Research on Marketing Segmentation

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ABSTRACT

This article mainly organizes the methods of today's market segmentation, describes their basic principles, compares the characteristics of different methods, and application scenarios, and also describes a detailed case using logistic regression to market segmentation. Therefore, the specific usage method of market segmentation is described in detail. The results of the case show that for market segmentation, considering the interaction between market segmentation variables and predictor variables can make the prediction effect of the model better.

Keywords: Marketing segmentation, model, customers, logical model

1. INTRODUCTION

Market segmentation refers to the use of certain characteristics to separate customers from the market in order to enable the company to cut costs while increasing product sales[1]. The main purpose of the company is to make a profit. It expects to obtain the greatest return with the smallest investment, that is, under the condition of low production costs, increasing sales and increasing profits. One way to accomplish these goals is called market segmentation. Currently, the more common market segmentation includes two algorithms, namely CHIAD and CRT[2]. Both types of technologies want to make the segmentation of the target as large as possible. The CHIAD algorithm mainly uses the X-square distribution, while the CRT algorithm mainly uses the Gini coefficient. In addition, the clustering algorithm and the K nearest neighbor algorithm are also widely used in market segmentation, and the objects they subdivide are mainly non-target markets[3]. These two types of algorithms use some common distance metrics to subdivide, including common Euclidean distance, Mahalanobis distance, and Manhattan distance. These market segmentation algorithms can make the difference between two different modules as large as possible, which also reflects that the maximum distance between unused modules after market segmentation is related to the different combinations and interactions of variables[4].

2. LITERATURE REVIEW

Currently, there are two main market segmentation techniques commonly used, including supervised market segmentation and unsupervised market segmentation[5]. Below are some examples of supervised and unsupervised market segmentation. Supervised market segmentation is also called target market segmentation, and unsupervised market segmentation is also called target market segmentation.

The main characteristics of target market segmentation are as follows: it can identify the types of customers, and at the same time understand which types of customers are interested in a specific product; at the same time, it can also use some commercial stimulus to make high-consumption groups Generate more consumption; in addition, it can learn information about customer credit card defaults[6].

The characteristics of non-target market segmentation are as follows: market segmentation for customers can build user portraits for customer groups, which can help merchants in business deployment and decision-making, and expand the consumption of customer groups[7]. Geographical market segmentation for different spatial regions can form different sales plans and strategies according to geographic locations. In addition, market segmentation for users on the Internet for clicks and browsing of different products can help businesses understand brand popularity and development trends[8].

In summary, for targeted market segmentation, algorithms need to be considered from different aspects, but for non-targeted market segmentation algorithms, use user portraits or spatial geographic locations for market segmentation. And the results of market

segmentation based on users' browsing behavior on the Internet are different.

3. METHOD OF MARKET SEGMENTATION

3.1. How to Create Product

There are two main ways to create products. The first is to study market demand first, and to understand the products produced after understanding the market demand. For example, for computers, companies such as Microsoft conduct market research and believe that a large number of products are needed in the market[9]. Computers have a lot of room for future development, so they entered the computer market to manufacture and sell computers. The second method of creating a product is to create a product that can arouse great demand from customers. For example, when the iPhone did not appear, no one knew that they needed a touch-screen phone, but after the iPhone appeared, everyone gradually felt that they needed it. A touch screen phone.

After product innovation, businesses need to use market segmentation technology to obtain greater profits, and continue to expand profits while reducing expenses.

3.2. Market Segmentation Technology Based on Machine Learning Methods

For machine learning algorithms for market segmentation, machine learning algorithms that consider

multiple trees are commonly used. Using regression trees and stochastic gradient descent algorithms, multiple trees can be used for overall prediction. The process is as follows. First, a complete tree is established, and then iterative training is performed using the stochastic gradient descent algorithm to gradually increase the accuracy of the prediction. Under normal circumstances, the above-mentioned tree is composed of many nodes, so as to ensure that the model does not produce over-fitting. Usually when the stochastic gradient of the tree increases, the nodes of the first batch of trees are given priority, and it is judged whether they are suitable for creating market segments.Here we use a logistic regression model to perform the prediction task, mainly for the customer's acceptance of the provided products, and the model used is the logistic regression model.

3.3. An Example

In the logistic regression model, 1 or 0 is used to represent the customer's response to the product, a response is represented by 1, and no response is represented by 0.

