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Analysis of Corporate Pricing Strategy based on Word-of-mouth Communication on Social Networks

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Abstract

As an indispensable marketing method for modern enterprises, word-of-mouth communication can be combined with recommendation and reward strategies to promote the promotion and purchase of new products, to improve enterprise profits. The research of social network word-of-mouth communication is of great significance to the pricing strategy of enterprises. In this paper, we establish a two-stage model, in which a manufacturer sells a single new product to several consumers with social network relationships. Consumers choose whether to buy or not according to their utility and the influence of word-of-mouth communication. Considering the influence of word-of-mouth communication, enterprises decide whether to adopt the recommendation incentive strategy and determine the pricing and the amount of recommendation incentive. The results show that the two-stage optimal pricing and the amount of recommendation reward are related to the recommendation satisfaction threshold and the influence coefficient of word-of-mouth. The two-stage optimal pricing decreases with the increase of recommendation satisfaction threshold; Under the influence of negative word-of-mouth, only when the threshold of recommendation satisfaction and the influence coefficient of word-of-mouth communication are within a certain range, can enterprises make profits. To achieve the maximum profit, the amount of recommendation reward increases with the increase of the recommendation satisfaction threshold. Under the influence of positive word-of-mouth, the threshold of recommendation satisfaction is larger, and the influence of positive word-of-mouth communication is smaller, so enterprises should give up the recommendation reward strategy; Under the influence of negative word-of-mouth, only when the threshold of recommendation satisfaction is small and the influence of negative word-of-mouth communication is large, can enterprises make profits by using recommendation reward strategy.

Keywords: *Social network, Pricing strategy, Word-of-mouth communication, Recommendation reward*

1. Introduction

In the past, there have been many studies on the information dissemination mode of word-of-mouth communication. Mohtasham et al. [1] studied the impact of service quality and innovation on word-of-mouth communication and found that service quality and innovation factors affect customer loyalty, which in turn affects product reputation in consumer networks. Ajorlou et al. [2] studied the dynamic pricing of products with zero or negligible marginal costs

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under the influence of word-of-mouth communication on social networks and established a dynamic model of word-of-mouth information dissemination. Literature [3] studies the selection of the best word-of-mouth communication target in the presence of negative word-of-mouth. The results show that choosing early adopters as the target of word-of-mouth communication is more conducive to the sales of low-quality products. Literature [4] established a model to prove that the word-of-mouth communication of strong ties can promote product marketing more than weak ties. Literature [5] studied the influence of opinion leaders on consumer purchasing decisions and corporate profits in online word-of-mouth communication. Literature [6] found through empirical research that service remediation can promote positive word-of-mouth communication among consumers. Literature [7] explains the mechanism of online reviews on customer equity based on the perspective of brand trust. The analysis results show that: positive online reviews lead to the increase of brand fairness, which has a positive effect on consumer fairness and brand trust.

The recommendation reward strategy refers to companies using cash, coupons, or other services to encourage consumers who have purchased to recommend products through their social networks. Literature [8] studied that when the satisfaction of purchased customers exceeds a certain threshold, it can induce their recommendation behavior, and the satisfaction threshold will have an impact on corporate pricing and profits. Lobel et al. [9] studied the impact of the two recommended reward payment strategies of enterprise linear payment strategy and threshold payment strategy on consumer purchases, and the results showed that the combination of the two payment strategies can obtain the optimal profit. Pieper et al. [10] used social exchange theory and expectation theory and found that referral bonuses motivate employees to recommend. The more bonuses, the greater the likelihood of employee recommendations. Literature [11] studied the impact of companies using recommendation and reward strategies on marketing effects when consumers' consumption budgets are constrained and found that when consumers have budget constraints, companies' recommendation and reward strategies with high prices and high rewards are not always Is effective.

In summary, previous studies have focused on how word-of-mouth communication affects consumer decision-making and how recommendation and reward strategies can improve corporate profits, but they have not considered how companies control word-of-mouth communication in social networks through recommendation and reward strategies. Based on the information dissemination model of Ajorlou et al. [2], this paper introduces the decision-making mechanism of social network consumers and considers the influence of different word-of-mouth communication and consumer recommendation satisfaction thresholds. Companies can control word-of-mouth communication through recommendation and reward strategies. Optimal profit.

