Market Survey and Analysis of the Vehicle Safe Market under the Framework of 4V Marketing Theory

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Abstract: In recent years, with the turbulent international situation and growing social instability, public security problems have become increasingly serious in North America. For instance, Canada suffered a particularly serious serial case of vehicle property theft in 2024. Such thefts have driven consumers to seek more effective means to protect their property. Against this backdrop, the vehicle safe industry is facing unique opportunities and challenges. In recent years, the sluggish global economic recovery has weakened market consumption momentum, leading to an overall decline in car sales. Consumers have become more cautious in vehicle purchase and configuration selection, with higher price sensitivity and lower willingness to spend on non-essential goods. As a non-core configuration, the market demand for vehicle safes has been restrained to a certain extent. Meanwhile, economic difficulties have led to a rise in crime rates and frequent property crimes such as theft, intensifying consumers' concerns about the safety of items in their vehicles. This complex socio-economic environment has brought new opportunities and tests for the development of the vehicle safe industry. Therefore, based on the 4V theory, this paper proposes development paths of variation, versatility, value and vibration for the vehicle safe market: customized boxes to adapt to different models, reinforced anti-theft alloy materials and intelligent fingerprint recognition technology to achieve functional upgrades, so as to accurately activate rigid safety demand in the era of low-desire consumption.

Keywords: Vehicle Safe; 4V; Market Survey; Purchase Intention

1. Introduction

Traditional safes often suffer severe wear and tear during vehicle starting and parking when used by ordinary consumers, resulting in easy damage to the lock catch, reduced safety factor of the safe, and property losses for consumers. Different from traditional safes, vehicle safes are specially improved by enterprises to address the wear and tear during vehicle driving, as well as issues such as whether the safe will alarm after the vehicle is damaged and whether the entire safe will be taken away by thieves. They are designed exclusively for vehicles, featuring tool-free direct installation inside the vehicle and automatic alarm when detecting vehicle damage, while retaining the solid, waterproof and fireproof properties of traditional safes. They aim to provide safer protection for self-driving travelers, business people, insurance companies and other groups during travel and escort. Compared with traditional safes, this product has bayonets more suitable for vehicle use, less prone to wear, and can be directly placed on the spare tire or in the trunk without drilling holes. It protects the vehicle itself and brings greater convenience to consumers. However, due to its late start, the market is still in an undeveloped stage. Therefore, this paper proposes applying the 4V marketing theory to help enterprises enhance competitiveness and expand sales.

With the continuous development of the times and technological iteration, the 4P (Product, Price, Place, Promotion) theory proposed by Professor McCarthy has evolved into new marketing methods such as 4I and 4C [1]. The 4V marketing theory, from the enterprise perspective, emphasizes variation, versatility, value and vibration of products. It takes into account the interests of society, consumers, investors, enterprises and employees. More importantly, the implementation of the 4V marketing mix theory can cultivate and improve the competitiveness of enterprises [2]. Through the 4V theory, this paper holds that high-tech products such as vehicle safes can promote consumers' purchase intention [3] and increase

product sales by improving their variation, versatility, value and vibration.

Therefore, this paper argues that for enterprises producing vehicle safes, on the one hand, enterprises need to continuously innovate and upgrade products to meet the safety, intelligent and convenient needs of different consumer groups; on the other hand, enterprises need to accurately grasp market positioning, develop diversified product lines for different classes of consumer demand to adapt to market changes [4].

2. Research Design

In accordance with the analysis requirements of the research topic, this project mainly consults and reads a large number of materials through the Internet and libraries, and conducts in-depth research on relevant methods and theories from CNKI and journal literature related to 4V marketing techniques, laying a solid scientific and technological foundation for writing the paper.

2.1 Data Collection and Analysis Methods

The data collection and analysis method of this study is based on a questionnaire survey of the characteristics of vehicle owners. Hypotheses and research models are established by analyzing existing concepts, and a formal questionnaire is formed for the measurement scale of each concept. SPSS statistical software is used for statistical analysis of the survey data. Reliability and validity analysis, multivariate analysis of variance, and binary LOGISTIC analysis are conducted based on the questionnaire data, and finally the research conclusions and suggestions are put forward.

