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The Research of The Pricing Strategy of New Market Entrants Entering Market

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Abstract
First of all, based on the summary of the development of SaaS, this paper takes the free trial strategy as the entry point, and takes the market share and market price as the decision points, the strategy model of market new entrants' optimal pricing and the market entry strategy model are discussed under the two dimensions of space and time. On the model side, the hotelling-based model expands the strategy of free strategy, supplier and consumer sustainable expectations-oriented pricing strategies. New entrants with low product quality consider from a short-term perspective to enter at high prices, relying on free strategies to accumulate market share, and provide space for subsequent price cuts. New entrants with high product quality enter at low prices, increase conversion rate through free trials, and stabilize the market with brand effect.

Key words: The pricing of SAS; Free

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INTRODUCTION
With the continuous emergence and development of new technologies, industries that are spawned by new technologies or high-tech in traditional industries are constantly emerging, facing the rise of emerging industries,at the same time, enterprises with industrial foundation, strong financial strength and high investment in research and development will actively explore. As an emerging industry that has been developing for nearly 10 years, the SaaS cloud service industry has also attracted companies to enter this field. When a number of companies with similar strength want to enter the same industry and provide differentiated similar products, there will be market competition.Under the competitive market structure, what factors will be affected by new entry into the enterprise? Do you want to take a free trial strategy? How to price to enter the industry? What are the barriers to entry? How to make a profit?Therefore, this section builds on the Hotelling model, incorporating factors that influence SaaS pricing into the model, and discusses two duopoly SaaS cloud service providers entering the industry's optimal pricing and profit issues.

1. THEORETICAL BASIS
Under the monopolistic market structure, Cheng Koehler built a dynamic pricing model between SaaS suppliers and their potential users in the monopoly market, and based on the rational expectation equilibrium hypothesis, the numerical simulation was carried out to obtain the optimal pricing strategy (Cheng & Koehler, 2003); Dewan studies how on-demand pricing affects the profit of monopoly providers in a monopolistic context, and concludes that monopolistic providers may simultaneously use subscription and authorization strategies to achieve price discrimination and market segmentization to optimize their own profits and user satisfaction (Ma & Seidmann, 2008). Cochrane (2014) studied the different licensing options available to monopoly providers and showed that under the powerful network effect, the hybrid licensing model SaaS and perpetual licensing are the most profitable choices for consumers (Cochrane, et al., 2014).

Research on competition among SaaS cloud computing service providers mainly includes:Huang and Kauffman

used game theory models to study market competition among SaaS service providers. Research found that service providers should pay attention to efforts to improve quality rather than improve service levels (Kauffman & Ma, 2013). Fishburn and Odlyzko (1999) studied the existence of competitive equilibrium. The study found that if there is no collusion, SaaS service providers will only provide a fixed price for the subscription, and there will be serious price wars and damage the market equilibrium (Fishburn & Odlyzko, 1999).Ma and Kauffman (2014) analyzed the pricing and quality strategies of two competing SaaS providers (Ma & Kauffman, 2014).One of its main findings is that customer conversion costs play a key role in determining competitive outcomes.For example, an increase in conversion costs may significantly worsen the position of less competitive suppliers, while more competitive suppliers can charge higher prices and achieve higher profits.Fan, Kumar used game theory to study short-term and long-term competition between SaaS and SWS providers. The influencing factors include user implementation costs and operational efficiency of SaaS providers,And improving quality, bundled software and services will reduce the user's software implementation costs and increase the equilibrium price;When providing software services, SaaS providers must bear considerable operating costs.In the long run, service operating costs can significantly affect SaaS's ability to improve software quality (Dan & Seidman, 2008).

2. MODEL BUILDING

2.1 Basic Model Assumptions

To simplify the model without loss of generality, this section assumes that there are two SaaS cloud service providers on the market (hereafter referred to as Cloud A and Cloud B), and the location, consumer preferences and location of the two service providers are the same as above. In order to better build a competitive model, the specific parameters are set to:

Table 1
Model Parameter List

Parameter	Meaning	Corresponding influence factor
V_i	The original quality of the products provided by SaaS$i\epsilon\{a,b\}$	Intrinsic Value
V	The difference between free trial and paid products	
φ	Trial product service deficiency	Service differentiation
γ	Power of network externalities，Because SaaS has positive network externalities,$\gamma > 0$	Network externalities
Q_i	Number of consumers，$i\epsilon\{a,b\}$，Number of different stages	User size
t	Sensitivity coefficient for each consumer	
σ	The cost of the consumer's trial product	
δ	Transfer costs paid by consumers to replace service providers	Enter the market threshold
m	Differences in free product quality and charge quality	Product differentiation
U_{ij}	Net utility achieved by consumers using products$i\epsilon\{f,p\}, j\epsilon\{a,b\}$	
p_i^j	Price of the paid version， $i\epsilon\{a,b\}$, $j\epsilon\{1,2\}$	
C_i^j	Unit cost per user $i\epsilon\{a,b\}$, $j\epsilon\{1,2\}$	Cost of production
π_i	The maximize revenue of Cloud A and Cloud B，$i\epsilon\{a,b\}$	