2. Theoretical analysis of the impact of social network word-of-mouth communication on corporate pricing strategies

Word-of-mouth communication is a marketing method that appeared in the early stage of the development of the commodity economy, and it has been widely studied in the field of marketing and management. Word-of-mouth communication in social networks occurs among friends, relatives, and colleagues, and it is more acceptable. Modern enterprises are also willing to use word-of-mouth communication to promote products because word-of-mouth communication is different from media advertising. It is a spontaneous communication method within social networks, with lower cost, higher acceptance, and wider spread. Many companies promote their products through word-of-mouth communication. For example, companies such

as Laoganma, even without relevant product advertisements, still become domestic industry giants, relying on good product and service reputation.

In recent years, with the rapid development of the Internet era, word-of-mouth information dissemination of products in social networks has become more convenient, its scope of influence has expanded rapidly, and the speed of dissemination has continued to increase. In this context, although word-of-mouth communication can be used more effectively in modern marketing methods, its problems have become increasingly prominent. For example, lower controllability, and the negative impact of word-of-mouth communication in social networks is greater than that of positive word-of-mouth communication. If a company uses word-of-mouth communication unreasonably, it can easily lead to serious losses and even affect its brand image. How to effectively control word-of-mouth communication in social networks and guide its development in a favorable direction for the enterprise has always been a difficult point in enterprise operation decision-making.

The recommended reward strategy is one of the methods to effectively solve the above problems. Recommendation and reward strategy is a strategy for enterprises to actively intervene in word-of-mouth communication, which can control the development of word-of-mouth communication in social networks to a certain extent. In the modern market, many companies choose the recommendation and reward strategy at the early stage of new products entering the market, which enhances the influence of new products to a certain extent and increases the total profit of the company. For example, shopping websites such as Taobao and Pinduoduo will use bargaining, coupons, cashback, and other methods to encourage users who have purchased products, so that they can share certain product or service information with potential consumers around them, and promote new products in social networking. Be promoted and purchased in the network. However, it should also be noted that the recommendation and reward strategy is not always beneficial to the enterprise, and improper use and unreasonable setting of the recommendation and reward quota can easily lead to a loss of corporate profits. Under what circumstances should the recommendation reward strategy be used and how to reasonably set the recommendation reward quota are issues that the industry needs to solve urgently.

In short, word-of-mouth communication has become an indispensable marketing method for modern enterprises. How to use word-of-mouth communication to expand product share and increase corporate profits is an important issue that modern enterprises pay attention to. Therefore, under the influence of word-of-mouth communication on social networks, this article establishes the recommendation and reward strategy and pricing model of two-stage sales of new products for enterprises and studies the company's two-stage optimal pricing, recommendation reward quota, consumer recommendation satisfaction threshold, and word-of-mouth communication Relationship. On this basis, it explores the conditions for companies to use the recommendation reward strategy and the optimal pricing and recommendation reward quota setting.

3. Model construction of corporate pricing strategy in the context of online word-of-mouth communication

This article considers a two-stage pricing model consisting of a monopolistic production and sales company and several consumers that constitute a social network. Consumers decide whether to purchase products based on their utility and the influence of word-of-mouth communication. Based on this, the company gives the best pricing and recommended rewards. The parameter symbol settings related to this article are shown in [Table 1].

