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Research on Closed-loop Financial Marketing Model Based on CRITIC Weight Method and Fuzzy Borda Evaluation Method

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Abstract

In the post-epidemic era, financial institutions are facing dual challenges at home and abroad, and the marketing link is particularly important in the competition for market share. This paper takes closed-loop financial marketing as the breakthrough point, explores the feasibility and effect of closed-loop financial marketing through specific empirical analysis, and finally puts forward relevant opinions according to the research conclusions. Put forward the summative views and opinions for the marketing innovation of the financial industry.

Keywords

Closed-loop finance, CRITIC weight method, Fuzzy Borda evaluation.

1. Introduction

The outbreak of COVID-19 in 2020 has brought a huge impact on financial institutions, while the financial industry in China also has a huge competition, in which banks, investment banks, insurance companies and other financial enterprises are involved. Faced with such a situation, the marketing of the financial industry has not played its due role, and it still lacks innovation and creativity. In the post-epidemic era, the closed-loop financial marketing model is a combination of institutions, customers and products. The so-called closed-loop marketing is to integrate the traditional financial marketing, change the decentralization of the past marketing, the long feedback cycle, the untraceable effect and other defects, through the closed-loop marketing model. Financial institutions, users, financial products and financial institutions are integrated, and the process of design, organization, control and feedback runs through the whole process of financial marketing.

Based on the public data of financial institutions, enterprises and other big data, this paper analyzes the impact of the implementation of closed-loop financial model on financial enterprises through CRITIC weight method and fuzzy Borda method, and finally gives our suggestions based on the conclusion.

2. Literature Review

At present, the domestic research mainly includes: Li Wei (2019) believes that with the accelerated transformation of Internet finance, in order to further develop the traditional banking industry, it is necessary to promote the transformation of financial marketing [1]. Chen Wei and Cheng Cheng (2020) believe that traditional corporate business should be organically

integrated with investment and banking business to create a benign financial ecology through chain marketing [2]. According to Chen Yue (2020), Today, with the rapid development of digital finance, traditional financial products have gradually lost their competitiveness, and new bank marketing strategies must be adopted [3]. Deng Yu (2020) believes that the impact of the epidemic has created a huge space for the development of digital finance, and in the post-epidemic period, the high operating costs of commercial banks and the complex process of transformation have restricted the living space [4]. Foreign studies include: Karlan Dean (2021) and others proposed that finance should pay more attention to inclusiveness [5]. Intekhab Alam (2020) and others proposed three future financial marketing research methods on the basis of reviewing the development of financial marketing in Islamic countries [6].

From the current domestic research content, many scholars believe that financial marketing needs to be changed, and in the post-epidemic normalization of the current, more need for marketing innovation. At present, the epidemic is not over, and there are few studies on the specific analysis of refined marketing innovation strategies, so this paper specifically analyzes the benefits of closed-loop financial marketing for enterprises. Finally, it provides reference opinions for corporate marketing innovation.

3. Model Establishment and Research

To explore the impact of closed-loop financial model on financial institutions, this paper selects two enterprises that apply this model and eight enterprises that do not apply it. Use N_1, N_2, ..., N_{10} represents (N_1, N_2 is a closed-loop finance company).

On the basis of combing the existing academic literature, this paper selects the number of customers, customer satisfaction, marketing conversion rate and marketing cost as the main indicators to evaluate marketing performance.

3.1. Establishment of index weight model

CRITIC weighting method is an objective weighting method, which mainly uses conflict index and contrast strength. The conflict is expressed by the correlation coefficient. If the correlation coefficient between the indicators is larger, the conflict is smaller, and the weight is lower. Contrast intensity is expressed by standard deviation, and if the standard deviation of data is larger, the fluctuation will be greater and the weight will be higher.