The parameters in the model of Table3-1 are consistent with the internal and external factors affecting pricing in the symbol direction. Where t is the utility loss of each user, indicating the difference in consumer sensitivity to the product, the network externality coefficient, indicating the strength of the network's externality, measuring the perceived increase in the perceived value of the product for each additional consumer trial product, because the two competitors belong to similar heterogeneous products, they can share the network effect, $r_A = r_B = r$ $r_A = r_B = r.Q_i i\epsilon\{A,B\} Q_i i\epsilon\{A,B\}$ is the size of the user, ie all using the SaaS installation base. v represents the due attributes and intrinsic value of the SaaS cloud service offering;φ indicated the lack of service. The paid SaaS provides relatively complete online support, security protection and other services, while the free trial uses the lack of service to characterize the service attributes. If the number of services provided is reduced, the number of consumers who try for free trials is reduced, thus leading to the generation of negative effects, which are proportional to the distance between cloud A and cloud B and the consumers, so use tx and use $t(1-x)$ to represent it.δ indicates the transfer cost caused by factors such as product differentiation of cloud A to cloud B. consumer preferences is:

In the market economy, all rational consumers aim at maximizing utility, and product quality issues, service issues, network externalities, etc. affect the product's undirected movement, so there will be $\delta > 0$.This section discusses the duopoly competition under full information conditions..

2.2 New Entrant Pricing Under the Free Strategy in the Short-Term Perspective

SaaS's service market has strong network externalities, and the adoption of free policies will increase the benefits of service providers. Generally speaking, in the short term, consumers and newcomers are more concerned about short-term profits and market share. SaaS cloud services have the uniformity of products and services. This section assumes that Cloud A and Cloud B provide free trial products and free value-added products to the existing market. Consumer market preferences are shown in Figure 1.Cloud A and Cloud B are located at both ends of the linear city, while the free trial products provided by Cloud A and Cloud B are adjacent to each other because of the utility generated without payment. At the same time, the basic value of the market V can cover the entire market. According to the different formulas of Li Keke and Wang Haiping, the consumer utility under different

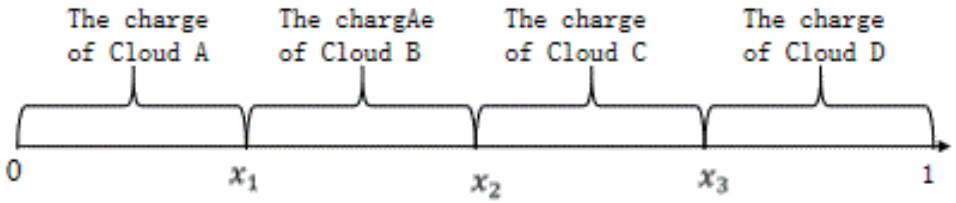

Figure 1
Consumer preferences at the same time entering the market

$$U_{pa} = V_a + rQ_a - tx - P_a \qquad (3\text{-}1)$$

$$U_{fa} = (1-\varphi)(V_a - V) + rQ_a - t(1-\varphi)x \qquad (3\text{-}2)$$

$$U_{fb} = (1-\varphi)(V_b - V) + rQ_b - t(1-\varphi)(1-x) \qquad (3\text{-}3)$$

$$U_{pb} = V_b + rQ_b - t(1-x) - P_b \qquad (3\text{-}4)$$

According to the expected utility theory, we know $U_{pa} = U_{fa}$, $U_{fa} = U_{fb}$, $U_{fb} = U_{pb}$ as it enters the market at the same time. Due to the complete information, the market is a problem of symmetrical market, and the differences in utility are as follows:

$$x_1^* = \frac{\varphi V_a + (1-\varphi)V - P_a}{t\varphi} \qquad (3\text{-}5)$$

$$x_2{}^* = \frac{(1-\varphi)(V_a - V_b) + t\varphi + r}{2(t\varphi + r)} \quad (3\text{-}6)$$

$$x_3{}^* = \frac{t\varphi - \varphi V_b - (1-\varphi)V + P_b}{t\varphi} \quad (3\text{-}7)$$

Based on the above inference, when the consumer's location is $x < \frac{\varphi V_a + (1-\varphi)V - P_a}{t\varphi}$,at this time, consumers will only use Cloud A's free trial SaaS cloud service; when the consumer's location is $\frac{\varphi V_a + (1-\varphi)V - P_a}{t\varphi} < x < \frac{1}{2} + \frac{(1-\varphi)(V_a - V_b)}{2(t\varphi + r)}$,at this point, consumers prefer to choose Cloud A's SaaS cloud service; when the consumer's location is $\frac{1}{2} + \frac{(1-\varphi)(V_a - V_b)}{2(t\varphi + r)} < x < \frac{t\varphi - \varphi V_b - (1-\varphi)V + P_b}{t\varphi}$*,at this point, consumers prefer the free trial SaaS cloud service provided by Cloud B, when* $\frac{t\varphi - \varphi V_b - (1+\varphi)V + P_b}{t\varphi} < x < 1$, *consumers prefer to choose the premium products offered by Cloud B.*