Table 1. Definition of related parameters and symbols

λ	The average degree of social networks formed by consumers in the market, that is, the average number of consumers' friends $0 \leq \lambda < N-1$
N	Total number of consumers in the market
i	Represents a certain consumer,$i \in N$
c	The unit production cost of the product
M_1	Phase 1 The company directly informs consumers of product information
M_2	Stage 2 informed consumers (Including consumers who did not purchase the product in the first stage and entered the second stage)
M	Two-stage total informed consumer
v_1	Consumers' valuation of the product in the first stage obeys the uniform distribution of $[0, v_{max}]$, $v_{max} > 2c$
v_2	In the second stage, the consumer's valuation of the product is newly added, which obeys the uniform distribution of $[\theta, v_{max} + \theta]$
D	The inferred satisfaction threshold of consumers who have purchased in the first stage, $0 < D \leq v_{max}$
σ_1	Consumers who did not purchase in the first stage spread to every friend with a low probability of word-of-mouth
σ_c	Consumers who have purchased and did not participate in the referral reward program in the first stage will pass the stirrup to every friend with a general probability of word of mouth
σ_h	Consumers who have purchased and participated in the referral award program in the first stage will spread to every friend with a high probability of word-of-mouth, $0 \leq \sigma_l < \sigma_c < \sigma_h \leq 1$
q	The influence coefficient of word-of-mouth communication among consumers in social networks, $0 \leq q \leq 1$
α	The influence coefficient of word-of-mouth communication among consumers on the valuation of new consumers $\alpha > 0$
Prob(i)	Phase 2 Newly-joined consumers i Probability of buying the product due to the influence of social networks
$k(i)$	In the social network, among all the consumer friends whose word-of-mouth spread to i product information, the number of consumers who have bought the product（Take the average here）
θ	The impact of word-of-mouth communication on the valuation of new consumers, and $\theta = \ln(\alpha q)$
π	Total profit of the enterprise
Stupid variable	meaning
p_j	The company's product pricing at stage j, $j \in \{1,2\}$, 1 and 2 sub-contracting represent the first and second stages
R	For consumers who have purchased in the referral reward program in the first stage, the amount of reward received for each recommendation of a friend, R>0

3.1. Model assumptions

New consumers can only learn about the product through word-of-mouth communication. Consumers in the first stage make purchase decisions based on their utility. Consumers who have purchased in the first stage will be informed of a recommendation reward strategy by the company. When the company's unit recommendation reward amount is greater than the recommendation satisfaction threshold of the purchased consumer, the consumer will participate in the recommendation reward strategy. Consumers who have not purchased in the first stage will enter the second stage. The valuation of this part of the consumer remains unchanged, and the purchase decision will be made in consideration of the second stage price and their utility. In the second stage, the purchase decision of new consumers joined by the influence of word-of-mouth communication not only considers their utility but also is affected by social networks. The valuation of new consumers is affected by word-of-mouth communication. Do not consider repeated purchases, and assume the first stage discount pricing, that is, $p_1 < p_2$. To facilitate the analysis, this article simplified and unified V_1 and V_2 into V_{max} for analysis.

3.2. The first stage

The company first selects a part of consumers M_1 (M_1 is much smaller than N), and directly informs the product information (through product presentations, leaflets, etc.); the company sets a price p_1 in the first stage and implements recommendation rewards for consumers who have purchased. Give a friend a reward of R. Suppose the recommendation satisfaction threshold of the purchased consumer is D (can be understood as the recommendation cost).

The decision rules of a consumer in the first stage are:

If $v_1 - p_1 + \sigma_h \lambda R \geq D$， then buy in this period and participate in the recommendation reward strategy, with a high probability of σ_h word-of-mouth spread to every friend. If $0 \leq v_1 - p_1 < D - \sigma_H \lambda R$， purchase in this period, do not participate in the recommendation reward strategy and spread the word of mouth to every friend with the ordinary probability σ_c. If $v_1 - p_1 < 0$， it will not be purchased in this period and spread to every friend with a low probability of σ_t word-of-mouth （$0 \leq \sigma_l < \sigma_c < \sigma_h \leq 1$）. The profit function of the first stage of the enterprise:

$$\pi_1(p_1, R) = (p_1 - c)M_1 \frac{v_{max} - p_1}{v_{max}} - M_1 \frac{v_{max} - (p_1 + D - \sigma_h \lambda R)}{v_{max}} \sigma_h \lambda R \qquad (1)$$

3.3. The second stage

1. Basic information. Starting from the second stage, the company's pricing is p_2, assuming that the impact of word-of-mouth communication in social networks on the valuation of new consumers is θ.

