

# Analysis of Pet Supplies Demand and Influencing Factors Based on Logistic Regression Model

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**Abstract:** With the continuous development of society and the influence of various factors, pets have become an important member of the family. This has brought about a booming development of the pet supplies market, so studying people's demand for pet supplies and the impact of various factors on purchasing intention is of great significance to related companies and merchants. This study will establish a linear regression model through the data collected from the questionnaire to explore the core influencing factors and consumer behavior characteristics of the market demand for pet supplies. The study found that when consumers choose pet products, product quality and safety, product function and practicality are the primary considerations, followed by brand reputation, price performance and health benefits of product ingredients. The study further reveals the heterogeneity of consumer preference groups: high-income groups pay more attention to brand and quality, while middle- and low-income consumers are more sensitive to price. However, linear regression models cannot effectively explain complex interaction effects (nonlinear effects of pet attachment emotion on consumption decisions, etc.). Future research can deepen feature analysis in combination with machine learning and other methods.

## 1 INTRODUCTION

After experiencing the closure and isolation caused by the epidemic, pets have become an important and indispensable member of many families. Pet owners are willing to spend more on their pets, especially in terms of money. This has driven the rapid development of pet-derived services, such as the pet supplies market. The continued growth of the number of newly established pet-related companies has not only made the products more diversified, but also led to increasingly fierce market competition. In order to stand out from the competition, companies need to have an in-depth understanding of consumers' needs and preferences and provide products and services that are more in line with consumers' expectations. At the same time, consumers' requirements for the quality, function and safety of pet products are increasing. However, the booming development of the pet supplies industry has also led to the proliferation of a large number of misinformation or false propaganda, which has disrupted the market order.

Pet owners have doubts about the safety of pet food and supplies (Di Cerbo et al., 2017). At the same

time, some pet supplies may not be suitable for the pet itself. Bläske et al. (2022) mentioned in the article: Most of the pet supplies on sale surveyed have a certain degree of missing product information, which leads to difficulty in purchasing. Therefore, what factors consumers pay more attention to when choosing pet supplies have become the focus of this research. When reading relevant materials and looking for existing research, it found an article studying pet clothing consumption (Wang et al., 2023). Wang et al. (2023) analyzed the data collected and found that consumers pay the most attention to pet clothing styles, accounting for 46.24%. Although other needs, such as price, quality and fabric, account for less than styles, only 13.87%, 12.14% and 15.03%, the proportion is still relatively high compared to other aspects such as function (3.47%), which has certain implications for our analysis results. In the article, Gromek and Perek-Białas (2022) analyzed whether factors such as social background, economic status and demographic characteristics will affect the family's spending on pets by constructing a logistic logical model. At the same time, there is also an article that studies the demand factors for pet supplies using Gansu

Province, China as an example (Ning et al., 2022). Ning et al. (2022) used the form of an online questionnaire in the study, collected 354 data and sorted it out. Ning classified pet supplies and explored the future consumption tendencies of consumers who purchase different types of pet supplies, such as users who buy more pet food, will have a higher probability of continuing to consume pet supplies. At the same time, Ning also conducted a word frequency analysis of consumers' keywords for pet supplies, pointing out that consumers have a higher demand for price and quality. However, Ning did not strongly associate these factors with the desire for consumption, which would also be the main purpose of this study.

That is, the relevant data collected were analyzed using the logistic regression model to evaluate the fitting effect of the model, and to explore what factors consumers are affected when purchasing pet supplies. Therefore, conducting this research has multiple significance. For enterprises, it can guide the research and development and marketing of pet supplies. For consumers, they can see whether they have paid too much attention to one aspect and ignored other aspects of the product when purchasing products.

## 2 RESEARCH METHODS

### 2.1 Data Collection and Processing

Because the first-hand data is collected by issuing questionnaires, the questionnaires are posted on the Internet and data is collected from users of all ages across the country. Finally, 151 data were collected, and the distribution of gender, age and cities was relatively balanced. In the data preprocessing stage, an abnormal questionnaire data was first ruled out, and then after the credibility coefficient estimate, the Longbach Alpha $\alpha$  coefficient is 0.61, which meets the basic reliability requirements (Ru & Zhang, 2011). It can be considered that the data collected in this questionnaire is reliable. When processing data, this article uses the assignment method to assign the value of the factors of interest to 1, and if it is not paid attention, the value is assigned to 0. For example, if the consumer takes the price factor into consideration when spending, then in this data, the price is assigned to 1, otherwise it is 0.

