Factors Influencing the Sales of Paid Membership
Evidence from Video Software Markets in China

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ABSTRACT

In recent years, the number of video software paid members in China has increased sharply. At present, the development of the video industry is relatively mature. The tightening of national copyright policies and the people's need for entertainment also helps the video software to grow faster. This paper utilize the data of the top five video software businesses, to study the sales of video software membership and its influencing factors such as price, Ad volume level, and video acquisition volume. Then we arrived at the conclusion after multiple regression and hypothesis testing, calculating t-values and p-values. The video acquisition volume has the most significant impact on demand of the video software membership. Therefore, video software enterprises should focus on the expansion of their internal capacity, such as enlarging the volume of video's copyright they have.

Keywords: video software; paid membership; multiple regression; video volume.

1. INTRODUCTION

Video software was becoming the most convenient and important way for people to get information due to the development of technology. As of June 2019, the number of online video users in China was nearly 759 million, and the utilization rate of online video reached 88.8%, maintaining a high level [1]. The importance of video software is significant especially during 2020. People were all staying at home because of COVID-19, so their daily activities become monotonous. thus, watching TV series, movies and variety shows became their major entertainment. People are now used to watching movies, news, and variety shows in video software due to its characteristic of not being limited by time and space.

The video membership had not appeared when it first entered the Chinese market, the video websites are free for everyone to watch. The membership had become the main source of income for the video companies as the increasing growth of users after many websites transferred to software and also after many new video software been published. Tencent, Youku, and IQIYI were in the first echelon; Mango and Bilibili were in the sec-

ond echelon by 2020 [2]. 41.1% of Tencent Video's revenue was made up by the demand for memberships in the first half-year-old 2019 [3].

As time pasts, the factors which influence the demand for video membership is changing. The price of it was the major factor at the beginning because there had less software for people to choose from. After a period of time, the competitive pressure keeps increasing, so the reason for the video software users became more and more, too. Therefore, changing the structure of the software to keep up with user needs will be the most important thing to increase the demand of the membership.

2. RELATED THEORIES

2.1. The Marketing Theory

Marketing theory puts forward the 4C (Customer, Cost, Convenience, Communication) marketing theory, which is oriented by consumer demand and resets the four basic elements of marketing mix: aiming at consumer demand and expectation (Customer). First of all, we should understand, study and analyze the needs and desires of consumers, rather than consider what products enterprises can produce; The Cost that the consumer is willing to pay.

First, understand how much consumers are willing to pay to satisfy their needs and desires, rather than the price of the product; The Convenience of purchase by consumers. First consider how to provide convenience to consumers in the transaction process such as shopping, rather than the choice and strategy of sales channels; Communicate with consumers. It is very important to take consumers as the center to implement marketing communication. Through interaction, communication, and other ways, the internal and external marketing of the enterprise is constantly integrated, and the interests of both consumers and enterprises are invisibly integrated together

The arrival of the information society will change the operation mode of traditional marketing. Virtual marketing based on Internet technology will not only replace the traditional way of transaction but also transform the market competition from physical space to virtual space. In the era of the knowledge economy, the combination of marketing factors is the combination of information and Internet technology. The integration of high-tech based on Internet technology and marketing resources will generate a new marketing model -- marketing virtualization, and consumers' consumption behavior will be transformed into digital behavior through the Internet. 20th-century industrial era to create marketing 4 ps elements with the Internet technology resources integration, to establish a global uniform and abstract of the market, it is not restricted by space, 24-hour online marketing, a product or service can be real-time transfer to any corner of the world, the promotion of products and services are no longer deals directly with customers face to face, but with the help of computers and the Internet to meet customers directly on the Internet, customers are no longer passive to accept goods or services, but actively establish interactive business relations with enterprises.

Investigation can be independent of time and space. The investigation is a common method in scientific research, which can be used in descriptive, explanatory, and exploratory research. It generally takes individuals as the unit of analysis through the basic steps of sampling and analyzes the inquiries of respondents through questionnaires, interviews, and other methods to carry out research. This method is proposed in [4]

2.2. The Demand Theory

The price of the video software membership is related to the demand theory, in which demand is related to consumers' income, products' substitution, and the addiction level. Moreover, the price elasticity of demand (PED), the income elasticity of demand (YED), and the cross elasticity of demand (XED) can be used to describe the relationship between the consumptions and their factors.