First of all, the four indicators are compared in conflict, that is, the correlation coefficient analysis. The correlation coefficient is calculated as follows, where the numerator is the covariance of the two factors and the denominator is the product of the standard deviations of the two factors.

$$\rho = \frac{cov(X,Y)}{\sigma_x, \sigma_y} \tag{1}$$

In the formula $cov(X,Y)$ is the covariance of X and Y, and D(X) and D(Y) are the variances of X and Y respectively.

Finally, we calculate the conflict and contrast strength, and get the weight result as shown in the figure below.

Table 1. Correlation coefficients of the four indicators

	Number of customers	Customer satisfaction	Marketing conversion Rate	Marketing cost
Number of customers	1.000	0.453	0.358	-0.709

Customer satisfaction	0.453	1.000	0.897	-0.893
Marketing conversion rate	0.358	0.897	1.000	-0.811
Marketing cost	-0.709	-0.893	-0.811	1.000

Through the analysis of the correlation coefficient, we can get the following conclusions:(1) There is a high correlation between customer satisfaction and marketing conversion rate, and the correlation coefficient is 0.897;(2) There is a negative correlation between customer satisfaction and marketing cost, and a small negative correlation between the number of customers and marketing cost, with the correlation coefficients of -0.893 and -0.709, respectively.

Quantitative indicator of the conflict between the j-th indicator and other indicators is $\sum_{i=1}^{n}(1-r_{ij})$.

Among, r_{ij} is the correlation coefficient between the evaluation index I and J.

Then, we analyze the contrast strength of the index. Due to the influence of dimension, we need to standardize the data. The processing formula is as follows:

$$y_i = \frac{x_i - \min\limits_{1 \leqslant j \leqslant n}\{x_j\}}{\max\limits_{1 \leqslant j \leqslant n}\{x_j\} - \min\limits_{1 \leqslant j \leqslant n}\{x_j\}} \tag{2}$$

Finally, we calculate the conflict and contrast strength, and get the weight result as shown in the following table.

Table 2. Weights of the four indicators

Index	Index variability	Index conflict	Amount of information	Weight
Number of customers	1.059	2.898	3.070	15.24%
Customer Satisfaction	1.874	2.543	4.765	23.66%
Marketing Conversion rate	1.494	2.557	3.821	18.97%
Marketing cost	1.567	5.414	8.484	42.12%

3.2. Establishment of Fuzzy Borda Evaluation Model

Compared with the single evaluation method, we can see from the above weight setting that the importance of the index lies more in efficiency. The fuzzy Borda analysis method takes efficiency as the main evaluation object, does not need the support of complex and diverse parameters, and can compare multiple decision-making units of the same type and complexity. It is very applicable when dealing with evaluation issues.

First, calculate each evaluation method for the evaluation unit i the "goodness of membership" of the score of $u_i^{(j)}$ .The fuzzy Borda method uses the range transformation formula as:

$$u_i^{(j)} = \frac{y_i^{(j)} - \min\{y_1^{(j)}, y_2^{(j)}, \ldots, y_n^{(j)}\}}{\max\{y_1^{(j)}, y_2^{(j)}, \ldots y_n^{(j)}\} - \min\{y_1^{(j)}\}} \times 0.9 + 0.1 \tag{3}$$

Among them, $y_i^{(j)}$ is the result of the i-th evaluation method of the j-th index.

Then, calculate the fuzzy frequency f_{ih} and the fuzzy frequency w_{ih} of the i-th evaluation unit at the h-th $(1 \leqslant h \leqslant n)$ position. The formula is:

$$f_i = \xi \hat{ui} E = (f_{i1} f_{i2} \ldots f_m)_{1\times n}^T \tag{4}$$

$$w_{ih} = \frac{f_{ih}}{\sum_{k=1}^{n} f_{ik}} \tag{5}$$

Among them, $\hat{ui} = \mathrm{diag}(u_i^{(1)} u_i^{(2)} \ldots u_i^{(m)}), E = (11 \ldots 1)_{1\times n}^T; \xi = [\xi_h^{(j)}]_{n\times m}$. If the j-th method ranks the i-th evaluation unit as the h-th place, record $\xi_h^{(j)} = 1$ and the rest as $\xi_l^{(j)} (l \neq h) = 0$.