Because this section discusses the need to fully cover symmetry information in the market, the consumer needs of this article can be written as:

$$\begin{cases} Q_a + Q_b = 1 \\ Q_A = Q_{pA} + Q_{fA} \\ Q_B = Q_{pB} + Q_{fB} \end{cases} \quad (3\text{-}8)$$

According to formulas (3-5), (3-6), (3-7), (3-8), the demand for the paid SaaS services of Cloud A and Cloud B is:

$$\begin{cases} Q_{pa} = \dfrac{\varphi V_a + (1-\varphi)V - P_a}{t\varphi} \\ Q_p = \dfrac{\varphi V_b + (1-\varphi)V - P_b}{t\varphi} \end{cases} \quad (3\text{-}9)$$

The revenue functions of Cloud A and Cloud B considered at this time are:

$$\pi_A(P_A, Q_{pA}) = \frac{\varphi V_a + (1-\varphi)V - P_a}{t\varphi} * (P_a^1 - C_a^1) \quad (3\text{-}10)$$

$$\pi_B(P_B, Q_{pB}) = \frac{\varphi V_b + (1-\varphi)V - P_b}{t\varphi} * (P_b^1 - C_b^1) \quad (3\text{-}11)$$

First order partial derivative $\frac{\partial \pi_A}{\partial P_A}$=0, $\frac{\partial \pi_B}{\partial P_B} = 0$,So calculate:

$$\begin{cases} P_a^{1*} = \dfrac{\varphi V_a + (1-\varphi)V + C_a^1}{2} \\ P_b^{1*} = \dfrac{\varphi V_b + (1-\varphi)V + C_b^1}{2} \end{cases} \quad (3\text{-}12)$$

Nature 1 In the duopoly market, the new entrant maximizes the return by the price, the version of the charge is different from the free product quality, the production cost, and the lack of service, and is inversely proportional to the lack of service. The price is affected by the poor quality of the product, the cost, and the externality of the network. At the same time, it is obvious that in the initial stage of entering the market, the price of the service provider is mostly determined by the cost and quality of the research and development, and determines whether the new market entrant has a price advantage and whether it can have a huge space for future price reduction. If the market equilibrium is reached at this time, then $\frac{(1-\varphi)(V_a - V_b) + t\varphi + r}{2(t\varphi + r)}$ needs to be equal to $\frac{1}{2}$,While Service deficiency is in the range of $0 < \varphi < 1$,therefore only $V_a = V_b$.In line with economics, when the market provides homogenized products, the duopoly provider can reach the equilibrium point in the market.

When entering the market, if two new entrants enter the market at the same time, the income at this time is:

$$Q_{pa}{}^* = \frac{\varphi V_a + (1-\varphi)V - C_a^1}{2t\varphi} \quad (3\text{-}13)$$

$$Q_{pb}{}^* = \frac{\varphi V_b + (1-\varphi)V - C_b^1}{2t\varphi} \quad (3\text{-}14)$$

$$\pi_A{}^* = \frac{[\varphi V_a + (1-\varphi)V]^2 - C_a^{1\,2}}{4t\varphi} \quad (3\text{-}15)$$

$$\pi_B{}^* = \frac{[\varphi V_b + (1-\varphi)V]^2 - C_b^{1\,2}}{4t\varphi} \quad (3\text{-}16)$$

Conclusion 1 Under the symmetry of network externality, when both companies provide free trial services, if they provide homogenized products, et

$V_a = V_b$, it means that the new entrants entering the market each account for half of the market. When the external network effect is gradually increased, the more obvious the utility of the network obtained by consumers, the more likely it is to improve the conversion efficiency from free to paid, so that the price and demand of the initial pricing will gradually increase.

Inference 1 Under the condition that two SaaS service providers provide access to the market at the same time, there is a certain amount of free demand in the market and enter the market at the same time. If it is less than zero, no one in the market is willing to try the product. Therefore, the cost of production is greater than the difference between the free SaaS and the charged SaaS. The premise of satisfying the free trial is that the quality difference is large enough; otherwise the erosion effect brought by the free trial strategy is greater than the invalidity caused by the external network effect (Fan, et al, 2009, 661-671).

Conclusion 2 When two new entrants enter the market at the same time, the pricing considerations are not the same as the quality of the free products. When the network externality is positive, the difference between the quality of the free and paid versions is greater, the price can be higher, but the conditions of the free trial strategy The quality of the free product must be sufficiently low, and the cost of the collection version cannot be too high (Yan, et al, 2013, 127-131).

