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Financial Statistical Analysis of Brand Loyalty and Customer Churn Rate Based on Social Media

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Abstract: This study tries to assess the effect of social media interaction on the relationship between brand loyalty and customer churn rate. Based on the results of an empirical analysis of relevant data in financial services, retail, and telecommunications, it has pointed out the essential role that brand loyalty plays in reducing customer churn rate. The results showed that there is a significant negative relevance between brand loyalty and customer churn rate; that is to say, with the increase of brand loyalty, customer churning rate would decline sharply. Meanwhile, social media interaction has a significant moderating effect in this relation; that is to say, under the high level of social media interaction, the inhibitory effect of brand loyalty on customer churning rate is more obvious. The finding provides important empirical evidence to show that strengthening the interaction in social media has the important practical significance for enterprises in enhancing brand loyalty and reducing customer churning rate. The paper gives guidance to enterprises in formulating more effective brand management strategies through an analysis of the intrinsic link between social media interaction, brand loyalty, and customer churning rate reflected in the data of social media.

Keywords: Social Media Interaction; Brand Loyalty; Customer Churn; Multivariate Regression Analysis; Empirical Research

1. Introduction

1.1 Research Background and Importance

Social media does not stop receiving widespread attention in the digital age, turning it into an important channel of interaction between brands and customers with respect to its influence on brand loyalty and customer churn. Companies would have to lean on social media as consumers' expectations for brands continued to increase, improve their connections with customers, and reduce customer churn by means of enhancing brand loyalty. Brand loyalty directly affects the purchasing decisions of customers and whether the customers will continue the long-term relationship with their brand [1]. Especially in the fields of higher competition, it has turned out that brand loyalty is an important issue for companies to maintain market share, such as financial services, retail, and telecommunications, where customers have more choices [2].

Social media is such a platform that can provide companies with an effective two-way interaction with the customers, which, in return, develops the emotional bond between customers and the brand. The emotional connection helps not only to improve customer loyalty but also directly impacts the financial performance of the company due to reduced customer churn [3]. Moreover, day-by-day improvement of technology in social media enhances the capability to obtain and analyze data on customer behavior. More precise prediction of customer behavior can provide companies an opportunity to optimize marketing strategies and further reduce churners [4].

1.2 Research Objectives

This study attempts to explore, through an empirical analysis approach, the moderation effect of social media on brand loyalty and customer churn. Specifically, it shall delve into how social media interactions enhance brand loyalty and Hamper Customer churning in the Financial Services, Retail, and Telecommunication sectors. This paper will apply multiple regression analysis methods with real data to disclose the inner relationship

between brand loyalty and customer churn, exploring the regulating effect of social media interaction on that relationship. Research findings will also turn into empirical evidence to provide companies with more effective ways of formulating brand management and strategies for retaining customers in a digital environment, which is of important practical significance.

2. Literature Review

2.1 Definition and Influencing Factors of Brand Loyalty

Brand loyalty refers to the continued preference and repeated purchase behavior of consumers for a specific brand, and is one of the key indicators of brand success. Brand loyalty is usually measured by customers' continued purchase intention, brand recommendation and ability to resist competing brands. There are many factors that influence brand loyalty, among which brand trust, brand emotion, and brand-consumer interaction are considered to be the most important factors[5]. Research shows that brand trust is one of the main drivers of brand loyalty, and the establishment of trust usually depends on brand consistency, transparency, and positive feedback from customer experience[6]. In addition, brand emotion, that is, consumers' emotional attachment to the brand, also significantly affects brand loyalty. Positive interactions between brands and consumers, such as through social media platforms, can further enhance this emotional attachment, thereby improving brand loyalty[7].

Brand image and brand identity are also influential towards brand loyalty. Brand image is defined as a summation of perceptions by the consumers about the brand, which doncidentally has a direct bearing on the loyalty and purchasing decisions of the consumers [8]. Brand identity refers to positioning by the consumer his or her self in the brand, which is termed as whether or not the consumer looks upon the brand as some sort of extension of the self-image of himself or herself [9]. When the consumer finds self-identity in the brand, then the loyalty often goes up radically. Therefore, brand managers have to increase the level of brand loyalty by building a positive brand image and

strengthening the emotional connection between the brand and consumers. All these factors that determine brand loyalty interact and interlink in a complex dynamics of brand loyalty.

