A Study of Factors Affecting Sales Volumes with the Example of Online Takeaway Milk Tea Stores

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Abstract. In China, online takeaway platforms have gained significant importance in people's lives following the wide access to the Internet and smartphones. Therefore, as the milk tea industry rose in China, online takeaway milk tea stores also gained increasing popularity. This paper focuses on potential factors of the monthly sales volume of online takeaway industries, including the average price, the customer rating, the number of positive comments, and the minimum fee. Thirty samples were taken from the thirty most typical online takeaway milk tea brands, and a multiple regression analysis was conducted. The multiple regression analysis results show that the number of positive comments has a significant and positive association with the monthly sales volume, and the other three factors show no significant relationship with the monthly sales volume. This result indicates that the feedback of customers should be paid more attention to compared to the other three factors when running an online takeaway milk tea store, and more factors should be analyzed in future studies to determine a more precise model for the monthly sales volume.

Keywords: Sales volume, online takeaway industry, milk tea, multiple regression analysis, factors.

1. Introduction

As the Internet becomes increasingly accessible, Internet-based industries are rising rapidly. One important Internet application in China is the online takeaway industry. Among all kinds of food sold on the takeaway platforms, milk tea is an unneglectable product. The data from Meituan-Dianping Takeaway shows that the market scale of tea-related beverages reached 410 billion at the end of 2020, and this number is anticipated to expand in the future. Nevertheless, though the milk tea industry has been put emphasis on these years, few such stores can last long. Many online takeaway milk tea stores closed up within one year. Hence, this paper aims to investigate factors associated with the sales volume of online takeaway milk tea stores to determine how these stores can maximize their sales.

Since the online takeaway milk tea industry gained popularity only recently, studies on this topic are still new. Most related studies focused on the influencers of the sales volume of brick-and-mortar milk tea stores, which often cannot be applied to online takeaway milk tea stores. For instance, the study by Huang, Ji, and Hu investigated if the sales volume can be affected by the services and environments of brick-and-mortar stores. These factors are clearly not seen for online takeaway milk tea stores [1]. As a result, this paper will be meaningful for those who are interested in starting up online takeaway milk tea stores, given the difficulty of running such stores and the fact that few statistics can be found regarding this topic.

Though factors affecting the sales volume of online takeaway milk tea stores are rarely studied, there has been much literature investigating factors that affect customers' purchase intention in general. Many factors have been determined as having statistically significant associations with purchase intentions, with one of the most important ones being price.

Chang and Wildt's empirical study in 1994 found that the objective price can affect customers' purchase intention with a rather complex procedure. They discovered that the objective price is positively associated with the perceived price, which is customers' subjective perceptions of the objective price [2]. The Perceived price then negatively influences the perceived value, which positively affects the customers' purchase intention. Therefore, as the objective price increases, the perceived price increases, the perceived value decreases, and the purchase intention decreases. This theory, moreover, is supported by the study of Chiang and Fang in 2007, which investigated the

intention of students at a major Midwestern university to book a specific hotel during a summer break [3].

On the other hand, though most studies are aligned with this relationship between the price and the purchase intention, some papers did deny it. For instance, Mirabi, Akbariyeh, and Tahmasebifard did not discover a significant association between the two variables for their study with 30 questionnaires in 2015, and the regression results of the study of Younus presented a weak association between the perceived value and the purchase intention [4] [5]. This paper will investigate if there exists a significant relationship between the purchase intention and the price of online takeaway milk tea stores.

Another potential factor of the purchase intention is the customers' comments and reviews for a certain product. Studies have revealed that social influence, or the influence based on the opinions and experiences of other users, is significantly associated with customers' purchase intention [6]. And in particular, both the quality and the number of comments received by a certain store show a significant association with the purchase intention [7]. Other researchers investigated in detail what kinds of comments would influence customers' purchase intention. It was concluded that relevancy, accuracy, timeliness, and comprehensiveness all determine if a comment will influence purchase intentions [8]. Also, Mao and He discovered that comments on a store's taste and service show significant associations with purchase intentions while these on packaging and price do not [9]. Moreover, the study by Yue Wen further assessed the customer's rating of an online takeaway store to be significantly associated with the purchase intention, making customers' rating a liable factor affecting the sales of online takeaway milk tea stores [10].