Inference 2 The lack of service will affect the needs of consumers for trial use. If a SaaS product is in trial service, it does not provide documentation, online trials, etc. As a "undervalued customer" for the SaaS service market,lack of basic services can lead to a lack of consumer interest in trials and a drain on opportunities for potential users.

2.3 New Entrant Pricing From a Long-Term Perspective

In the short-term new market, because consumers are unfamiliar with products, only large-scale consumers with high-risk preferences and large amounts of funds are willing to try, whiling most small and medium-sized consumers do not practice, and the early SaaS providers are concerned about the feasibility of market entry. As can be seen from the previous section, affecting its pricing is the cost of production, the difference between the quality of the charge and the free. Due to the impact of service shortage caused by trials, with the dynamic evolution of the market, after trial or purchase of SaaS services, consumers have gained different purchasing experience from the initial stage, and consumers in the market will also maximize their net utility. Changes are adjusted, and SaaS cloud service providers in the market will adjust pricing strategies based on consumer and market changes to guide the long-term benefits of long-term SaaS cloud services.

In the SaaS scenario, the transfer cost affects the SaaS consumer. If there is a business relationship between the consumer and the existing SaaS service provider, the consumer needs to upload the data to the server formed by the provider, and the provider handles all the IT support services. , including software daily maintenance, data backup, software upgrades and security. For users who rely on the provider's behavior and have a close partnership with the provider, it is likely to result in a 'lock-in' risk (Guo & Yan, 2016). And x_1、x_2 is the customer retention rate due to the lock at this time.Although users have no initial investment costs, they still pay for search services, trial learning, data deposition costs, and when transferring from the original provider, the user experiences the data transfer and recycling costs, which is the user must consider the important conversion costs when making decisions. This section considers the conversion of the paid SaaS cloud computing service product, and after a free trial, $Q_i^1 + Q_i^2 = 1, (i \in A,B)$ appeared on the market. After further selection in the market, different forms can be derived in the short-term phase, so the current utility is expressed as:

The paid version of Cloud A and Cloud B will also be transferred due to the maximum utility of the consumer. The following formula indicates that cloud A is selected at the initial stage, and it is re-selected in the dynamic evolution process of the market in the latter stage. δ_1 indicates the learning cost paid by cloud B.

$U_a^{11} = V_1 + rQ_a^2 - tx_1 - P_a^2$ Continue to use Cloud A (3-17)

$U_b^{12} = V_2 + rQ_b^2 - t(1-x_1) - P_b^2 - \delta_1$ Turn to use cloud B (3-18)

The following formula indicates that cloud B is selected at the initial stage, and is re-selected during the dynamic evolution of the market in the latter stage, and δ_2 indicates the transfer cost paid for selecting A.

$$U_a^{21} = V_1 + rQ_A - tx_2 - P_1 - \delta_2$$

Turn to use cloud A (3-19)

$U_b^{22} = V_2 + rQ_B - t(1-x_2) - P_2$ Continue to use Cloud B (3-20)

According to the theory of expected utility, $U_a^{11} = U_b^{12}$, $U_a^{21} = U_b^{22}$, The difference in utility at this time is:

$$x_1^* = \frac{r\left(Q_a^2 - Q_b^2\right) - \left(P_a^2 - P_b^2\right) + t + \delta_1}{2t} \quad (3\text{-}21)$$

$$x_2^* = \frac{r\left(Q_b^2 - Q_a^2\right) - \left(P_a^2 - P_b^2\right) - t + \delta_2}{2t} \quad (3\text{-}22)$$

According to the calculation of the above retention rate, the demand due to the locking effect of the customer can be obtained, that is, the demand of the customer who has been using the cloud A in the market is:

$$Q_{pa}^1 * x_1^* = \frac{r\left(Q_a^2 - Q_b^2\right) - \left(P_a^2 - P_b^2\right) + t - \delta_1}{2t_1} Q_{pa}^1 \quad (3\text{-}23)$$

For the short-term selection of cloud A, after charging, the demand for choose the cloud B for the charge is:

$$Q_{pb}^1 * (1 - x_2^*) = \frac{r\left(Q_a^2 - Q_b^2\right) - \left(P_a^2 - P_b^2\right) + t - \delta_2}{2t_1} * Q_{pb}^1 \quad (3\text{-}24)$$

From a long-term perspective, the demand function of cloud A on the market at this time is:

$$Q_a^2 = + {Q_{pa}}^1 * x_1^* + {Q_{pb}}^1 * (1 - x_2^*) = \frac{1}{2} + \frac{\delta_1 Q_{pa}^1 - \delta_2 Q_{pb}^1 - (P_a^2 - P_b^2)}{2(t_1 - r)} \quad (3\text{-}25)$$

At this time, the demand function of cloud B on the market is:

$$Q_b^2 = + {Q_{pb}}^1 * x_2^* + {Q_{pa}}^1 * (1 - x_1^*) = \frac{1}{2} - \frac{\delta_1 Q_{pa}^1 - \delta_2 Q_{pb}^1 - (P_a^2 - P_b^2)}{2(t_1 - r)} \quad (3\text{-}26)$$