2.2 Theory and Research on Customer Churn Rate

Customer Churn Rate represents the ratio of customers who have stopped using a certain brand or service during a specific period. It is one of the important indicators that measure how well customer relationship management is done [10]. The level of customer churn rate directly influences an enterprise's profitability and market share. Therefore, in order to strategically design customer retention strategies, an enterprise needs to understand the motives of churn. Customer churn is usually due to a decrease in customer satisfaction, attraction by competitors, and price sensitivity [11]. Customer churn theory mainly focuses on how to reduce churn rate by improving customer satisfaction, increasing customer switching costs, and enhancing customer relationships [12].

Theoretical research points out that customer satisfaction is a key factor in preventing customer churn [13]. Greater the satisfaction, lesser will be the expectation to have customer churn. Additionally, increasing the switching cost of the customers is also an effective strategy for customer retention, such as increasing the cost of switching from customers to competing brands with long-term contracts, point-based programs, or other forms of rewards for customer loyalty in every possible way. On the contrary, emotional connection is also one of the effective ways through which the probability of customer churn can potentially be minimized [14]. In general, the emotional bond between enterprise and customer is an important factor that influences the retention of customers, especially in service industries and high-touch industries [15].

2.3 The role of Social Media in Brand Loyalty and Customer Churn

As one of the main platforms for modern brands to interact with consumers, social media has an important impact on brand loyalty and customer churn. Studies have shown that social media can improve brand

loyalty by enhancing the interaction between brands and consumers, thereby effectively reducing customer churn[16]. On social media platforms, brands can enhance consumers' sense of participation and dependence on brands by publishing consumer-related content, conducting interactive activities, and providing personalized services[17]. This interaction can not only improve consumers' brand awareness and brand recognition, but also further enhance brand loyalty through positive customer experience and word-of-mouth communication[18].

Social media also provides brands with a channel to quickly respond to customer needs and solve problems, which greatly reduces customer churn caused by service dissatisfaction[19]. By effectively using social media, brands can build a stronger customer relationship network, enhance customer loyalty, and reduce the risk of customer churn[20]. In addition, the word-of-mouth effect of social media also has an important impact on customers' brand choice. Positive social media reviews and recommendations can significantly enhance the attractiveness of a brand, while negative reviews may increase customer churn. Therefore, a brand's presence on social media directly affects the effectiveness of its customer retention strategy.

3. Research Methods

3.1 Data Source and Sample Selection

The data for this study comes from public user comments and interaction data on social media platforms, combined with customer churn data in the financial sector. Sample selection is based on the following criteria:

① Industries that are active on social media and have a broad customer base, such as financial services, retail, and telecommunications, were selected.

② The time span is the last five years to capture the long-term impact of social media on brand loyalty and customer churn.

③ Inactive users and records lacking key variables were removed during data filtering to ensure the accuracy and effectiveness of the analysis.

Among them, θ_0 is a constant term, θ_1 is the coefficient of social media interaction on

3.2 Variable Definition and Measurement Method

In this study, the main variables include brand loyalty, customer churn, and social media interaction indicators. The specific definitions are as follows:

Brand Loyalty (BL): measured by users' active interactions on social media (such as comments, likes, and sharing times). This variable is defined as the sum of a series of standardized scores:

$$BL = \sum_{i=1}^{n} \left(\frac{x_i - \mu_x}{\sigma_x} \right) \tag{1}$$

Among them, x_i represents the number of interactions of each user, μ_x and σ_x represent the mean and standard deviation of the sample respectively.

Customer Churn Rate (CR): It is defined as the ratio of the number of customers who cancel the service in a specific time period to the total number of customers. The calculation formula is as follows:

$$CR = \frac{C_{lost}}{C_{total}} \times 100\% \tag{2}$$

Among them, C_{lost} is the number of lost customers, and C_{total} is the total number of customers.

Social Media Interaction (SMI): This variable includes the frequency and depth of user interaction on the brand's social media pages and is represented by the following formula:

$$SMI = \alpha \times C_{comments} + \beta \times L_{likes} + \gamma \times S_{shares} \tag{3}$$

Among them, $C_{comments}$, L_{likes} and S_{shares} represent the number of comments, likes and shares respectively, and α, β and γ are the corresponding weight coefficients.

3.3 Data Analysis Method and Model Selection

This study uses multiple regression analysis to explore the impact of social media interaction on brand loyalty and its impact on customer churn rate. The main models are:

Brand loyalty model:

$$BL = \theta_0 + \theta_1 \times SMI + \grave{o} \tag{4}$$

brand loyalty, and $\grave{o}$ is an error term.