PED is the percentage change in quantity demand divided by the percentage changing the price of product.If PED is elastic, a change in price can result in a decrease

in revenue. If PED is inelastic, a change in price may result in an increase in revenue.

YED is the percentage change in quantity demand dived by the percentage changed in consumers' income. When YED<1, it is a necessity; When YED>1, it is a luxury.

XED is the percentage changed in quantity demand of a good divided by the percentage changed in price of another good. When XED>0, the two goods are substitutes. When XED=0, the two goods are unrelated. When XED<0, the two goods are complements [6].

For the video apps membership, the PED of it has not been calculated specifically, but the "buy one get one free" sales method of Youku had increased the demand of the membership sign in 2020 [7]. In this situation, it is clear that the PED of the video software membership is elastic, which decrease in price will increase the consumption.

3. METHODOLOGY

After selecting all raw data from the website and question-naire, We found this relationship through a numerical and computational method, which is different from the previous paper using theoretical logic provided not so accurate results like [8]. We used the multiple regression model that was simi-lar to [9].

3.1. Economical Model

We firstly do the hypothesis testing. The null hypothesis is that those factors we searched could not be the influence factors on the sales of video membership. We entered our independent variable and dependent variable data in the data analyst column of the excel sheet. And our T-testing confirms that all factors are suitable variables and obtain the regression equation for it, which is y=aV-bP+cA

3.1.1. Regression Analysis

The regression models describe the causal relationship between a dependent variable and the independent variable.

Y is at the dependent variable, x is the independent variable, and b_0 and b_1 represent the coefficient of different independent variables.

The larger the coefficient is, the bigger the impact it will have on the Y value.

$$Y = b_0 + b_1 x$$

In the above, Y is the number of video software membership, and Xs are price, Ad volume level, and video acquisition volume.

3.1.2. Hypothesis Testing- Test Statistics

The T-test is used to determine whether a process or treatment actually has an effect on the population of interest.

x̄ is the observed mean of the sample, μ is the theoretical mean of the population, s is the standard deviation of the sample, and n is the sample size.

$$t = (\bar{x} - \mu) / (s / \sqrt{n})$$

In the above, x̄ is the mean of each of the video software, μ is the mean of all the five video software, and n is five.

3.1.3. Coefficient of Determination (R^2)

R^2 represents the proportion of the variance for a dependent variable that's explained by an independent variable or variables in a regression model.

R^2= Explained variation/ total variation

3.1.4. Probability Value (P-Value)

P-value is the probability of obtaining a value of test statistic more extreme than the observed sample value given H0 is true.

When p-value<a (level of significance), then the H0 needs to be rejected.

3.2. Variables Selection

We found out the independent variables by searching several articles that analyze the factors which influence the demand of the video software membership. The factors include but are not limited to 1. Improved in the policy of copyright; 2. opportunity costs such as time costs and transaction cost; 3. numbers of favorite content, etc. For the improvement in the copyright policy, it is hard to represent it In numerical details, because it is distributed in many parts of the daily lives. Also, the transaction costs such as differences in mode of payment are not significant. This is because the current payment channels have become very perfect in the Chinese market, for example, WeChat and Alipay. The paying process of the scan code payment function is constantly simplified, too. Therefore, the number of favorite content of the video software consumers became a factor which this paper selected to reach. Most of them show that the software should promote more high-quality content to increase their sales [2]. Moreover, we choose the price and the ad volume level as the independent variables because they are obviously the basic factors of demand. It is basically three steps in terms of how do we find the data. We look for data in four categories: membership price, video content, AD spending, and sales of memberships of different apps (AIQIYI, Tencent, Bilibili, Youku, Mango).

3.2.1. Price

Firstly, we downloaded all the five video softwares, and go to the membership page in these apps to check the member's price. Also, we found the financial statements of five video app companies, through which we determined the income of each company in the membership system and go to the membership page in these apps to check the member's price.

3.2.2. AD spending

After that, we made a questionnaire and forwarded it to the public. Through this questionnaire, we determined the content acquisition amount of these video software by the public, the popularity of the software, and the proportion of members buying the software, etc. However, most of the people filling in the questionnaire are between 15 and 25 years old, which lacks the opinions of many older people. In addition, it is difficult to determine whether they have filled in the questionnaire carefully, if not, it will greatly affect the accuracy of our final data. Therefore, we deny this method to find data. After that, we used a professional enterprise data analyzer, Appgrowing, to obtain the amount of advertising each company was spending at a certain time interval(from 2021 .7.19 to 2021 10. 17).