### 2.2 Data Analysis

First, different types of data will be fitted through the logistic regression model to establish a logistic

regression model. Logistic regression model is a generalized linear model with advantages such as simple and easy to interpret, high computing efficiency, loose data requirements and strong scalability. It is based on intuitive probability output, easy to understand parameters, efficient solution process, suitable for small data sets, and has certain robustness to outliers. In addition, the model can also introduce interactive terms and polynomial terms, which are combined with other technologies and are widely used in binary classification problems and are used to predict binary classification results. Its mathematical form can be expressed as:

$$\log\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + \beta_5x_5 \quad (1)$$

Among them:  $p$  is the probability of an event occurring (that is, the consumer's consumption intention is also assigned to a specific value, willing to be 1, and unwilling to be 0).  $\beta_0$  is the intercept term,  $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$  are regression coefficients, corresponding to the variables  $x_1, x_2, x_3, x_4, x_5$ , respectively.  $x_1, x_2, x_3, x_4, x_5$  are independent variables, corresponding to price, quality, brand, function, and reputation, respectively. The above independent variables are factors that consumers are concerned about when purchasing pet supplies in the questionnaire.

## 3 RESEARCH RESULTS

Table 1 : Coefficient estimation results of Logistic regression model

Coefficients	Estimate	Std. Error	z value	Pr(> z )
Intercept	-2.141	1.399	-1.530	0.12594
price	4.597	1.523	3.019	0.00254
quality	1.391	1.251	1.112	0.26634
brand	2.403	1.189	2.020	0.04335
function	2.169	1.065	2.037	0.04168
reputation	1.784	1.242	-1.437	0.15081

In this logistic regression analysis, it evaluated the impact of multiple variables on the target variable. Results are shown in Table 1, price, brand, and function are significant factors, while quality and reputation do not reach statistical significance. Specifically, the p-value of the price variable is only 0.00254, which is well below the significance threshold of 0.01, and two asterisks are marked in the results, indicating that their effect on the target variable is very significant. In contrast, the p-values for brand and feature are 0.04335 and 0.04168, respectively, both slightly below the threshold of

0.05, marked with an asterisk indicating that they also have a significant effect on the target variable, but are slightly less significant than the price. The p-values for quality and word of mouth were 0.26634 and 0.15081, respectively, both above 0.05, not reaching the significance level, indicating that their effect on the target variables was not significant. Furthermore, the p-value of the intercept term is 0.12594, which is also not at the significance level, indicating that in this model, the intercept term contributes not significantly to the predicted results. These results suggest that price has the strongest statistical significance of all significant variables and may be more critical to the predictive power of the target variable.

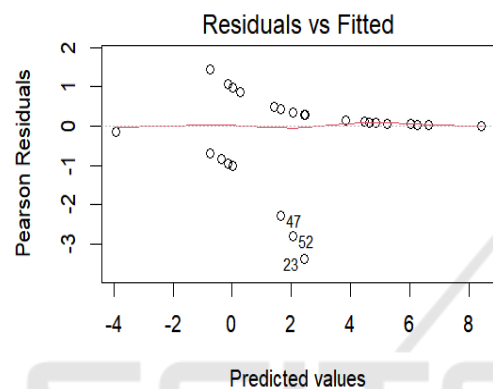


Figure 1: Residual and fitted value graph (Photo/Picture credit: Original).

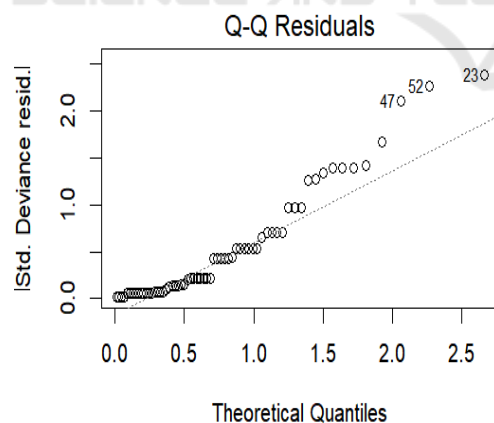


Figure 2: Normal Q-Q Picture (Photo/Picture credit: Original).

## 4 FITNESS TEST

Residual vs. fitted value graphs are often used to check whether the model has a nonlinear relationship or heteroscedasticity. If the residuals are randomly

distributed around the horizontal line (0), then it means that the model hypothesis is true; if there is a significant curve shape, it indicates that there may be a nonlinear relationship or heteroscedasticity. Obviously, the distribution of residuals in Figure 1 is random, indicating that the logistic regression model can better explain the problem. Normal Q-Q graphs are methods used to check whether residuals are approximately normal distributions. If the sample point falls roughly on a straight line, it means that the residual is approximately normal distribution. If the sample point deviates from the line, it indicates that the residual may not obey the normal distribution. Obviously, the sample points in Figure 2 fall roughly on a straight line, and the residuals are approximately normal distribution. In summary, it can conclude that the model satisfies the basic assumption of linear regression, has good fitting effect and high reliability, and can be used for further analysis and explanation.