Customer churn rate model:

$$CR = \phi_0 + \phi_1 \times BL + \phi_2 \times SMI + \grave{o} \tag{5}$$

Among them, ϕ_0 is a constant term, ϕ_1 and ϕ_2 are the coefficients of brand loyalty and social media interaction on customer churn rate, and δ is an error term.
Moderating effect model:

$$CR = \gamma_0 + \gamma_1 \times BL + \gamma_2 \times SMI + \gamma_3 \times (BL \times SMI) + \delta \qquad (6)$$

Among them, γ_3 is the moderating effect coefficient of social media interaction on the relationship between brand loyalty and customer churn rate.

4. Empirical Analysis

4.1 Analysis of the Impact of Brand Loyalty on Customer Churn Rate

This study selected sample data from the financial services, retail and telecommunications industries. The sample data covers social media interaction data of 200 companies in the three major industries and their corresponding customer churn rate and brand loyalty information. These data include more than 50,000 user comments and interaction records in the past five years, combined with the company's actual customer churn data to ensure the representativeness and reliability of the analysis results.

According to the model we defined earlier,

brand loyalty data (BL) and customer churn rate data (CR) obtained from social media were used for analysis. The following figure shows the linear relationship between brand loyalty and customer churn rate:
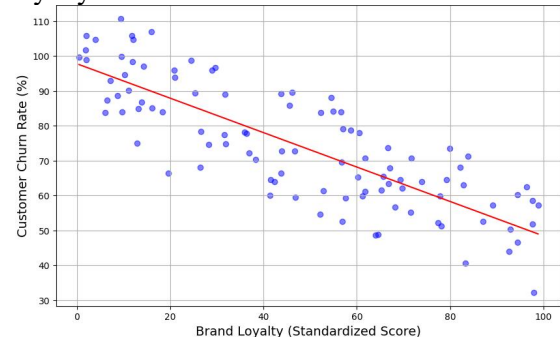

Figure 1. The Impact of Brand Loyalty on Customer Churn Rate

Figure 1 shows the relationship between brand loyalty (horizontal axis) and customer churn (vertical axis). The results show that there is a significant negative correlation between brand loyalty and customer churn. This means that as brand loyalty increases, customer churn rates decrease significantly. This finding supports theoretical predictions that brand loyalty can effectively reduce customer churn and enhance customer long-term value. In addition, Table 1 shows the specific parameter estimates of the regression model:

Table 1: Regression Analysis Results of Brand Loyalty on Customer Churn Rate

Variable	Coefficient	Standard Error	t-Statistic	p-Value
Intercept	105.4	2.3	45.8	0.000
Brand Loyalty	-0.52	0.05	-10.4	0.000

The regression results in Table 1 further confirm the negative impact of brand loyalty on customer churn rate. The coefficient is -0.52, indicating that for every unit increase in brand loyalty, the customer churn rate will decrease by 0.52 percentage points, and this effect is statistically significant.

4.2 The moderating effect of social media interaction on brand loyalty

We analyzed the moderating effect of social media interaction (SMI) on the relationship between brand loyalty (BL) and customer churn rate (CR). Figure 2 shows the impact of brand loyalty on customer churn rate at different levels of social media interaction.

Figure 2: The moderating role of social media interaction level on the link between brand loyalty and customer churn rate. It can be observed from the graph that at its high levels, green dots, the negative influence of brand

loyalty on customer churn rate is much stronger, while for low levels of social media interactions, this effect is attenuated. This will reveal that the use of social media enhances the positive inhibitory effect of brand loyalty on customer churn rate.

Figure 2. The Moderating Effect of Social Media Interaction on the Relationship Between Brand Loyalty and Customer Churn

5.Conclusion

This study reveals the central moderating role played by social media interaction between brand loyalty and customer churn through empirical analysis of social media interaction data and brand loyalty linked with customer churn rates of 200 companies in the financial services, retail, and telecommunications industries. The key findings are as follows: First, there exists a strong negative relationship between brand loyalty and the customer churn rate. That is, the rate of customer churn is seen to decrease strongly as brand loyalty increases. This fact validates that brand loyalty has a great impact on customer retention, and it indicates brand loyalty as one of the core factors that determine the success of any company over an extended period of time.

Second, social media interaction has a significant moderating effect on the relationship between brand loyalty and customer churn rate. Under high levels of social media interaction, the inhibitory effect of brand loyalty on customer churn rate is more obvious. This suggests that by enhancing social media interaction, companies can further strengthen the positive impact of brand loyalty on customer churn rate. This finding has important practical significance for corporate management, suggesting that companies should increase their investment in social media platforms to promote interaction with customers, thereby improving brand loyalty and reducing customer churn rate.

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