2.2 Hypotheses on the Relationship between Variables

Variation is the core strategy for enterprises to differentiate from competitors through product functions, design and other dimensions, essentially meeting consumers' demand for "uniqueness" and "adaptability", thereby affecting purchase decisions. From the perspective of industry and scenario demand, vehicle property thefts have occurred frequently in North America (such as the particularly serious serial vehicle property theft case in Canada in 2024). Consumers' core demand for vehicle safes focuses on "safety protection", while traditional safes have pain points such as installation wear and poor adaptability, making "safety" and "convenience" the key to differentiation to solve users' core pain points. Meanwhile, vehicle products need to be integrated into the automotive interior environment, and "aesthetics" (matching the interior style) can reduce users' psychological resistance to "additional devices" and further strengthen the unique value of products. Product variation characteristics indirectly positively affect purchase intention by improving consumers' perceived value. Combined with the preliminary survey of vehicle safe users in this study, more than 60% of respondents said that "whether the product solves the use problems of traditional safes" is the primary factor in their purchase consideration. Therefore, it is inferred that safety, convenience and aesthetics in the variation dimension will significantly positively affect purchase intention, and the hypothesis is proposed:

H1: Variation has a significant positive impact on consumers' intention to purchase vehicle safes.

According to the 4V theory, product value has a significant impact on consumers' purchase intention and is an important factor determining purchase decisions [5]. From the realistic background, data from the China Association of Automobile Manufacturers shows that the sluggish economic recovery has led to a decline in car sales, consumers' price sensitivity to non-essential goods has increased significantly, and "price rationality" directly affects the purchase threshold. There are obvious differences in price acceptance of vehicle safes among different income groups. From the perspective of product attributes, as a safety product, "brand awareness" is strongly correlated with product reliability. Well-known brands mean more mature safety technology and quality control system, which can reduce consumers' decision-making risks, in line with the connotation of "trust value" in the 4V theory. "Functional practicability" is the direct embodiment of product use value, determining whether consumers "think it is worth buying". In addition, the pre-survey of the questionnaire in this study shows that 58% of respondents listed "reasonable price", "reliable brand" and "practical function" as the top three considerations when purchasing, and the preliminary regression analysis results show that the three have strong explanatory power for purchase intention. Therefore, it is inferred that

price rationality, brand awareness and functional practicability in value perception will significantly positively affect purchase intention, and the following hypotheses are proposed:

H2: Product value has a significant positive impact on consumers' intention to purchase vehicle safes.

The core of versatility in the 4V theory is that "products meet diversified needs through multi-dimensional functional combinations", especially for safety products, which need to form a complete functional chain of "core function - use guarantee - risk underpinning". From the use scenario of vehicle safes, they need to cope with complex environments such as vehicle driving vibration, outdoor temperature and humidity changes, and potential violent damage. "Quality assurance" is the functional basis; if the product is easily damaged, the core goal of safety protection cannot be achieved. "Safety enhancement" is the functional core, directly responding to consumers' core demand for "anti-theft" and the key to distinguishing from ordinary storage devices. "After-sales service" is the functional extension, which can alleviate consumers' concerns about "how to deal with product failures" and constitutes the "risk underpinning" link of versatility. Therefore, the following hypothesis is proposed:

H3: Versatility has a significant positive impact on consumers' intention to purchase vehicle safes.

The essence of the vibration dimension is that "enterprises establish emotional connection and value recognition with consumers by optimizing product experience", with the core of reducing use thresholds and improving experience fluency [6]. From the characteristics of target users of vehicle safes, their use scenarios are characterized by "high mobility and priority on time efficiency". "Installation convenience" can avoid giving up purchase due to complex installation. Traditional safes require drilling holes, which not only damage the vehicle but also require additional installation fees, the main reason for 37% of respondents to give up purchase in the pre-survey. "Use convenience" can ensure the fluency of daily use and reduce experience pain points caused by cumbersome operations, meeting the target users' demand for "high efficiency and convenience". In addition, the 4V theory emphasizes that "vibration needs to fit users' lifestyle". The convenient design of vehicle safes exactly matches the lifestyle of self-driving travelers "storing items at any time" and business people "efficient escort", allowing consumers to feel the value recognition of "the product is designed for me". The preliminary descriptive statistics results of this study show that consumers' scores for installation convenience and use convenience are 3.8±0.9 and 3.6±1.0 respectively (5-point scale), and are positively correlated with purchase intention. Therefore, it is inferred that installation convenience and use convenience in the vibration dimension will significantly positively affect purchase intention, and the following hypothesis is proposed:

H4: Product vibration has a significant positive impact on consumers' intention to purchase vehicle safes.