Conclusion 1 From the perspective of short-term demand, whether the demand of cloud A or cloud B is greater than 0 and less than 1,therefore, the formulas (3-23) and (3-24) satisfy the constraint condition that is greater than 0 and less than 1, $\left|\frac{\delta_1 Q_{pa}^1 - \delta_2 Q_{pb}^1 - (P_a^2 - P_b^2)}{2(t_1 - r)}\right| < \frac{1}{2}$.And in the short-term market, cloud A and cloud B demand expressions have market shares of short-term charging versions as parameters, so in the short-term, the income of cloud A and cloud B will also be affected by short-term market share and erosion share of free use (Guo & Yan, 2015).

The expressions of cloud A and cloud B at this time are:

$$\pi_a^2 = Q_a^2 * (P_a^2 - C_a^2) \quad (3\text{-}25)$$

$$\pi_b^2 = Q_b^2 * (P_b^2 - C_b^2) \quad (3\text{-}26)$$

At this point, the above demand function is brought into the income function,and $\frac{\partial \pi_a^2}{\partial P_a^2} = 0, \frac{\partial \pi_b^2}{\partial P_b^2} = 0$,Then find:

$$P_a^{2*} = t - r + \frac{2C_a^2 + C_b^2}{3} + \frac{\delta_1 Q_{pa}^1 - \delta_2 Q_{pb}^1}{3} \quad (3\text{-}27)$$

$$P_b^{2*} = t - r + \frac{C_a^2 + 2C_b^2}{3} - \frac{\delta_1 Q_{pa}^1 - \delta_2 Q_{pb}^1}{3} \quad (3\text{-}28)$$

$$Q_a^{2*} = \frac{1}{2} + \frac{\delta_1 Q_{pa}^1 - \delta_2 Q_{pb}^1 - (C_a^2 - C_b^2)}{6(t_1 - r)} \quad (3\text{-}29)$$

$$Q_b^{2*} = \frac{1}{2} - \frac{\delta_1 Q_{pa}^1 - \delta_2 Q_{pb}^1 - (C_a^2 - C_b^2)}{6(t_1 - r)} \quad (3\text{-}30)$$

$$\pi_A{}^2 = 2(t - r)\left[\frac{1}{2} + \frac{\delta_1 Q_{pa}^1 - \delta_2 Q_{pb}^1 - (C_a^2 - C_b^2)}{6(t_1 - r)}\right]^2 \quad (3\text{-}31)$$

$$\pi_B{}^2 = 2(t - r)\left[\frac{1}{2} - \frac{\delta_1 Q_{pa}^1 - \delta_2 Q_{pb}^1 - (C_a^2 - C_b^2)}{6(t_1 - r)}\right]^2 \quad (3\text{-}32)$$

Inference 3 Because the second-order reciprocal of the cloud A and cloud B income functions are less than 0, there is a maximum benefit, and the gain will increase as the price increases. But because the function expression of profit is a convex function, when the price is too high and the customer is lost, the profit will fall as the price rises. In the short-term pricing process, whether cloud A or cloud B has a price advantage depends on its cost and transfer cost, because the relative price is: $\Delta P^* = \frac{C_a^2 - C_b^2}{3} + \frac{2(\delta_1 Q_{pa}{}^1 - \delta_2 Q_{pb}{}^1)}{3}$, When Cloud A's short-term market share exceeds that of Cloud B, the latter will choose to cut prices to attract more new customers to the market. As the market price gap becomes larger, the conversion cost will also increase. In the long-term perspective, if a customer switches to a new supplier, the new supplier will have barriers to entry (Wang, et al., 2012).

2.4 Short-Term vs Long-Term Numerical Simulation and Model Analysis

2.4.1 The Impact of Short-Term Market Share on Long-Term Models

This section considers the new entry of cloud A and cloud B to provide similar heterogeneous service products, and competes in the market. The goals of both cloud A and cloud B are to successfully enter the market and obtain long-term benefits. And development, so when two companies enter the market at the same time, they must consider the other party's entry strategy in order to find the optimal entry and income strategy. Compare the market share, price, and return functions considered in the short-term and long-term perspectives (taking Cloud A as an example) (Guo, et al, 2012). Because the short-term market adopts symmetrical network analysis, cloud A and cloud B market conditions are consistent. Specific as table.