Another potential influencer of the sales volume of online takeaway milk tea stores is the minimum fee to deliver (most stores are willing to deliver only when the total fee paid by a customer reaches a certain amount). Since online takeaway platforms have only risen for a few years, there are not many studies that looked at the minimum fee, a unique feature of this new industry. Hence, though the study of Zhu, Zou, and Zheng concluded that the minimum fee did not show a statistically significant association with purchase intentions, it is arguable if this conclusion can be applied to online takeaway milk tea stores, and this factor is worth investigating [11].

All in all, based on the previous literature, this paper will be investigating the relationships between the average price, the rating of customers, the number of positive comments, and the minimum fee of an online takeaway milk tea store and its sales volume in order to find factors that should be focused on running an online takeaway milk tea store, which otherwise lacks investigation and research.

2. Methods

2.1. Data Collection

In order to analyze the relationships between the monthly sales volume and the four explanatory variables (the average price, the customer rating, the number of positive comments, and the minimum fee), this paper collected data from 30 online takeaway milk tea stores on the Meituan platform. The 30 stores were selected based on the 30 most typical milk tea stores determined by the China Chain Store & Franchise Association and the most recommended online takeaway milk tea stores presented on the Meituan platform. The required data were all available on the Meituan platform, and they were recorded and summarized for analysis.

2.2. Research Protocol

Among all the literature reviewed, one of the most commonly used analysis methods was the multiple regression analysis, which analyzes the relationship between multiple explanatory variables and the response variable, the coefficients, as well as the percentage of change in the response variable that accounted on the explanatory variables. This paper will conduct a multiple regression analysis for the relationships between the monthly sales volume of the online takeaway milk tea stores and the four explanatory variables (average price, customer rating, number of positive comments, and

minimum fee) using SPSSAU, the online SPSS analyzer and determine the factors that have significant relationships with the monthly sales volume.

2.3. Hypotheses

In order to test if the four explanatory variables are factors affecting the monthly sales volume, four null hypotheses need to be developed:

H_1: The average price does not have a significant relationship with the monthly sales volume on average.

H_2: The customer rating does not have a significant relationship with the monthly sales volume on average.

H_3: The number of positive comments does not have a significant relationship with the monthly sales volume on average.

H_4: The minimum fee does not have a significant relationship with the monthly sales volume on average.

The corresponding alternative hypotheses are:

H_{a1}: The average price has a significant relationship with the monthly sales volume on average.

H_{a2}: The customer rating has a significant relationship with the monthly sales volume on average.

H_{a3}: The number of positive comments has a significant relationship with the monthly sales volume on average.

H_{a4}: The minimum fee has a significant relationship with the monthly sales volume on average.

The multiple regression analysis will be carried out with a significance level α of 0.05. If the p-value is smaller than the significance level, then the corresponding null hypothesis will be rejected, and the corresponding alternative hypothesis will be supported.

3. Results and Discussion

3.1. Data Summary

The monthly sales volume, average price, customer rating, number of positive comments, and minimum fee can be summarized in the figures below.