## 5 DISCUSSION

In this study on the influencing factors of pet supplies selection, it was found that the positive driving effect of price on consumers' willingness to purchase is the most obvious, and it is a key factor that affects consumers' decision-making when purchasing pet supplies. This shows that when consumers buy pet supplies, they often first consider whether the price of the product meets their own budget. Products with high cost performance are more favored by consumers. Of course, this may also be related to the subject's occupation, considering that students do not have their own income, but emerging cloud pet raising and feeding animals on campus may be a strong driving force for them to buy related products, so they will consider prices more.

In addition, brand and function are also important considerations for consumers when choosing pet supplies. Both brand awareness and product functional characteristics have a significant positive impact on whether you are willing to consume. Nie (2024) mentioned in his report: At the 2024 Asian Pet Show, there are many new pet supplies that are popular among consumers. Xiao, Wang & Li (2021) mentioned in the statistical results of the article: About 68.6% of pet owners believe that brand reputation is an important consideration when choosing pet supplies. It can see that products of well-known brands or emerging brands are being seen more widely, which may be because well-known brands usually have higher credibility and better after-sales service. At the same time, the functional

characteristics of the product have also attracted the attention of consumers. If it link the two together, it can also think that a good brand usually has better and more functions, and the two have a certain connection.

However, word of mouth and quality did not show significant positive effects in this study. The inconspicuousness of the word-of-mouth factor may be caused by a large number of advertisements on the Internet: the product itself is very different from the publicity and cannot satisfy consumers. At the same time, Sun, Wang, Zheng & Su (2025) mentioned in the article: Most users who participated in the research believe that the materials of pet toys in pet supplies are unsafe and of poor quality. At the same time, Liu et al. (2025) proposed that the pet economy has developed too rapidly in recent years, and many supervision and policies have not been formulated or implemented, so the inconspicuousness caused by quality can be seen.

So for enterprises, they should pay more attention to product price strategies and ensure that the products are competitive in the cost-effectiveness competition through innovative production methods to attract consumers who pay attention to costs. Secondly, brand building and functional innovation are also key. Enterprises need to enhance their market attractiveness by enhancing brand awareness and developing practical products with good functional characteristics. Furthermore, although word of mouth and quality did not significantly affect purchasing decisions in this study, companies should not ignore it. In the long run, high-quality products and good reputation are the cornerstones of the sustainable development of the brand. Therefore, enterprises should continue to optimize product quality and actively manage consumer feedback to enhance brand reputation and customer loyalty.

To sum up, when consumers choose pet supplies, price is the most important factor, and brand and function also have significant positive impact. However, word of mouth and quality did not show a significant positive impact in this study. This article only gives inferences, and the reasons need to be further explored.

## 6 RESEARCH LIMITATIONS AND PROSPECTS

This study has certain limitations in sample selection and data collection. The data in the questionnaire sample is small and is mainly concentrated in urban

areas. There is insufficient research on the consumption behavior of pet owners in rural areas. Future research can further expand the sample range and cover the data to pet owners of different regions and income levels to obtain more comprehensive research results. Of course, when purchasing pet supplies, there may be complex interaction effects. For example, owners who are deeply attached to pets may be willing to consume more for pets, and these sample points may affect the accuracy of the model. Therefore, in the future, it can consider introducing deeper analytical methods, such as combining deep learning to explain some consumer behaviors. In addition, with the continuous development and changes of the pet supplies market, future research can also focus on the impact of emerging technologies on the pet supplies market, such as the impact of artificial intelligence, the Internet of Things, cloud pet raising, etc. on the pet supplies market, as well as consumers' acceptance and use behavior of these new technologies.

## 7 CONCLUSION

This study analyzed the factors that influence consumers to purchase pet supplies through questionnaire surveys and Logistic regression models. The study found that price is the primary factor in consumer decision-making and has a significant positive impact, indicating that consumers are extremely concerned about cost-effectiveness when purchasing pet supplies. Brand awareness and product functionality also have a significant positive impact on purchasing intention, but the impact of quality and reputation is not significant, which may be related to market information asymmetry and general consumer trust in quality. The study also found that consumer preference groups are heterogeneous, high-income groups pay more attention to brand and quality, and middle- and low-income groups are more sensitive to prices. The research limitation is that the sample size is small and concentrated in urban areas. In the future, the sample range can be expanded and deep learning can be introduced to further analyze complex interaction effects such as pet attachment emotions, while paying attention to the impact of emerging technologies on the pet supplies market.

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