Table 2
Short-Term VS Long-Term Market Entry Equilibrium (taking cloud a as an example)

	Short-term equilibrium	Long-term equilibrium
Price	$\frac{\varphi V_a + (1+\varphi)V + C_a^1}{2}$	$t_1 - r + \frac{2C_a^2 + C_b^2}{3} + \frac{\delta_1 Q_{pa}^1 - \delta_2 Q_{pb}^1}{3}$
Share	$\frac{\varphi V_a + (1+\varphi)V - C_a^1}{2t\varphi}$	$\frac{1}{2} + \frac{\delta_1 Q_{pa}^1 - \delta_2 Q_{pb}^1 - (C_a^2 - C_b^2)}{6(t_1 - r)}$
Income	$\frac{[\varphi V_a + (1+\varphi)V]^2 - C_a^{1\,2}}{4t\varphi}$	$2(t - r)\left[\frac{1}{2} + \frac{\delta_1 Q_{pa}^1 - \delta_2 Q_{pb}^1 - (C_a^2 - C_b^2)}{6(t_1 - r)}\right]^2$

In terms of price strategy, as a new entrant in the market, the short-term need to pay more attention to the intrinsic value of its own paid products, and the product difference between the charges and the free, to avoid the erosion caused by too much free products, and enter The market's R&D products are also the advantage of determining whether their product pricing will enter in the short term; From the perspective of long-term pricing strategy, not only the internal product differentiation needs to be concerned, but also the external product

differentiation and the previous market share, which will affect the pricing of products from R&D costs. From the short-term market share to the impact of late pricing can be derived:

$$\frac{\partial P_a^{2*}}{\partial Q_{pa}^1} = \frac{\delta_1}{3} > 0 \qquad (3\text{-}33)$$

The above formula shows that in the period of entering the market, the large market share is conducive to the later high price or higher gain, and the increase of the price increase increases with the increase of the conversion cost. Therefore, the size of the conversion cost limits the long-term development of new companies entering the market, and the market share seized in the early stage is the basis of the later price strategy.

Inference 4 When Cloud A Cloud B just entered the market, most companies are still in a conservative state because SaaS cloud computing services involve enterprise data security. Only high-innovation and high-risk companies will try to transfer some of their services to SaaS clouds. The service is above, so there is a form of "underestimation" or avoidance of "early taste" on the market. Therefore, this paper adopts a free trial strategy in the short-term entry strategy. Such a strategy is beneficial to the market share preemption and is conducive to the later share. 360 is a typical example of success. In the early stage of entering the market, it provided a large number of free anti-virus software. In the subsequent competition, it took advantage of the deep customer base and network effect to obtain revenue through advertising and value-added products (Wu, et al., 2018).

The impact of short-term market share on long-term perspectives on demand and earnings:

$$\frac{\partial Q_a^{2*}}{\partial Q_{pa}^1} = \frac{\delta_1}{6(t-r)} \qquad (3\text{-}34)$$

According to the situation, if the user sensitivity is greater than the network externality, the market share entering the market in the short-term perspective has a positive impact on the later market share, and if the user sensitivity is less than the network external effect, it has a negative effect. In fact, the law governing the operation of the SaaS market is that when the added value of each additional customer is less than the value lost by the competitors, the customer will be lost, that is, the consumers who are locked in the early stage for free will follow Transfer. Therefore, while taking a free strategy to lock customers, improving service quality and product upgrade is the key. In the sixth chapter of this article, we discuss the issue of product upgrade.

Bringing 1, 2 into the impact of the lack of service on long-term perspective pricing:

$$\frac{\partial P_a^{2*}}{\partial \varphi} = \frac{\varphi[(\delta_1(V_a+V)-\delta_2(V_b+V)]-\varphi(V_b-V_a)-C_a^1+C_b^1}{(6t\varphi)^2} > 0 \qquad (3\text{-}35)$$

According to the situation, when $\varphi > \frac{C_a^1 - C_b^1}{V_a(1+\delta_1) - V_b(1+\delta_2) + V(\delta_1-\delta_2)}$, the pricing in the long-term perspective is positively guided by the lack of service,

this also explains from one side that the lack of service in the free strategy reduces the quality of service, and has a correlation with R&D costs, transfer costs, and product quality. Therefore, it verifies that there is a certain scope of service shortage in the short-term market, and blindly pursuing the erosion caused by the reduction of service will lead to poor perception of the customers of the fee-based products, thus affecting the situation of the paid version.

2.4.2 Pricing Analysis of New Market Entrants From a Long-Term Perspective

The previous section considered the impact of short-term market share on pricing and market share in the long-term perspective. But in fact, market share is affected by factors such as price, and this article focuses on how entrants in new markets use reasonable pricing to enter the market. The following article focuses on how to choose pricing and provide a higher price for the upfront price of the free strategy in the long-term perspective of the optimization of total profit.