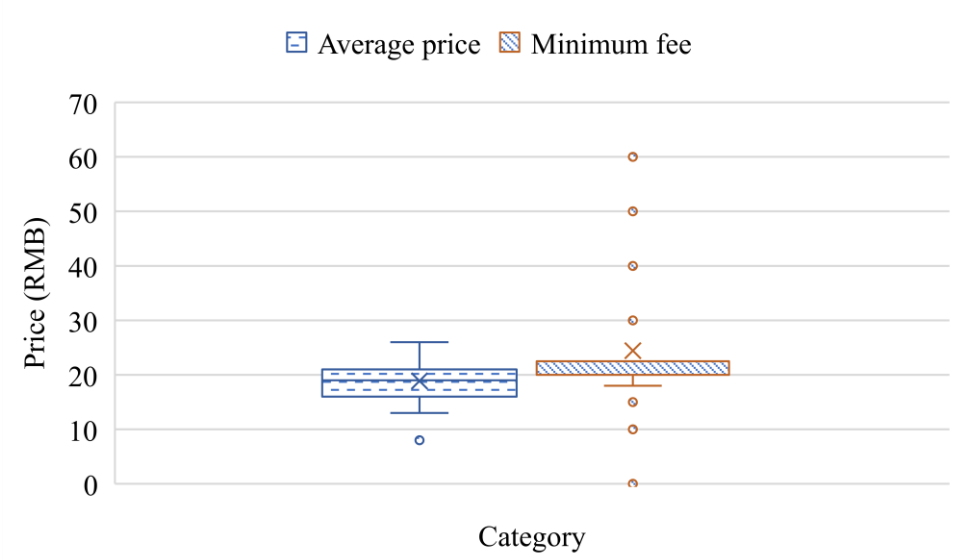


Figure 1. The boxplots for the average price and the minimum fee

Figure 1 shows the boxplots for the average price and the minimum fee. As shown in the figure, the average price has a median of 19 RMB and is relatively densely distributed with an IQR of 5, though an outlier exists at 8 RMB. The minimum fee is even more concentrated, with an IQR of 2.5. Nevertheless, seven outliers exist, enlarging the range.

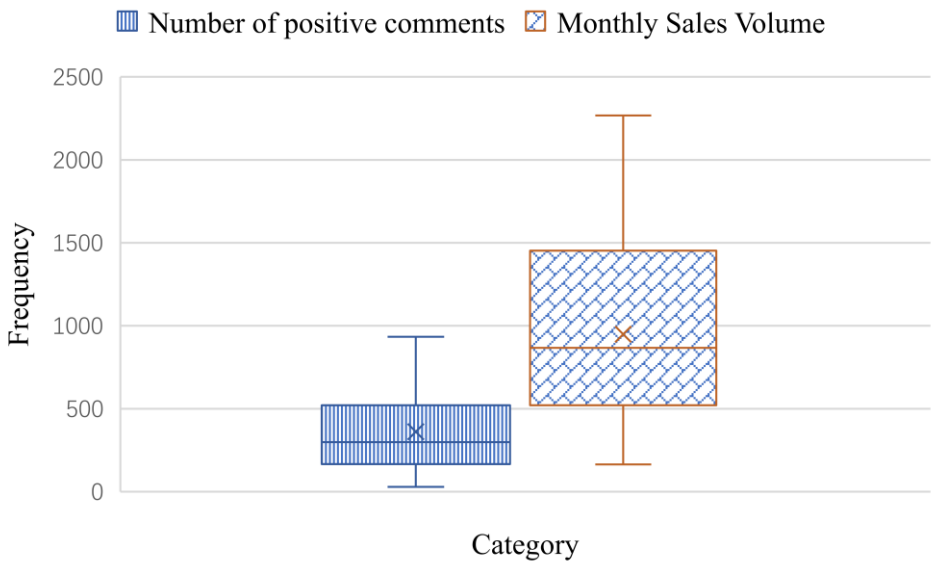


Figure 2. The boxplots for the number of positive comments and the monthly sales volume

Figure 2 presents the boxplots for the monthly sales volume and the number of positive comments. The monthly sales volume is rather spread out, with a median of 866.5 and an IQR of 931.25. The number of positive comments centers around 361.733, with an IQR of 354 and a range of 905. No outliers exist on either plot.



Figure 3. The bar chart of the customer rating

Lastly, the histogram for the customer rating data is shown in figure 3. The customer rating on the Meituan platform is 1 through 5, with ratings above 4 showing a positive attitude. The customer rating of the 30 samples ranges from 4.3 to 5, meaning that the ratings are generally high. One-third of the samples are within the range of (4.6, 4.7], and the histogram is slightly skewed to the left.

After collecting these data, a multiple regression analysis will be made.

3.2. Analysis Results

The four explanatory variables, the average price, the customer rating, the number of positive comments, and the minimum fee, underwent a multiple linear regression process that tested their associations with the monthly sales volume of online takeaway milk tea stores.

In order to simplify the illustrations, the average price, customer rating, number of positive comments, minimum fee, and monthly sales volume will be denoted as AP, CR, NPC, MF, and MSV. The result of the multiple linear regression analysis is shown in Table 1.

