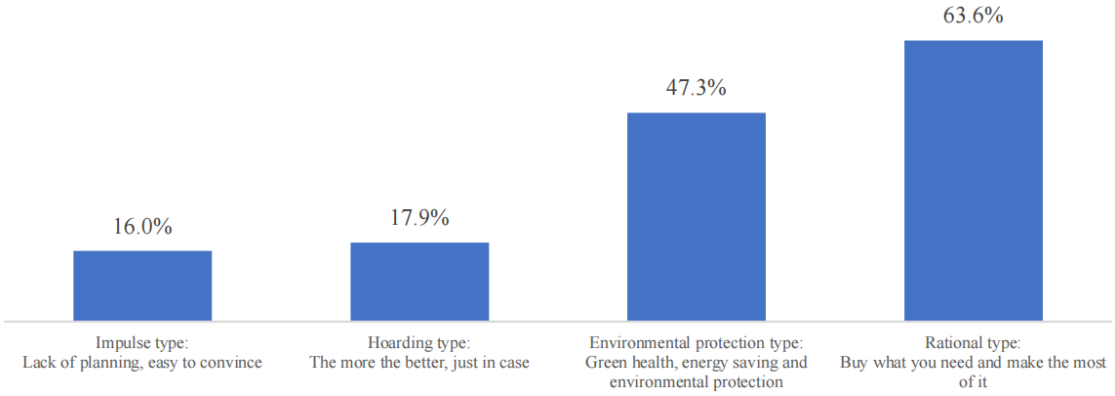


**Figure 9.** High-End NEV User Consumption Style

In terms of consumption style, high-end NEV users predominantly have a rational consumption style, with 64.6% indicating "only buy when needed, make the most of it." Additionally, a portion of users has an environmentally conscious consumption style, accounting for 47.3%, signifying "green health, energy-saving, and environmental protection."

### 4.2. Analysis of High-End NEV User Demands

#### 4.2.1. Usage Scenario Analysis

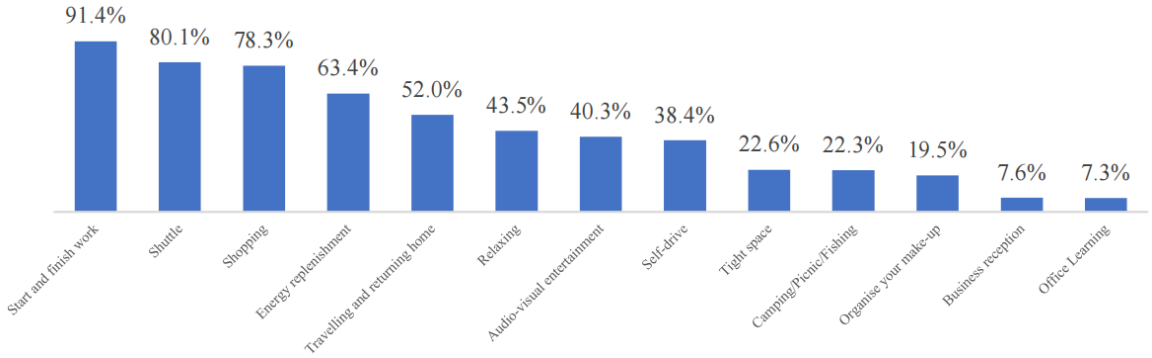


**Figure 10.** High-End NEV User Usage Scenarios

Among high-end NEV users, personal commuting constitutes the highest usage proportion, reaching 91.4%. This statistic underscores that the primary usage scenario for most high-end NEV users is personal travel, emphasizing the suitability of NEVs for meeting daily commuting needs. Family transportation accounts for 80.1%, indicating that family usage is also a significant consideration for these users. Additionally, shopping or business-related travel accounts for 78.3%, reflecting that a substantial portion of high-end NEV users utilize their vehicles for these purposes as well.