In general, market segmentation is mainly carried out through established goals, and each segment will establish an independent model. In market segmentation, the task to be achieved is to find the biggest difference between different types of market segmentation related to the selected target. The following is a commonly used method for market segmentation using logistic regression.
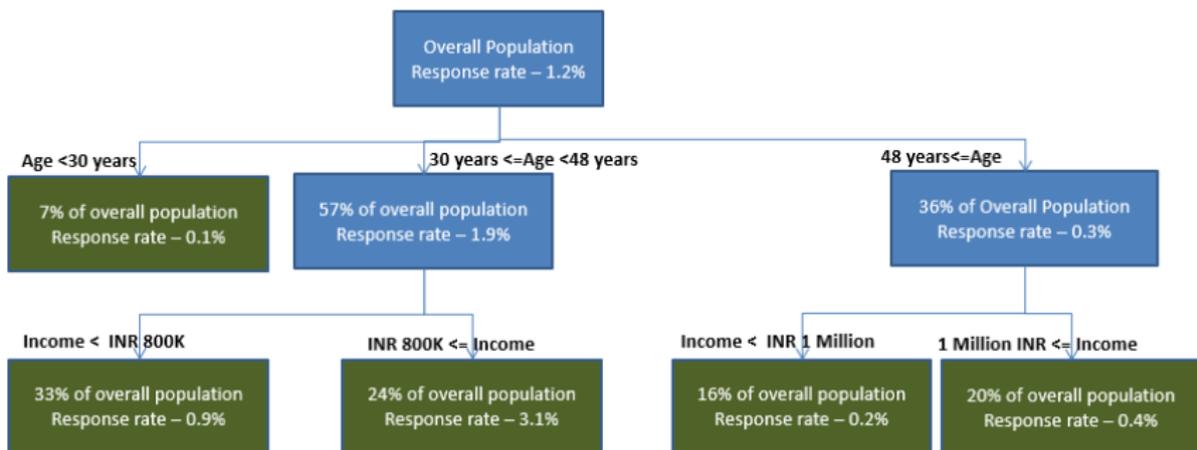

Figure 1 Market segmentation case based on logistic regression model[7]

The market segmentation method shown in the figure above usually has a good effect, because the segmentation method above shows the biggest difference with the target. As can be seen from the tree diagram above, each different segmentation module represents a more obvious difference between the nodes related to the target. When using the CHIAD algorithm

for market segmentation, there is a very obvious difference in the X-square value between each module.

The following case uses a logistic regression model to make predictions. We assume that a logistic regression model is based on the total population to make predictions. Call this model 1, as the mother model, the Gini coefficient is 0.5, and for the 5 nodes of

this model, 5 different independent models are established respectively.

Model 1-1: Prediction of response to younger than 30 years old.

Model 1-2: Prediction of the reaction between 30-50 years old and income less than 700 rubles.

Model 1-3: Prediction of the reaction between the age of 30-50 and the income is greater than 700 rubles.

Model 1-4: Prediction of the response to the age over 50 and income less than 1 million rubles.

Model 1-5: Prediction of the response to those over 50 years old and whose income is greater than 1 million rubles.

After establishing 5 separate models, observe their different prediction results.

Combined with the data set and the Gini degree of the model, these two coefficients can be used to improve the prediction ability. In addition, the market segmentation of the overall model can be carried out with the aid of the dummy variable method. The following is the representation of some imaginary coefficients.

False 2-1: Age less than 30 years old

Imaginary 2-2: between the ages of 30-50

False 2-3: Income in 1000k rubles

False 2-4: Income is between 1,000K and 1 million rubles

The use of these dummy variables can make the prediction effect of the overall model better. In terms of forecasting methods, it is better to have evidence weight. The positive value of the weight of evidence means that the distribution of a certain variable within a certain range is relatively concentrated, while the negative value of the weight of evidence means that the concentration of the variable within a certain range is relatively low. Therefore, for the number of purchases, the corresponding evidence weight is also relatively large, indicating that the concentration of such people is relatively high.

In order to use market segmentation variables and predictors at the same time, it is necessary to design a more complete forecasting model. The following is a newly designed market segmentation program.
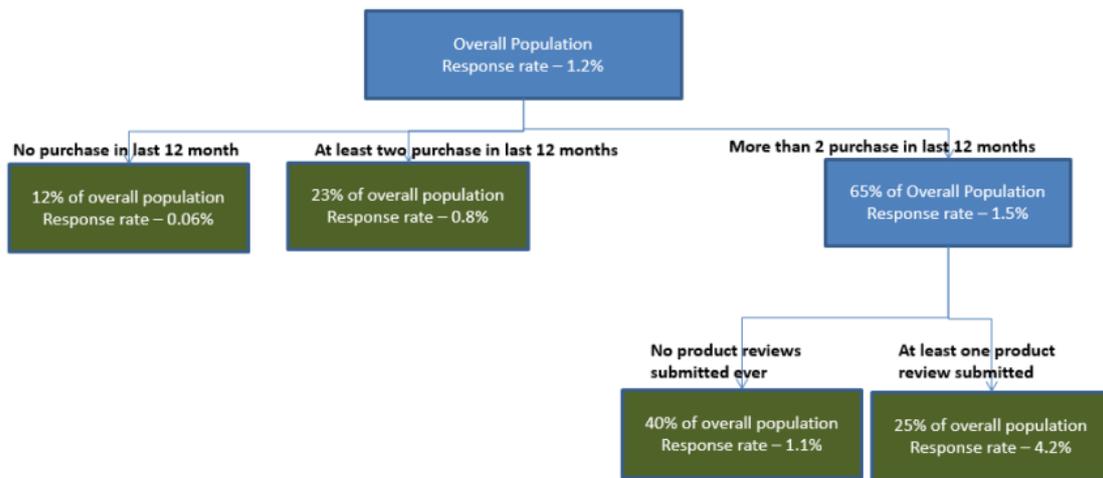
Figure 2 Market segmentation for creating logical models[7]