The consumer decision-making rules for the second stage are:

The remaining consumers in the first stage will buy when $v_1 - p_2 \geq 0$, otherwise they will not buy. If it is a new consumer who is affected by word-of-mouth communication when $v_2 - p_2 \geq 0$ and is affected by the purchase decision of friends in the social network, they will buy with probability $Prob(i)$, otherwise, they will not buy. The total number of informed consumers in the two stages:

$$M(M_1, p_1) = M_1 + M_2$$

$$= M_1 + M_1 \frac{v_{max} - (p_1 + D - \sigma_h \lambda R)}{v_{max}} \sigma_h \lambda + M_1 \frac{D - \sigma_h \lambda R}{v_{max}} \sigma_c \lambda + M_1 \frac{p_1}{v_{max}} \sigma_l \lambda \qquad (2)$$

Regarding the literature of Goldenberg et al. [12] and Garber et al. [13], the second stage of the second phase of the newly added informed consumer i is affected by social networks to purchase the product:

$$Prob(i) = 1 - (1-q)^{k(i)} = 1 - (1-q)^{\lambda \frac{[v_{max} - (p_1 + D - \sigma_h \lambda R)]\sigma_h + (D - \sigma_h \lambda R)\sigma_c}{[v_{max} - (p_1 + D - \sigma_h \lambda R)]\sigma_h + (D - \sigma_h \lambda R)\sigma_c + p_1 \sigma_l}} \quad (3)$$

2. Under the influence of positive word of mouth, the second stage situation $\theta = \ln(\alpha q) \geq 0$.

Assume that the average impact of word-of-mouth communication is non-negative, and $\theta \leq \ln(\alpha q) < c$, which is $\frac{1}{\alpha} \leq q < \frac{e^c}{\alpha}$, at this time $0 \leq \ln(\alpha q) < c \leq p_1 < p_2 < v_{max} < v_{max} + \ln(\alpha q)$

To reduce the complexity of the model and obtain more general conclusions, it is assumed here $|\theta = \ln(\alpha q)| < c$, That is, the absolute value of the impact of word-of-mouth communication in social networks on the valuation of new consumers in the second stage is less than the unit cost （Same under the negative influence）. Do not consider some extreme situations, such as the negative impact of word-of-mouth communication is very large so that the valuation falls below the unit cost.

The total profit of the enterprise in two stages:

$$\pi(p_1, p_2, R) = \pi_1(p_1, R) + \pi_2(p_2) \quad (4)$$

$$\begin{aligned} &= (p_1 - c) M_1 \frac{v_{max} - p_1}{v_{max}} - M_1 \frac{v_{max} - (p_1 + D - \sigma_h \lambda R)}{v_{max}} \sigma_h \lambda R \\ &\quad + (p_2 - c) \left\{ M_1 \frac{p_1 (v_{max} - p_2)}{v_{max} 2} \right. \\ &\quad + \left[M_1 \frac{v_{max} - (p_1 + D - \sigma_h \lambda R)}{v_{max}} \sigma_h \lambda + M_1 \frac{D - \sigma_h \lambda R}{v_{max}} \sigma_c \lambda + M_1 \frac{p_1}{v_{max}} \sigma_l \lambda \right] \\ &\quad * \frac{v_{max} + ln(\alpha q) - p_2}{v_{max}} \\ &\quad \left. * \left[1 - (1-q)^{\lambda \frac{[v_{max} - (p_1 + D - \sigma_h \lambda R)]\sigma_h + (D - \sigma_h \lambda R)\sigma_c}{[v_{max} - (p_1 + D - \sigma_h \lambda R)]\sigma_h + (D - \sigma_h \lambda R)\sigma_c + p_1 \sigma_l}} \right] \right\} \end{aligned}$$

3. Under the influence of negative word of mouth, the second stage situation $\theta = \ln(\alpha q) < 0$.

Assume that the average impact of word-of-mouth communication is negative, and $\theta < -\ln(\alpha q) < c$, which is $\frac{e^{-c}}{\alpha} < q < \frac{1}{\alpha}$, at this time $0 < c \leq p_1 < p_2 < v_{max} < \ln(\alpha q) < v_{max}$

The total profit of the two stages of the enterprise is the same as formula (4).

To obtain the optimal pricing and the optimal recommended quota, the derivation of (4) combined with the constraint conditions under the influence of positive word of mouth and negative word of mouth can obtain the two-stage optimal pricing, as shown in [Table 2] and [Table 3].