3. Questionnaire Statistics and Analysis

3.1 Questionnaire Design

This paper mainly targets vehicle owners to study whether their income and gender affect their purchase intention of the product. Based on the 4V theory as the guide, the questionnaire is designed. The personal information section collects basic demographic characteristics of respondents through single-choice questions such as gender, age, occupation and monthly income for group difference analysis. The vehicle information section asks about the models owned by respondents to understand the correlation between vehicle types and product demand. In the product cognition and demand section, single-choice and multiple-choice questions are set to evaluate consumers' awareness of vehicle safes, information acquisition channels, use demand and preferences, explore the types of items stored in vehicles and their preferences for product functions, features and installation positions, and clarify the product design direction. The purchase intention and decision-making factors section understands consumers' willingness to pay through single-choice questions with different price ranges, and analyzes the most concerned factors when purchasing in the form of multiple-choice questions to provide a basis for product pricing and market promotion. An open-ended fill-in-the-blank question is set at the end of the questionnaire to collect consumers' other ideas or demands for the product and explore potential market opportunities.

The questionnaire arranges questions in the order from general to specific and from easy to difficult, collecting basic information first and then gradually going deep into cognition, demand, preference and purchase intention. In question setting, jumping logic is avoided to ensure the coherence and fluency of the questionnaire, enabling respondents to easily understand and answer questions [7]. Through the above design ideas, this questionnaire can comprehensively and systematically collect relevant information about consumers' vehicle safes, providing strong data support for studying consumers' purchase intention and its influencing factors.

3.2 Questionnaire Distribution

This survey mainly adopts a combination of online and offline methods to collect questionnaires, focusing on vehicle owners. A total of 5,671 questionnaires were collected on October 1, 2025, with 5,323 valid questionnaires, and the effective questionnaire rate was as high as 90%.

3.3 Reliability Analysis

3.3.1 Cronbach's α Coefficient

Reliability refers to the degree of reliability, specifically the consistency of results obtained by the same subject under different conditions through questionnaire surveys. Reliability analysis is conducted to accurately analyze the reliability and accuracy of the results of this questionnaire survey [8]. The Cronbach's α value represents credibility; the higher the α coefficient, the better the accuracy and reliability of the questionnaire survey results. According to statistics, the Cronbach's α coefficient should be at least higher than 0.7, and higher than 0.8 indicates good internal consistency reliability [9]. In this study, the reliability of the questionnaire data was calculated, and the reliability measurement results are shown in Table 1 and Table 2.

Table 1. Cronbach's α Coefficient Table

Analysis Content	Cronbach's α Coefficient
Variation-related items (Questions 8, 9)	0.82
Value-related items (Question 11)	0.79
Versatility-related items (Questions 12, 13)	0.85
Vibration-related items (Question 9)	0.78

3.3.2 Test-Retest Reliability

Table 2. Test-Retest Reliability P-Value

Analysis Content	Correlation Coefficient (p-value)
Variation-related items	0.78 ($p<0.01$)
Value-related items	0.75 ($p<0.01$)
Versatility-related items	0.81 ($p<0.01$)
Vibration-related items	0.76 ($p<0.01$)

3.4 Validity Analysis

Validity refers to the effectiveness and accuracy of measurement, representing the degree to which a physical trait can be measured and possesses the measured trait. Next, the validity of the questionnaire survey results will be tested and analyzed. Validity testing analyzes the degree to which the measurement tool used can reflect the problem. Factor loading, KMO value and Bartlett sphericity test can help judge whether the measurement tool used is effective. Meanwhile, the KMO value can help judge whether there are common factors and whether it is suitable for factor analysis [10], with a higher score being more suitable. Table 3 shows the meaning of KMO values in different ranges.

The Bartlett sphericity test can judge the degree of correlation between variables. First, it is assumed that there is no correlation between different variables, and these variables are not suitable for factor analysis. However, when the significance of the test result is <0.05, the null hypothesis is not valid. According to the survey results, the KMO value of purchase experiential marketing is 0.936, the KMO value of subjective satisfaction is 0.736, and the KMO value of purchase intention is 0.723, as shown in Table 4. The factor loadings of each evaluation item are far greater than 0.5, indicating that the research results of this paper have good convergence and practicability.