The following are some sub-models of the overall model:

Model 3-1: For market segmentation where no purchases have been made in the past 12 months

Model 3-2: For market segmentation with at least two purchases in the past 12 months

Model 3-3: For market segmentation that has purchased more than twice in the past 12 months and has not evaluated products

Model 3-4: For the market segmentation of products that have been evaluated twice in the past 12 months

The following figure shows the situation where the forecast is true. It can be seen that the current market segmentation has better forecasting ability, because it not only considers the market segmentation variables and predictors, but also considers the interaction between the two.
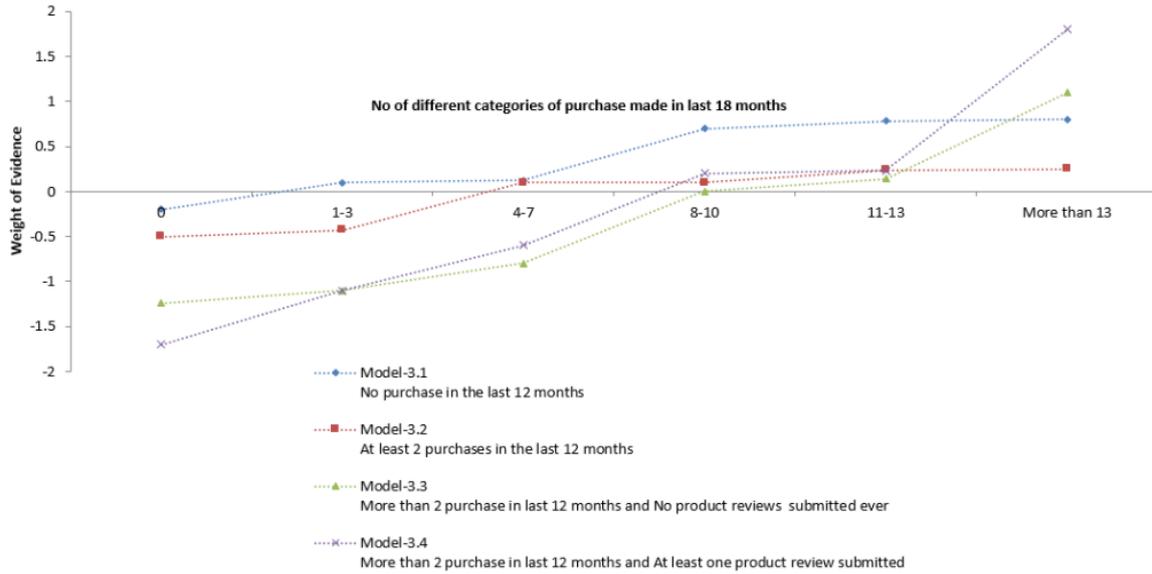
Figure 3 Forecast model of the variable "number of purchases in the past 24 months"[7]

The blue line represents: Model 3-1 has not purchased goods in the previous 12 months. The red line represents: Model 3-2 purchased goods at least twice in the previous 12 months. The green line represents: Model 3-3 has more than two purchases of products in the previous 12 months, but there is no product evaluation. The purple line represents: Model 3-4 has more than two purchases of products in the previous 12 months, and at least one product evaluation has been submitted.

It can be seen from the figure that the predictive ability of this model has been greatly improved compared to the previous one, which shows that considering the interaction between market segmentation variables and predictor variables at the same time has a very positive significance for the prediction effect.

3.4. Application

For market segmentation, the most common is demographic segmentation, which is also very widely used. Through this technology, many companies can learn about the large amount of use of their company's products. In the demographic market segmentation model, there will be many variables, including gender, age, family members, occupation, annual income, race, country, religious beliefs, etc. The most common demographic segmentation model is applied to the automobile market, the main reason is Because different cars have different prices, car companies use demographic market segmentation models to match cars with corresponding prices to customers. In this case, the demographic market segmentation model uses statistical information such as age, annual income, and gender.

4. CONCLUSION

Firstly, improvement of the model's predictive ability must be paid attention in the process of creating and optimizing the market segmentation model. We can gradually optimize the model, improve the predictive ability, and also pay attention to making the target as large as possible. In the market segmentation algorithm, interactive factors will be considered, so predictive variables and predictive models are both important. In the process of establishing the market segmentation model, it is necessary to establish sub-models for each shopping mall segmentation, and then process the variables in each sub-model.

The most important function of the market segmentation model is the ability to have a high predictive ability, which is the core of the entire model, so it is very useful for the visual representation of the forecast situation and can help us continuously optimize the model.

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