Table 1. The multiple linear regression analysis result

	Unstandardized Coefficients		Standardized Coefficients	t-value	p-value	VIF
	B	Std. Error	Beta			
Constant	2358.204	2472.053	-	0.954	0.349	-
AP	-22.763	23.679	-0.166	-0.961	0.346	1.092
CR	-253.594	489.485	-0.092	-0.518	0.609	1.168
NPC	1.135	0.392	0.505	2.896	0.008**	1.118
MF	-7.6	7.746	-0.179	-0.981	0.336	1.226
R^2	0.321					
Adj. R^2	0.212					
F	F (4,25)=2.948,p=0.040					
D-W Value	2.002					
Response Variable: MSV (Monthly Sales Volume)						

Note: * p<0.05 ** p<0.01

First of all, the F-test, or the joint hypothesis test, was carried out before the regression analysis. With an F of approximately 2.948, the corresponding p-value is 0.04<0.05, meaning that at least one of the explanatory variables has a significant association with the response variable, and the model works. Also, since the VIF values for all the explanatory variables are less than five (1.092, 1.168, 1.118, and 1.226), multicollinearity is not assessed to exist in the model. Hence, the following analysis regarding the associations between the explanatory variables and the response variable can be carried out.

According to the regression analysis result, the average price has a regression coefficient of -22.763, which produces a t-value of -0.961 and a p-value of 0.345>0.05, failing to reject the null hypothesis H_1. In other words, there is not enough evidence to prove that the monthly sales volume has a significant relationship with the average price. This result may seem unreasonable, for it contradicts common sense and the conclusions drawn in some literature investigating factors of customers' purchase intentions described previously. Nevertheless, this result can be explained when considering other potential factors affecting the sales volume. Mirabi, Akbariyeh, and Tahmasebifard's study analyzed the factor "brand name." With a t-value of 0.778, this factor presented a positive and significant relationship with customers' purchase intention. In the meantime, the null hypothesis stating that the product price is a factor of customers' purchase intention was rejected with a t-value of 2.588. This result shows that for some products, the brand is more influential than the price. Some customers may prefer to buy a product of a certain brand even if the price is higher than that of other brands. The milk tea industry might be such an industry where brand popularity plays a big role in customers' choices, and this factor can be studied and analyzed in future studies.

The second null hypothesis, H_2, is also rejected with a p-value of 0.609>0.05, meaning that there is no significant relationship shown between the customer rating and the monthly sales volume. H_4, with a t-value of -0.981 and a p-value of 0.336>0.05, is rejected as well, meaning that the minimum fee is not proven to be a factor in the monthly sales volume.

The number of positive comments, in contrast to the other three factors, shows a positive and significant relationship with the monthly sales volume. It has a t-value of 2.896 and a p-value of 0.008<0.05, meaning that H_3 is rejected and the number of positive comments is a factor affecting the monthly sales volume. In addition, the unstandardized coefficient of 1.135 indicates that one unit of increase in the number of positive comments is estimated to be aligned with 1.135 units of increase in the monthly sales volume.

Finally, when looking at the model as a whole, it has this formula below:

$$\text{Expected MSV} = 2358.204 - 22.763\text{AP} - 253.594\text{CR} + 1.135\text{NPC} - 7.600\text{MF} \quad (1)$$

The R^2 of 0.321 indicates that the four explanatory factors in total account for 32.1% of the changes in the monthly sales volume, meaning that a part of the purchase intention can be explained by those examined factors and the model above, while other factors should be explored in future studies.

4. Conclusion

In summary, this paper studies the factors influencing the monthly sales volume of online takeaway milk tea stores. Since the online takeaway milk tea store is a newly-developed industry, it is explored by few existing studies. Given the fact that this industry is popular and promising while the business is rather difficult to maintain, this paper will provide people who want to start up an online takeaway milk tea store hints on what aspects to focus on when running the business in order to raise their sales volume.

This paper focused on four explanatory factors: the average price, the customer rating, the number of positive comments, and the minimum fee. Among all four of them, only the number of positive comments shows a positive and significant relationship with the monthly sales volume, which is consistent with the previous literature. The other three variables do not show significant associations with the monthly sales volume. Though this result may seem to be against the former studies and common sense, it becomes more understandable in light of other potential influencers of the monthly sales volume that are not analyzed in this paper, such as brand name. When taking only the four explanatory variables into consideration, the analysis result shows that, compared to the pricing, store owners should pay more attention to the feedback of customers and try to have more positive comments in order to raise the monthly sales volume of an online takeaway milk tea store.

Altogether, the four explanatory variables can explain 32.1% of the changes in the monthly sales volume. That being said, there exist other factors affecting the monthly sales volume. One potential factor is the brand name mentioned previously. Advertising strategies, product qualities, and discounts are also possible influencers of the monthly sales volume studied in the previous literature that can be analyzed in the future.

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