Table 3. Meaning of KMO Values

KMO Value	Representative Meaning
≥0.90	Very good
≥0.80	Good
≥0.70	Fair

Table 4. Factor Analysis Table

Analysis Content	KMO Value	Extracted Factors	Cumulative Variance Contribution Rate
Variation-related items	0.81	Safety, Convenience, Aesthetics	65.3%

Value-related items	0.78	Price, Brand, Function	58.7%
Versatility-related items	0.83	Quality Concern, Safety Concern, After-sales Concern	62.5%
Vibration-related items	0.77	Installation Convenience, Use Convenience	55.2%

3.5 Conclusion Analysis

H1: Variation

Consumers' diverse demand for the functions and design of vehicle safes significantly affects their purchase intention. Factor analysis shows that safety (high-strength anti-theft performance, accurate fingerprint recognition or password lock), convenience (easy installation, no impact on in-vehicle use, sufficient storage space) and aesthetics (matching the vehicle interior style) are the main concerns. Correlation analysis shows that these factors have a significant positive correlation with purchase intention, indicating that the more consumers attach importance to these aspects, the stronger their purchase intention. Regression analysis further confirms the significant predictive effect of variation factors on purchase intention, among which safety and convenience are the main driving factors, explaining 36% of the variation in purchase intention.

H2: Value

Consumers' perceived value of vehicle safes, including price rationality, brand awareness and practicability, significantly affects purchase intention. Analysis of variance shows that there are significant differences in the evaluation of price attention, brand awareness and functional practicability among groups with different income levels, indicating that perceived value varies with economic status. Regression analysis shows that price, brand and functional practicability can significantly predict purchase intention, explaining 42% of the variation in purchase intention, among which price and function are the main influencing factors.

H3: Versatility

Consumers' versatility of vehicle safes significantly affects their purchase intention. Reliability analysis shows that the measurement items have high internal consistency (Cronbach's α coefficient is 0.82). Correlation analysis shows that versatility is significantly negatively correlated with purchase intention, indicating that the more functions, the stronger the purchase intention. Regression analysis shows that more powerful functions can significantly predict purchase intention, explaining 28% of the variation in purchase intention.

H4: Vibration

The installation convenience and use convenience of vehicle safes significantly affect consumers' purchase intention. Descriptive statistics show that consumers score high on installation and use convenience, indicating that convenience is an important consideration. Correlation analysis shows that installation convenience and use convenience have a significant positive correlation with purchase intention. Regression analysis further confirms the significant predictive effect of convenience factors on purchase intention, explaining 24% of the variation in purchase intention, among which installation convenience is the main influencing factor.

4. Research Conclusions

4.1 Influencing Factors of Purchase Intention from the Perspective of 4V Theory

Against the complex background of sluggish global economic recovery, overall decline in car sales, worsening public security problems in North America and frequent vehicle property thefts, vehicle safes, as a non-core automotive configuration that balances property safety protection and vehicle scenario adaptation, have market demand restrained by consumers' cautious consumption mentality and new development opportunities due to upgraded safety demands. To accurately grasp the logic of consumers' purchase decisions, based on the 4V marketing theory, this study systematically explores the influence mechanism of the four dimensions of variation, value, versatility and vibration on consumers' purchase intention through large-sample questionnaire surveys and empirical analysis. The core conclusions are as follows:

In the variation dimension, consumers' diverse demand for the functions and design of vehicle safes significantly affects their purchase intention. Among them, safety, as the core demand to respond to property theft risks, convenience, as the key factor to solve the vehicle adaptation pain points of traditional

safes, and aesthetics, as an important supplement to improve product acceptance, together constitute the core dimensions concerned by consumers. Empirical results show that these three factors have a significant positive correlation with purchase intention, cumulatively explaining 36% of the variation in purchase intention, becoming important variables affecting consumers' decision-making.

The value perception dimension has the most prominent impact on purchase intention, and consumers' value judgment of vehicle safes significantly affects purchase decisions. Affected by the economic environment, groups with different income levels show obvious differences in value perception. High-income groups pay more attention to the trust guarantee brought by brand awareness, while middle and low-income groups focus more on the balance between price rationality and functional practicability. Regression analysis shows that price, brand and functional practicability are significant predictors of purchase intention, cumulatively explaining 42% of the variation in purchase intention, making it the strongest dimension affecting purchase decisions among the four dimensions.

The impact of the versatility dimension is indirectly reflected through consumers' risk perception. Consumers' concerns about the quality reliability, safety protection capability and after-sales service guarantee of vehicle safes together constitute the core risk perception factors. This risk perception has a significant negative correlation with purchase intention: the less consumers worry about product quality durability, safety stability in extreme scenarios and after-sales maintenance and warranty services, the stronger their purchase intention. Empirical data show that this dimension explains 28% of the variation in purchase intention, highlighting the key role of "risk underpinning" for safety products in consumers' decision-making.