Table 2. Optimal decisions of companies under the influence of positive word-of-mouth communication

Condition	Optimal pricing for stage 1	Optimal pricing for stage 2	Optimal Referral Reward Amount
$0 < D < v_{\max} - c$	$p_1^* = \frac{v_{\max} + c - D}{2}$	$p_2^* = \frac{3v_{\max} + c - D}{4}$	$R^* = \frac{D}{2\sigma_k \lambda}$

$D = v_{\max} - c$	$p_1^* = \frac{2v_{\max} - D}{2}$	$p_2^* = \frac{4v_{\max} - D}{4}$	$R^* = \frac{3D}{4\sigma_h\lambda}$
$v_{\max} - c < D < v_{\max}$	$p_1^* = \frac{v_{\max} + c}{2}$	$p_2^* = \frac{3v_{\max} + c}{4}$	$R^* = \frac{-v_{\max} + c + 4D}{2\sigma_h\lambda}$

Table 3. The optimal decision-making of enterprises under the influence of negative word-of-mouth communication

Condition	Optimal pricing for stage 1	Optimal pricing for stage 2	Optimal Referral Reward Amount
$0 < D \le -\ln(\alpha q)$	$p_1^* = \frac{v_{\max} + c + \ln(\alpha q)}{2}$	$p_2^* = \frac{3v_{\max} + c + 3\ln(\alpha q)}{4}$	$R^* = \frac{D}{2\sigma_h\lambda}$
$-\ln(\alpha q) < D < v_{\max} - c$	$p_1^* = \frac{v_{\max} + c - D}{2}$	$p_2^* = \frac{3v_{\max} + c - D + 2\ln(\alpha q)}{4}$	$R^* = \frac{D}{2\sigma_h\lambda}$
$D = v_{\max} - c$	$p_1^* = \frac{2v_{\max} - D + \ln(\alpha q)}{2}$	$p_2^* = \frac{4v_{\max} - D + 3\ln(\alpha q)}{4}$	$R^* = \frac{3D + \ln(\alpha q)}{4\sigma_h\lambda}$
$v_{\max} - c < D < v_{\max}$	$p_1^* = \frac{v_{\max} + c + \ln(\alpha q)}{2}$	$p_2^* = \frac{3v_{\max} + c + 3\ln(\alpha q)}{4}$	$R^* = \frac{-v_{\max} + c + 4D + \ln(\alpha q)}{2\sigma_k\lambda}$

4. An example analysis of the impact of social network word-of-mouth communication on corporate pricing strategies

Benwen took an online translation service company as an example. The company first released its new product or service information in some academic forums or college groups to allow stage 1 consumers to enter the market. The company implemented certain measures for stage 1 consumers. Discount pricing. Consumers who have purchased the service can participate in the referral rebate activity, that is, every newly registered user is recommended, a certain number of points will be given as a reward, and the points can be used for translation services. Normal pricing is implemented for new users in the second stage. The company's two-stage pricing and recommended rewards directly affect the company's total benefits. This paper carries out a numerical simulation of the company's sales process, and analyzes the impact of consumer recommendation satisfaction threshold and word-of-mouth communication on sales decision-making through simulation and comparison, and provides a reference for business decision-making. The parameters are assumed to be:

$$N = 1000, M_1 = 100, \lambda = 10, c = 20, v_{max} = 100,$$
$$\sigma_h = 0.8{,}8, \sigma_c = 0.4, \sigma_l = 0.2, \alpha = 10$$

4.1. Corporate decision-making and profit analysis under the influence of positive word-of-mouth

Under the influence of positive word-of-mouth, the company's two-stage optimal decision is directly related to the recommendation satisfaction threshold D, and the optimal total profit is related to the recommendation satisfaction threshold D and word-of-mouth communication influence coefficient q（$(\frac{1}{10} \le q < \frac{e^{20}}{10})$）。

[Figure 1-4] shows that under the influence of positive word of mouth, when $0 < D < v_{max} - c$, the two-stage optimal pricing has nothing to do with D and is a fixed value. The recommended reward amount R is positively correlated with D within the domain of D. R when $v_{max} - c \le D < v_{max}$ is significantly higher than the growth rate within $0 < D < v_{mx} - c$,

this means that enterprises can reduce the sensitivity of R to D when D is small, and increase R to increase when D is large. The sensitivity of D can get the maximum profit.