### 4.2.2. Function Configuration Demand

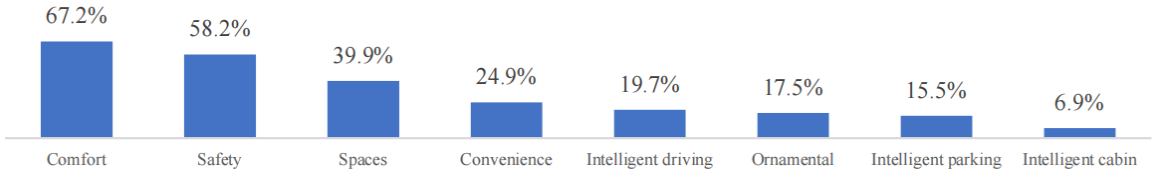


**Figure 11.** High-End NEV User Function Configuration Demand

In terms of functional configuration demand, comfort ranks highest at 67.2%, indicating that high-end NEV users place significant importance on vehicle ride comfort. This includes elements such as seat comfort, air conditioning performance, and in-car fragrance, with users expecting a holistic comfort experience while driving. Safety demand ranks second at 58.2%, underscoring the priority that high-end NEV users assign to vehicle safety performance. This encompasses protection systems, monitoring systems, and alert functions, with users seeking comprehensive safety assurance while on the road. Space demand ranks third at 39.9%, highlighting a strong demand for optimal vehicle interior layout and storage capacity.

Although the demand for intelligent driving, intelligent parking, and intelligent cockpits is relatively lower, it is emerging. Intelligent driving ranks fifth at 19.7%, showing that some high-end NEV users are beginning to pay attention to autonomous driving capabilities. Intelligent parking and intelligent cockpit demands rank sixth and seventh at 15.5% and 6.9%, respectively, indicating growing user expectations for vehicle intelligence levels.

### 4.2.3. Cross-Analysis of Gender and Function Configuration Demand

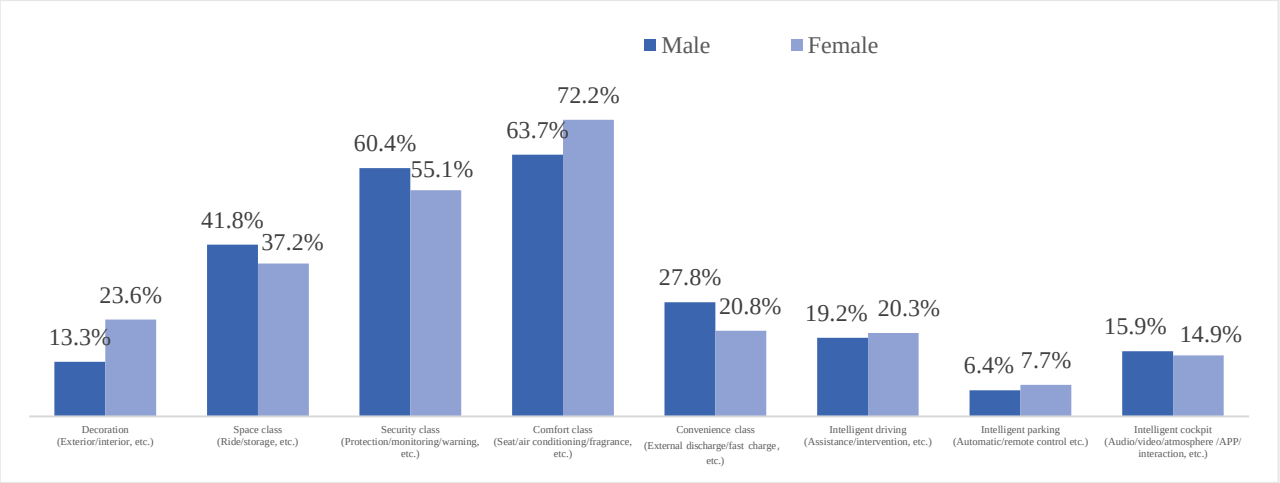


**Figure 12.** Cross-Analysis of High-End NEV User Gender and Function Configuration Demand

Male users demonstrate higher demands in areas such as aesthetic design, interior space, safety, and comfort. This reflects their emphasis on the vehicle's appearance, spaciousness, safety features, and overall ride comfort. In contrast, female users exhibit relatively balanced demands across various functional configurations. They show a slightly higher interest in intelligent cockpits, autonomous driving, and intelligent parking systems compared to their male counterparts. Furthermore, female users have a pronounced preference for comfort features such as seat comfort and air conditioning performance, highlighting their focus on a comfortable driving experience.