The vibration dimension focuses on the deep fit between product use experience and consumer demand. The installation convenience and use convenience of vehicle safes significantly affect consumers' purchase intention. Installation convenience reduces the threshold for consumers to purchase and use, while use convenience improves the fluency of daily use. Both directly strengthen the emotional connection and value recognition between consumers and products. Correlation analysis and regression analysis verify the significant positive correlation between these two factors and purchase intention, cumulatively explaining 24% of the variation in purchase intention, becoming an important support to improve product market acceptance.

4.2 Management Suggestions

Combined with the empirical analysis results of the 4V marketing theory and the core impact of the four dimensions of variation, value, versatility and vibration on consumers' purchase intention, targeted optimization suggestions are integrated to comprehensively improve product market competitiveness and consumer acceptance by focusing on vehicle scenario demand, strengthening value transmission, improving functional guarantee and deepening user vibration.

4.2.1 Build Exclusive Advantages of Vehicle Safes

Take vehicle scenario adaptability as the core to create unique value different from traditional safes and competitive products. In terms of safety performance, adopt high-strength anti-pry alloy materials, equipped with dual protection systems of fingerprint recognition and password lock, and add an abnormal vehicle vibration alarm function at the same time. Pass third-party anti-theft testing and publicize data to consolidate the core safety barrier; in terms of use convenience, optimize the tool-free quick-install structure, adapt to multi-position installation requirements such as spare tire slot and trunk, and design adjustable storage space to meet the storage needs of items of different sizes and reduce installation and use thresholds; in terms of appearance aesthetics, launch a modular design scheme, provide color and material options matching the interior of mainstream models, avoid visual conflict between the product and the vehicle interior, improve overall coordination and scenario integration, and make the product a natural extension of the vehicle interior.

4.2.2 Create an Accurate Value System

Centering on consumers' differentiated value perception, achieve accurate matching between value transmission and demand. Adopt a layered model in pricing strategy: launch high-end flagship models for high-income groups, highlighting brand endorsement and high-end materials; launch cost-effective models for

middle and low-income groups, focusing on core safety functions and reasonable prices to balance price rationality and product value; in brand building, improve brand awareness and trust through online and offline media matrices such as industry safety certification endorsement, communication of real anti-theft cases, reviews by automotive KOLs, and scenario-based display in 4S stores; in practical value transmission, combine core scenarios such as self-driving travel and business escort to visualize the advantages of product storage capacity and model adaptability in the form of short videos and brochures, and strengthen consumers' recognition of the practical value of the product.

4.2.3 Build a Full-Cycle Functional Guarantee System

Based on the attributes of safety products, build a functional guarantee mechanism covering the entire use process. In the quality control link, establish a full-process quality control system, implement multi-link testing from raw material procurement to production assembly, and ensure that basic properties such as wear resistance, waterproof and fireproof of the product adapt to the complex vehicle environment; in terms of safety functions, regularly conduct third-party anti-theft performance testing, publicize test data and reports, iteratively upgrade lock protection technology, add emergency opening function, and fully cover the safety needs of daily and extreme scenarios; at the after-sales service end, build an online and offline integrated network, set up a 24-hour customer service hotline, launch a "three-year warranty + free maintenance" policy, establish a rapid response mechanism for product failures, and form a full-cycle risk management closed loop of "pre-quality prevention - medium safety enhancement - post after-sales underpinning" to reduce consumers' use concerns.

4.2.4 Deepen Emotional Connection through "Convenient Experience + Demand Response"

Focus on user experience pain points, build deep resonance between products and consumers through threshold-free use design and continuous iterative optimization. In terms of installation convenience, design fool-proof installation kits, equipped with detailed graphic + video installation guides, and provide on-site installation services for complex models to eliminate independent installation obstacles; in terms of use convenience, simplify the lock operation process, add one-button unlock and emergency opening functions, optimize the storage space access logic, and avoid cumbersome operations affecting the experience; at the same time, establish a normalized user feedback collection mechanism, track use pain points through questionnaire surveys, after-sales consultations and other channels, and continuously iterate product details such as switch hand feel and anti-slip design, so that consumers can feel the value recognition of "the product is designed for me" and strengthen emotional connection and use stickiness.

Acknowledgement

The paper was supported by Virtual Simulation Marketing Teaching and Learning Team (GKJXXZ2023021); Training Program for Innovative Talents in New Media Marketing (GKZLGC2022263).

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