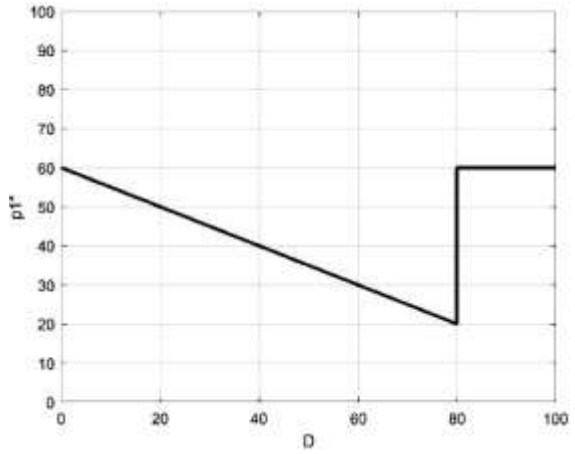

Figure 1. The influence of D on P_1^*

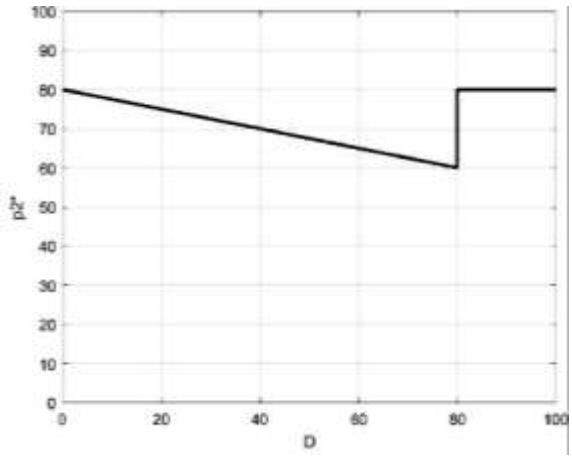

Figure 2. The influence of D on P_1^*

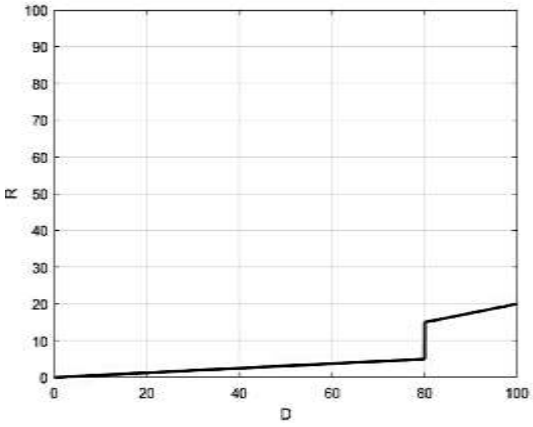

Figure 3. D's influence on R

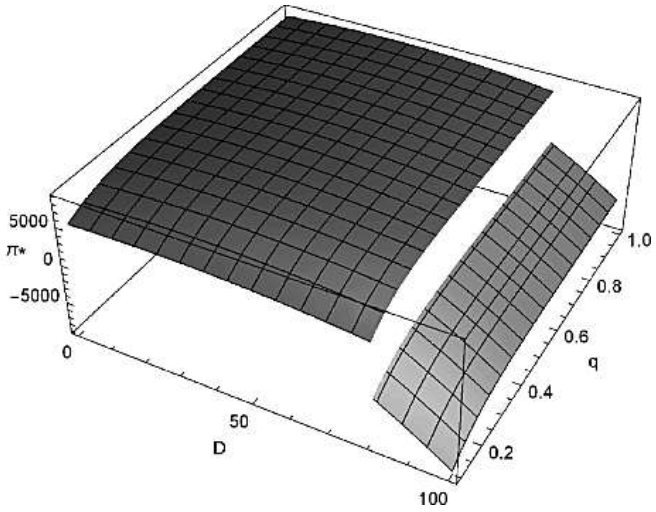

Figure 4. The influence of D on π*

It can be seen from [Figure 5-6] that for the optimal total profit of the enterprise when the recommended satisfaction threshold D is large, close to the maximum value of consumers max, and the impact of positive word-of-mouth is small (at this time, q is small), The company will suffer a loss of profit. This situation is that the recommendation satisfaction threshold D of consumers who have purchased in the first stage of the market is so large that the company needs to increase the value of the reward R to encourage these consumers to recommend behavior, but when the positive word-of-mouth impact of the product is small, If the company adopts the recommendation reward strategy, it will lose money. The company should abandon the recommendation reward strategy at this time and price the two-stage consumers normally to avoid this part of the loss and generate appropriate profits because the company's loss is not considered in the pricing process. In pricing behavior, the only source of possible losses for companies is to recommend reward strategies.

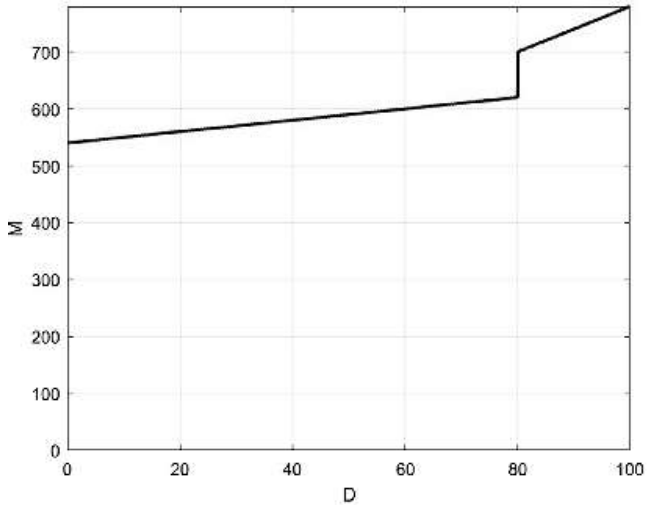

Figure 5. D's influence on M