Thirdly, calculate the conversion score of "ranking", the formula is:

$$Q_h = \frac{1}{2}(n-h)(n-h+1) \tag{6}$$

According to the above formula, the conversion component vector $Q = (Q_1 Q_2 \ldots Q_n)^T$ can be formed. In fact, the vector is a certain sequence. In this way, we can calculate the fuzzy Borda score of the i-th evaluation object. Then sort according to size, the formula is:

$$FB_i = \sum_{h=1}^{n} W_{ih} Q_h \tag{7}$$

In the end, we get the marketing performance rankings of these 10 financial institutions, with N_2 ranking as 1 and N_1 as 2.

The results show that companies that adopt the closed-loop financial model have satisfactory marketing performance. In the same industry, N_1 and N_2 customer satisfaction ranks in the forefront. Although the number of customers does not occupy an advantage, the stable customer source greatly reduces marketing costs, reduces unnecessary expenditures, and greatly improves marketing efficiency.

How to carry out financial marketing innovation ideas and practices under traditional thinking is nothing more than marketing concept innovation or environmental innovation, such as financial product and service design innovation, customized personalized service exclusive, etc., and again, it is the innovation of publicity and communication methods. And so on, and closed-loop finance no longer changes marketing from the product side, but focuses on the integrity and overall nature of marketing. If we save wasted resources, make accurate portraits of users, and establish user feedback mechanisms, then the benefits will be greatly improved; and digital methods are applied to this, that is, not to use manual but to use big data To do this, not only will the marketing speed increase, but the error rate will also decrease a lot.

4. Conclusions and Recommendations

In the context of digital marketing, the proposed closed-loop marketing model effectively captures customer needs, saves marketing costs, improves marketing efficiency, and can timely feedback customer information according to customer evaluation, further optimize the delivery, so as to go round and round, constantly circulate, and real-time monitor changes in customer needs. However, there are some shortcomings and difficulties in the practice of this model.

4.1. Analysis conclusions

(1) According to the current implementation of innovative marketing mode in China's financial industry, many enterprises and their marketing personnel's marketing concept is still under

the traditional marketing mode, and the closed-loop chain marketing mode in this paper still needs the operation of relevant marketing personnel in the process of promoting each link. This leads to the failure to match the new marketing model. Ensure that this mode runs smoothly.

(2) Moreover, in the process of customer portrait in the closed-loop chain marketing mode, the customer label system contained in the system can not cover all the characteristics of customers, and there is a phenomenon of vague label definition. Then it is impossible to make a detailed portrait of the customer according to the customer tag set, so the accuracy of the precise delivery link will be reduced.

(3) In addition, as a link between the past and the future in the model, the evaluation and feedback link is an inevitable requirement to achieve real-time monitoring of customer needs. However, according to the previous customer evaluation of financial products, it is found that most customers have very little effective evaluation content after purchasing financial products, and can not get effective information from it. Some customers will not choose to take the initiative to evaluate products, resulting in a longer implementation process of evaluation feedback and lower efficiency.

4.2. Recommendations

(1) In order to solve the difficult problem of mode operation, enterprise leaders realize that financial marketing is a collective behavior, which has a profound impact on employees in the collective, so they should strengthen the training of financial sales employees, create a collective atmosphere of financial sales under the new concept, and promote the transformation of employees' own concept.

(2) At the same time, when establishing a fine and perfect customer label system, it needs to be initially created according to the common characteristics of customers, and then add the types and quantities of labels in the system according to the different characteristics of each customer, so that each customer can finally correspond to the corresponding labels.

(3) In addition, we should establish an incentive mechanism for customer evaluation, dispatch customer service personnel to conduct telephone interviews with customers, and capture the real evaluation of customers. At the same time, the corresponding gifts or services are given, so as to monitor the customer's next needs in real time.

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