3.2.3. Video acquisition volume

We first search the most popular movies all over the world in these few years and the ten most popular TV drama programs of China in 2020, and then see which of these apps has more copyrights of these movies and TV shows to determine the video software's content volume.

3.2.4. Amount of membership

This research confirm the number of sales of video membership through the annual report for 2020 of the five different video software company. The tables below shows the average values of the five companies of their video acquisition volume, price, ad volume level and their user due to the end of 2020.

Table 1. Adjusted Raw data

Variable	Mean	Std. dev.	Min	Max
Video acquisition volume	41%	21.5407	15%	70%
Price (per month)	23.6	4.2237	18	30
Ad volume level (ten thousand)	2.33202	4.2901	0.0034	4.7928
User (hundred million)	0.73146	0.3929	0.179	1.2

Data source: App growing, qianzhan

4. RESULTS AND DISCUSSION

4.1. Experiment Results

According to the regression model, we obtained these following results.

Table 2. Regression results

	Coefficients	standard error	t Stat	P-value
Video acquisi-tion volume	1.9165	0.0254	75.4260	0.00844
price	-0.0338	0.0013	-25.1786	0.02527
Ad volume level (ten thou-sand)	0.0264	0.0028	9.4264	0.06728

Table II shows that all P-values are lower than 0.1, which means all variables have a significant effect and they can be regarded as the independent variables of the regression equation. The coefficient of advertisement and video acquisition volume is positive, which means that both of them have positive influences on the sales of membership.

It is universally acknowledged that there is a positive relationship between video acquisition and the sales of membership. Here are interview questions from a famous electronic product company: A cow wants to cross the bridge, the maximum load of the tree is 200kg, while the mass of the cow is 300 kg. What should the farmer do? The point is not that how to help the cow cross the bridge, but why instead. If he can figure out the reason why the cow wants to cross it and bring those things back to the bridge, the question is solved. This story is similar to the relationship between the producer and consumers. The producer has to know what the flavor of the consumers is and provide them so as to cater to consumers' prefer-ences and increase sales. Compared with the apps that possess lower video acquisition level, the one with greater content obviously has higher competition and be able to attract more customers. That is why the more pa-tents video app has, the more consumers it will gain. The result is consistent with our common sense. The price has a negative coefficient, as mentioned above, the PED of membership is elastic, when price reduce a little bit, quantity demanded for it will rise at a higher proportion, which is consistent with our common sense. The higher the price is, the fewer people would prefer to buy the product.

The ad volume level of the membership of the video apps has positive effects on their demand quantities. This is because the video apps market is such an oligopoly, which has a few firms with high concentration ratios, and their products are similar and the qualities are at a similar level, too [10]. In this situation, the video software firms have less choice to increase their sales, so advertising Is one of the most inefficient ways to increase it, especially when the demand for products is really low. Also, much research shows that adver-tisement is most effective when the products are first to enter the market [11].

Finally, the obtained equation is:

$$y=1.9165V-0.0338P+0.0264A \qquad (4)$$

5. CONCLUSION

This paper utilized the data from video software mar-kets in China to study the sales of video software mem-bership and its influencing factors, including advertising volume, membership price, and video acquisition. We established the regression model by doing the hypothesis testing (assuming that all factors can not be regarded as independent variables), calculating t-values and corre-sponding P-values. After empirical tests, we concluded video acquisition has the most significant impact on the sales of the video software membership.

According to these results, this paper wants to give the app developers some advice. When firms want to manage their video software to obtain the highest turno-ver, the enterprises can start from many aspects, such as deeply excavating the service and value of the website, improving the customer experience, paying attention to the introduction of exclusive copyright and the layout of the company's copyright strategy, lower the price. For example, find some attractive people fixed video content, such as some funny movies, this type of video will be very attracting most teenagers and youth and get high rat-ings and turnover. Also, the quantity and quality of video software content, the video clarity, the fluency of the vid-eos and the removal of advertising privilege have a high comprehensive impact on users to consume the member-ship, too. So the apps developers may need to balance between the user sense of experience and their own rev-enue, such as reduces the advertisement in the video for the memberships as much as possible. Moreover, Regu-lators also need to be able to predict future fashion trends and be prepared to buy the rights to such videos.

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