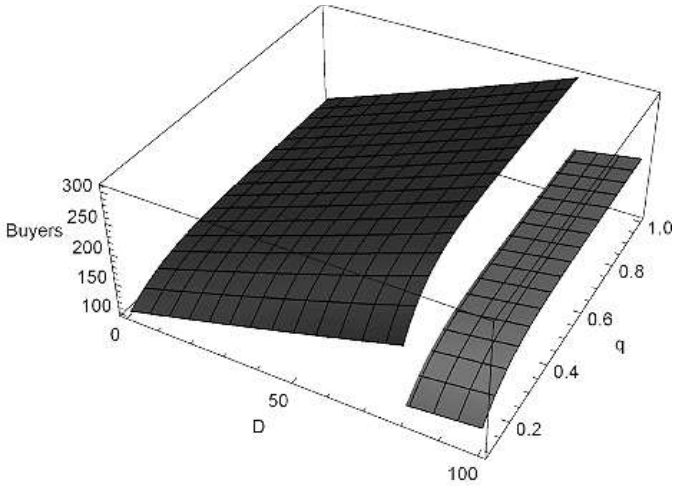

Figure 6. The influence of D, q on the total number of purchases

4.2. Corporate decision-making and profit analysis under the influence of negative word of mouth

Under the influence of negative word-of-mouth, the company's two-stage optimal decision-making, total profit, and recommendation satisfaction threshold, word-of-mouth communication influence coefficient q are related（$\frac{e^{-20}}{10} < q < \frac{1}{10}$）。

For the optimal total profit of an enterprise, under the influence of negative word-of-mouth, only when the satisfaction threshold D is small and the negative word-of-mouth influence is small (at this time q is large), the enterprise will make a profit. This situation is that the threshold D of consumer recommendation satisfaction that has been purchased in the first stage of the market is quite small, and when the negative word-of-mouth impact of the product is small (at this time q is large), the company uses a very low value of the reward R to promote Only when these consumers make recommendations will the company make a profit. Under the influence of negative word-of-mouth, companies should give up the recommendation and reward strategy for normal pricing for consumers in the two stages to generate appropriate profits, because the company's loss-making behavior is not considered in the pricing process, and the only source of possible losses for the company is Recommend reward strategy.