### 4.2.4. Cross-Analysis of Marital Status and Function Configuration Demand

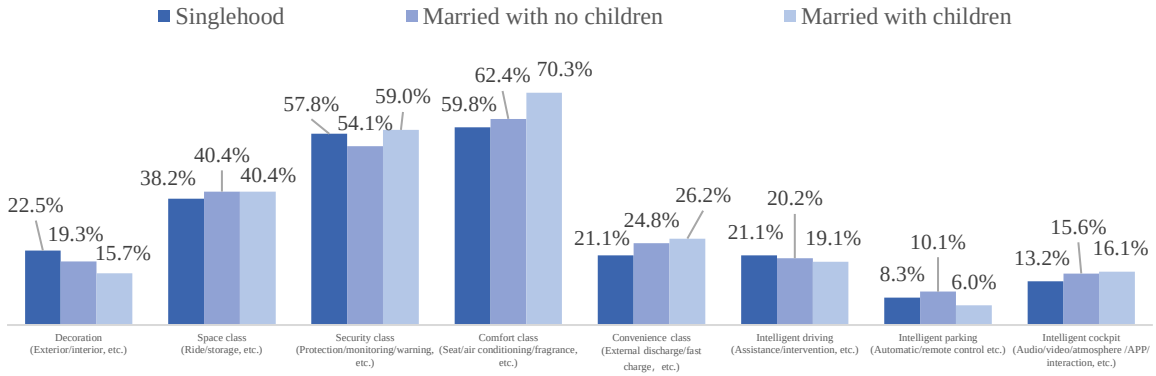


**Figure 13.** Cross-Analysis of High-End NEV User Marital Status and Function Configuration Demand

Individual users typically exhibit a higher demand for various functional configurations, particularly in areas such as aesthetic design, interior space, and advanced intelligent systems. This trend likely reflects their emphasis on personal taste and driving experience, with a preference for vehicles that are stylish, spacious, and technologically advanced.Conversely, users who are married but without children demonstrate a greater demand for safety, comfort, and convenience features. This pattern underscores their focus on secure and comfortable travel, with a strong preference for configurations that enhance the ease and safety of family journeys.For users who are married with children, the demand is predominantly centered on space and convenience features. They prioritize ride comfort, ample storage capacity, external power options, and fast-charging capabilities, catering to the multifaceted needs of family travel. Additionally, these users place significant importance on safety configurations to ensure the well-being of all family members during travel.

### 4.2.5. Cross-Analysis of Usage Scenarios and Function Configuration Demand

In the personal commuting scenario, users place a high value on safety features, including protection systems, monitoring, and alert functions, to ensure their commuting safety. Comfort configurations, such as seat comfort, adjustable air conditioning, and in-car fragrance, are also key focus areas to enhance the daily commuting experience. As technology becomes more prevalent, the demand for auxiliary driving functions, such as adaptive cruise control and lane-keeping assistance, is gradually increasing to improve driving convenience and safety.