In the model of long-term pricing, the total return = short-term gain + the sum of late earnings, so the expression of total return is:

$$\Pi = Q_{pa}^1 * \left(P_a^1 - C_a^1\right) + Q_a^2(P_a^2 - C_a^2)$$

The market share is expressed in terms of pricing, with P_a^t indicating the optimal price, and let $\frac{\partial \Pi}{\partial P_a^t} = 0$, the solution is:

Let $X = \varphi V_a + (1+\varphi)V$, $Y = \left(\varphi V_b + (1+\varphi)V - C_b^1\right)$

$$P_a^{t*} = \frac{\frac{5\delta_1}{12t\varphi(t_1-\mathrm{r})} - \frac{C_a^1+\mathrm{X}}{2t\varphi}\left[t_1-\mathrm{r}+\frac{2C_a^1+C_b^1}{3}+\frac{\delta_1 X-\frac{\delta_2}{2}Y}{3t\varphi}\right]+\frac{\delta_1}{3t\varphi}\left(\frac{5\left[\delta_1(\mathrm{X}-\frac{\delta_2}{2}Y\right]-6t\varphi\frac{C_a^1+C_b^1}{3}}{12t\varphi(t_1-\mathrm{r})}\right.}{\frac{5{\delta_1}^2}{18t\varphi(t_1-\mathrm{r})}-\frac{1}{t\varphi}}$$

The above formula involves the short-term cost, long-term cost, horizontal difference, transfer cost, and service industry deficiency of Cloud A and Cloud B, which are more complicated. As an entrant to the new market, the goal is to enter the market at a reasonable price and obtain the optimal profit, so it is necessary to compare the size of the pair and its impact on the income in order to adopt the corresponding strategy.Since the data entering the market is not uniform and the data is small, the numerical simulation method can be adopted. The specific values are as follows:

Table 3
Parameter Assignment Table

Parameter	φ	V_a	V_b	V	t	C_a^1	C_a^2	C_b^1	C_b^2	δ_1	δ_2
Assignment	5/6	5	16	2.03	6/25	0.9	0.8	1	0.6	0.7	0.8

As shown in Figure 2, on the premise of satisfying the customer's utility, considering the short-term perspective, the pre-pricing that meets the optimal profit of $\pi_A = 43.675$ is 3.5, which is much larger than the upfront cost of the market 1.The gains from the pre-pricing are below zero, indicating that the cost is greater when not entering the market. In the market, only a small number of consumers share the cost, so the return is negative. And the optimal return is increased as the price of the product continues to increase, but it is not blind growth, and the price increases after the optimization of the income. After the new entrants join the industry, the consumers try to use the product according to the "blind follow" or "attempt" mentality, but when the product price is 3.5, it exceeds the threshold of the heart, and the consumers in the market will retreat. Second, use free products or withdraw from the market, which will lead to a gradual decline in maximizing revenue.

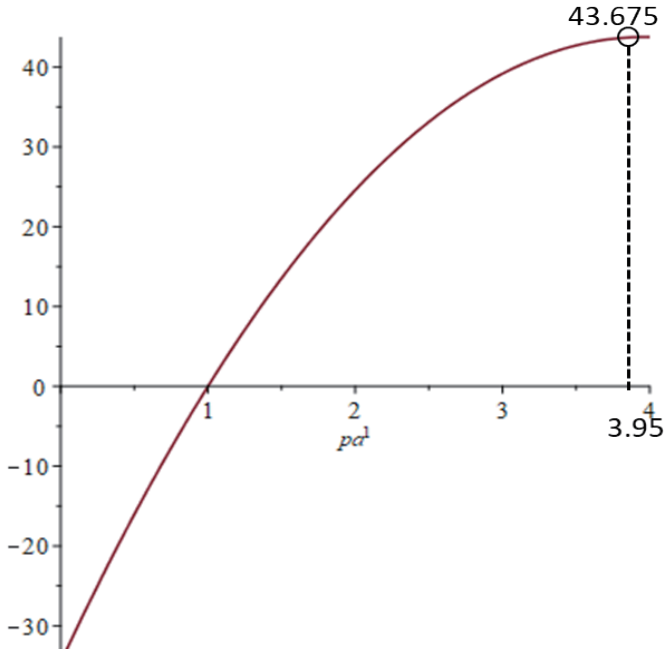

Figure 2
Cloud a short-term perspective new entrant pricing

Differentiate the pricing of new entrants in the market from a short-term perspective. Figure 2 below analyzes the pricing of new market entrants entering the market from a long-term perspective, and compares the difference between the pre- and short-term of the unified new entry service providers. Under the same product quality $V_b = 16$, the optimal value of the new entrant pricing for this long-term perspective is $\pi_B = 47.373$, at this time the price is 2.613, and the short-term new entrant optimization income is $\pi_B = 42.533$, at this time The price is 3.918.When the return is 222, the long-term perspective is 1.325 less than the short-term perspective of 1.802.Selecting pricing from a long-term perspective, the loss in the early period is far greater than the loss in the short-term perspective. However, the low price in the early stage is conducive to attracting customers with their own high-quality product quality. The early share has a positive impact on the later income, so the final maximum benefit is achieved. However, pricing cannot always pursue low prices, but also consider other competitors in the market to avoid losses.