5. Conclusion

The research results of this paper show that the two-stage optimal pricing and recommendation reward amount of an enterprise is related to the recommendation satisfaction threshold of consumers who have purchased in the first stage and the influence coefficient of word-of-mouth communication. The two-stage optimal pricing decreases as the recommended satisfaction threshold increases; under the influence of negative word-of-mouth, the recommended satisfaction threshold and word-of-mouth communication influence coefficient is within a certain range before the company can make a profit. To achieve the maximum profit, the recommendation reward amount is increased with the increase of the recommendation satisfaction threshold. Under the influence of positive word-of-mouth, the recommendation satisfaction threshold is relatively large, and when the positive word-of-mouth communication affects less, the company should abandon the recommendation reward strategy; while under the influence of negative word-of-mouth, the company only has a smaller recommendation

satisfaction threshold, and the negative word-of-mouth communication has a greater impact At the same time, the recommendation reward strategy can be used to make a profit.

Based on the above conclusions, the following enlightenment is obtained:

1. Comprehensively weigh the influence and pricing of the product. When a company sells new products, it should not only focus on the high pricing and early profits of the product but also consider the impact of the product's word-of-mouth communication on social networks. The early low pricing is conducive to the diffusion of product information in consumer networks, and it is easy to achieve small profits. The effect of overselling.

2. Reasonable use of the promotion and reward strategy. Regardless of whether the product's reputation is positively or negatively affected in social networks, under certain conditions, as long as the recommendation and reward strategy is reasonably used, the company is profitable. If used unreasonably, even if the product is affected by positive word-of-mouth, there will be losses.

3. Focus on product quality and reputation. Generally speaking, the positive word-of-mouth influence of the product in social networks is more beneficial to the company than the negative word-of-mouth influence. Only by improving the quality of products and related services to enhance the reputation of the products, can enterprises be able to develop themselves healthily and sustainably.

References

[1] S. S. Mohtasham, S. K. Sarollahi, and D. Hamirazavi, “The effect of service quality and innovation on word-of-mouth marketing success,” Eurasian Business Review, no.2, **(2017)**

[2] A. Ajorlou, A. Jadbabaie, and A. Kakhbod, “Dynamic pricing in social networks: The word-of-mouth effect,” Management Science, no.2, **(2018)**

[3] F. Cui, H. Hu, and W. Cui, “Seeding strategies for new product launch: The role of negative word-of-mouth,” PloS one, no.11, **(2018)**

[4] Z. Jie and T. Daugherty, “Third-person effect and social networking: Implications for online marketing and word-of-mouth communication,” American Business Law Journal, vol.24, no.2, pp.53-63, **(2009)**

[5] J. M. Bristor, “Enhanced explanations of word-of-mouth communications: The power of relations,” Research in Consumer Behavior, vol.4, no.1, pp.51-83, **(1990)**

[6] J. Iii, “Service recovery’s influence on consumer satisfaction, positive word-of-mouth, and purchase intentions,” Journal of Business Research, vol.54, no.1, pp.11-24, **(2001)**

[7] J. Glazier and I. Miller, “Referral tracking and reward system for shaded links,” **(2018)**

[8] D. Kiosses, G. S. Alexopoulos, and J. A. Sirey, “A novel model for late-life depression intervention development, session 312 science direct,” The American Journal of Geriatric Psychiatry, vol.27, no.3, **(2019)**

[9] I. Lobel, E. Sadler, and L. R. Varshney, “Customer referral incentives and social media,” Management Science, no.10, **(2016)**

[10] J. R. Pieper, J. M. Greenwald, and S. D. Schlachter, “Motivating employee referrals: The interactive effects of the referral bonus, perceived risk in referring, and affective commitment,” Human Resource Management, no.5, **(2018)**

[11] J. Wirtz, C. Tang, and D. Georgi, “Successful referral behavior in referral reward programs,” Journal of Service Management, vol.30, no.1, pp.48-74, **(2019)**

[12] J. Goldenberg, B. Libai, and E. Muller, “Riding the saddle: How cross-market communications can create a major slump in sales,” Journal of Marketing, no.2, **(2002)**

[13] T. Garber, J. Goldenberg, and B. Libai, “From density to destiny: Using the spatial dimension of sales data for early prediction of new product success,” Marketing Science, no.3, **(2004)**

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