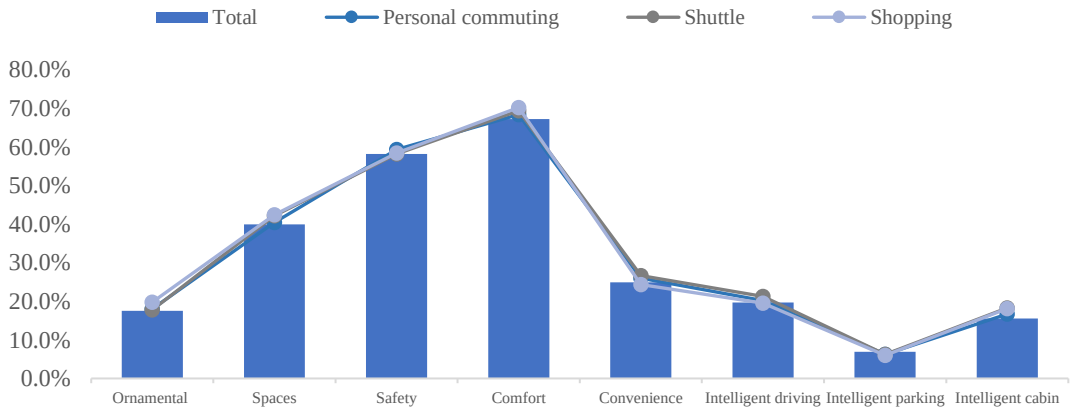


**Figure 14.** Cross-Analysis of High-End NEV User Usage Scenarios and Function Configuration Demand

In the family transport scenario, safety protection and monitoring functions remain top priorities to ensure the safety of family travel. Adequate seating and storage space become particularly important

to accommodate more passengers and luggage. Enhancing the transport experience also relies heavily on seat comfort, effective air conditioning systems, and maintaining a clean car interior.

In the shopping scenario, features like external power functions, fast charging technology, and convenient parking design (such as compact size and easy maneuverability) significantly improve shopping convenience. Rapid cooling/heating air conditioning systems and seat comfort enhance the rest experience after long waits or walks. In congested urban streets, intelligent driving assistance systems can reduce the driving burden, making shopping trips more relaxed and enjoyable.

# 5. CONCLUSIONS AND RECOMMENDATIONS

## 5.1. Main Research Conclusions

In summary, high-end NEV users are primarily concentrated in the 26-35 age group, possessing a bachelor's degree or higher, and exhibit characteristics of youth, high educational attainment, middle-to-high income levels, and rational consumption habits. Their usage scenarios and demands can be summarized as follows:

(1) Common Usage Scenarios and Demands: The primary usage scenarios for high-end NEV users include commuting to work, transporting family members, and shopping. In these contexts, there is a significant demand for vehicle safety performance, ride comfort, and advanced intelligent features. Users prioritize multifunctionality and convenience, showing a strong preference for intelligent cockpits, autonomous driving, and intelligent parking systems. Additionally, there is a notable interest in personalized configurations such as audio-visual systems, ambient lighting, and app-based interactions.

(2) Differentiated Demands in Various Scenarios: The demands of high-end NEV users vary across different usage scenarios. For personal commuting, users highly value safety features, including protection systems, monitoring, and alert functions, to ensure safety during commutes. In family transportation scenarios, safety protection and monitoring functions remain the top priorities to ensure the safety of family members. In shopping scenarios, users emphasize the importance of external power functions, fast-charging technology, and convenient parking designs to enhance the shopping experience.

(3) Differences Among User Groups: Different user groups exhibit distinct preferences. Female users demonstrate a particularly strong preference for comfort-related configurations such as seat comfort and air conditioning performance. Married users with children show the highest demand for space and convenience features. Single users exhibit stronger preferences for aesthetic design, interior space, and advanced intelligent configurations.

## 5.2. Recommendations

Based on the functional configuration demands of high-end NEV users in various scenarios, this paper proposes the following recommendations for product design and marketing strategies:

(1) Precise Marketing and Product Positioning: Tailor marketing strategies and product positioning to align with the specific functional configuration demands of high-end NEV users across different scenarios. For young, highly educated, middle-to-high income users, companies should accurately target the market and design NEV products that cater to this demographic. Emphasize features such as advanced intelligence, energy efficiency, and stylish design. Continuous optimization of product strategies and service systems through market research and user feedback is essential to better meet the needs of this user group.

(2) Enhancing Multifunctionality and Convenience: In the design of high-end NEV, continue to optimize features such as external power, fast-charging technology, and convenient parking designs to meet the diverse needs of users in scenarios such as shopping, road trips, and camping.

(3) Catering to Family User Needs: For married users with children, offer more family-friendly models and services, such as spacious SUV or MPV with multiple seating arrangements, to meet the diverse travel needs of family users.

(4) Deepening the Application of Intelligent Technologies: Increase investment in the development of intelligent driving assistance systems, intelligent cockpits, and intelligent parking technologies. Enhance the stability and intelligence level of these systems to meet the high demand for intelligent features and improve the overall user experience.

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