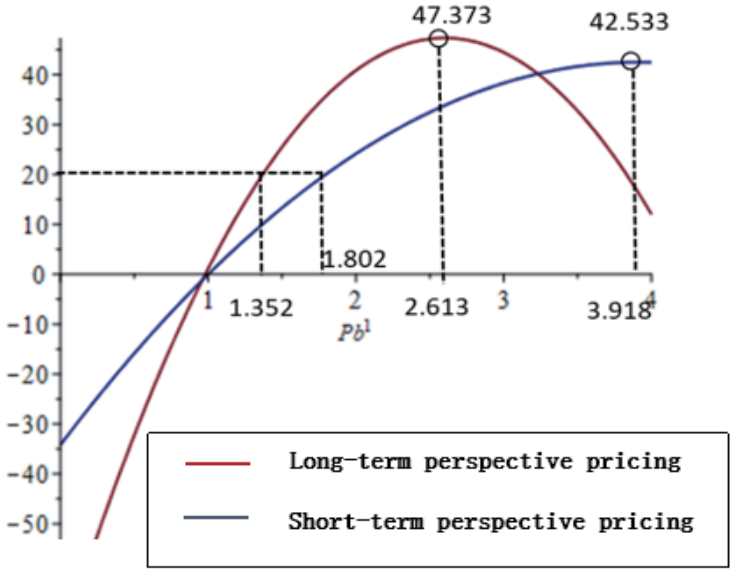

Figure 3
Pricing from different perspectives of Cloud B

Comparing Figure 2 with Figure 3, it is found that although the benefits from long-term perspective pricing are higher than the new entrant gains from the short-term perspective, the new entranfigurets in the long-term perspective are priced less than the new entrant pricing based on the short-term perspective. However, compared with the short-term perspective of cloud B, the optimal return is $\pi_B = 42.533$, while the profit of cloud A in the short-term perspective is $\pi_A = 47.373$, and the profit of cloud A is higher than that of cloud B. Based on the long-term, the quality of Cloud B's products is $V_b = 16$, which is much higher than $V_a = 5$. Therefore, the low quality product is suitable for entering the market in a short-term perspective. When choosing to enter the market quickly, it gives a relatively high price, and it is convenient to use the free strategy to expand the market base and strive for price reduction. The maximum value of the return is reached before the higher quality competitor enters the market or cuts the price. The reason for the low price of new entrants based on long-term pricing is that the free strategy brings a good reputation, the quality of the products, etc., can effectively use the difference to effectively lock users while attracting new customers.

2.4.3 New Market Entrant Pricing Strategy

Regardless of the quality and other influencing factors, considering the pricing of new entrants from a long-term perspective, the overall return will be higher than the short-term pricing. However, due to the different quality of the products offered, it needs to be considered comprehensively.

Providing new entrants with relatively low product quality, in entering the market, from a short-term perspective, pricing is higher than production costs, and controlling the quality of free products and paid products is poor, avoiding the erosion caused by low prices. Based on the full use of the free strategy, higher prices can maximize consumer gains for consumers with higher consumer preferences for pre-products of quality deviation.

To provide new entrants with high product quality, in the market, the optimization is lower in the long-term perspective, because the long-term market income is affected by the previous market share, so the provider needs to pass the previous market. A reasonable low price to seize market share to obtain long-term benefits, and new entrants with better product quality to adopt lower

market pricing is a "strategic strategy." On the basis of using the free strategy, improving the consumer's utility perception is beneficial to long-term profitability. However, when entering the market and setting a lower price, you should fully consider your own research and development costs, otherwise blind low prices will lead to The service providers in the new entrant market cannot afford excessive losses and are eventually expelled from the market.

In summary, the pricing of new market entrants is not only a threshold for entering the market, but also affects long-term development through market share. New entrants with high market share in the early stage are also beneficial to long-term quality improvement and dynamic changes in later pricing. Therefore, comprehensive considerations and long-term considerations are more conducive to the development of the entire market.

CONCLUSION

Based on the Hotelling model, this chapter introduces the influencing factors affecting the pricing of new entrants, constructs the extended model of Hotelling, and studies the market entry pricing model under different short-term perspectives under the premise of ensuring user utility. Based on the existing results, the back-calculation method is used to find the early equilibrium pricing based on the short-term perspective and the long-term perspective. Because the results obtained are more complex, it is not possible to visually compare the equilibrium pricing in the long-term and short-term perspectives. Finally, the numerical analysis method is used for further analysis. The main indicators are income, supplemented by market share, and the optimal market pricing is measured. It is concluded that the pricing based on the long-term perspective can enable the provider to obtain higher total returns, and the pricing is lower than In the short-term perspective, the pre-market pricing is even lower than the cost under certain conditions, which explains the rationality of the loss-making operation in which the pricing is lower than the cost in the previous market. For providers with limited funds, the previous market is suitable for pricing higher than the competition, and in the latter stage, it is suitable to lower the price of the competitor to obtain the overall benefit. This provides relevant advice and provides a theoretical basis for subsequent long-term dynamic pricing studies.

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