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Se-Hak Chun
Hallym University, shchun@hallym.ac.kr

Jhung-Soo Hong
SK Telecom, wilco@sktelecom.com

Ji-Ho Joo
KTF, jhjoo@ktf.com

Eun-Jin Kim
Korea Advanced Institute of Science and Technology, ejkim@kgsm.kaist.ac.kr

Min-Young Kim
Korea Advanced Institute of Science and Technology, minykim@kgsm.kaist.ac.kr

See next page for additional authors

Authors
Se-Hak Chun, Jhung-Soo Hong, Ji-Ho Joo, Eun-Jin Kim, Min-Young Kim, and Jae-Cheol Kim

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Se-Hak Chun
Hallym University, 1
Okchun-dong, Chunchun City, Kangwon-do, 200-702
Korea
Phone:82-33-248-1838, Fax: 82-33-256-3424
shchun@hallym.ac.kr

Jhung-Soo Hong
SK Telecom, Serin-dong 99, Jongro-gu, Seoul 110-110
Korea
Phone : 82-02-2121-4183
wilco@sktelecom.com

Ji-Ho Joo
KTF, Daechi-dong 890-20, Kangnam-gu
Seoul, Korea
Phone : 82-02-2016-1407
jhjoo@ktf.com

Eun-Jin Kim
Korea Advanced Institute of Science and Technology
207-43 Cheongryangri-dong, Dongdaemoon-gu, Seoul 130-012, Korea
Phone:82-2-958-3686, Fax: 82-2-958-360
ejkim@kgsm.kaist.ac.kr

Min-Young Kim
Korea Advanced Institute of Science and Technology
207-43 Cheongryangri-dong, Dongdaemoon-gu, Seoul 130-012, Korea
Phone:82-2-958-3686, Fax: 82-2-958-360
minykim@kgsm.kaist.ac.kr

Jae-Cheol Kim
Korea Advanced Institute of Science and Technology
207-43 Cheongryangri-dong, Dongdaemoon-gu, Seoul 130-012, Korea
Phone:82-2-958-3686, Fax: 82-2-958-360
jckim@kgsm.kaist.ac.kr

Abstract

Many online content providers tend to charge their services since they are confronted with difficulties to attain revenue from the online advertising. This paper shows why they charge their services as the online market becomes grow and explore the strategies when the conventional offline contents firms enter the online contents market. And we also discuss some implications related to pricing strategies in online contents market.

Keywords

Electronic Commerce, Internet Contents Provider, Business Models, Pricing Strategy

1. Introduction

The Internet provides a new distribution channel of content for conventional offline media firms such as newspaper, magazine and encyclopedia publishers and broadcasting companies with very low marginal production and distribution cost of online content. There have been various revenue models in online contents markets when comparing with traditional offline channel such as advertising model, subscription model, affiliation fee model, etc. In the earlier of the Internet era, most of contents firms provided their services free in order to boost offline revenue or they depend on advertising revenue sources in lieu of attaining revenue from their services or contents. However, as they are confronted with many difficulties to attain revenue from only the online advertising model, many online content providers began to charge their services.

The Wall Street Journal Online is one of the few successful online advertising subscription mixed model services in newspaper industry. The Wall Street Journal online has launched in 1996 as fee-based service since the beginning of online service. Now it has over 0.6milion subscribers online. In 2001, the revenues of the Wall Street Journal online declined 10 percent in part due to decline in advertising revenue. The Wall Street Journal online raised its yearly fee from $59 to $79 for non-print subscribers and from $29 to $39 for print subscribers. It continuously increases the revenue proportion of subscription fee when comparing with advertising revenue. Financial Times(FT.com) began to charge for its online service in may 2002. It charged $75 yearly fee for service of search of news, survey and famous column. The New York Times originally planed to charge fee for subscription but online subscribers increased so slowly that changed its strategy from fee based to free pricing in 1999. But it charges for the database search of old archives. Britannica Online has been provided from 1994. First, it started its service with fee based but it changed its strategy from fee based to free pricing sponsored with advertising revenue. The free pricing strategy of online service turned out to be failure cause it cannibalized its own offline market. Britannica decided to recharge its online service for recovering its offline sales reduction.

Digital Chosun (Chosun.com), the largest newspaper company in Korea, began to charge for its PDF file in news DB in November 2001. It charged $0.24 per page of PDF version of original newspaper for news from 1945 to 1999 and free usage for news after 2000. The charged online service records over expected usage and therefore it is understood success of charged online service. SBSi (sbs.co.kr), the broadcasting company in Korea, began to charge its online contents in 2001. It charged $1.6 per 24 hours for usage of its all contents or $0.4 per volume such as VOD service of old TV program though there was opposition of users for charging online service. Also other broadcasting companies such as KBS and MBC have plan to charge therir online VOD services.

A tacit belief had prevailed that contents provided in the Internet was free and online users have resisted paying for the online content in early era of the Internet. However, tides are changing with depression and harsh competition in the advertising market. Recently, the relative importance of the subscription model or advertising subscription mixed model is raised and the pricing scheme of online contents has become important issue.

As mentioned above, because online contents are produced and distributed with almost zero cost, cost based pricing will always result in free pricing, So this pricing scheme is not very useful in this environment. Instead, value based pricing scheme is to be more effective (Varian, 1995, 1997). For the characteristic of Internet and availability of micro payment technology in the Internet, unbundling of content that was previously bundled in offline market can be possible. Also the Internet makes it possible and profitable to bundle

large scale of information that was not available in the offline with low marginal costs (Bakos and Brynjolfsson 1999b). Bundling and unbundling of online content combining with online pricing strategies have become major controversial research issues. Bundling is preffered in its less dependence of variation in preference of consumers (Bakos and Brynjolfsson, 1999b; Schmalensee, 1982). Bundling is favored in the arguments but still unbundling and unit pricing cannot be negligible. Some suggested that mixed strategy of bundling and unbundling can be profitable to the providers (Chung and Sirbu 1997; Brynjolfsson 1999b). But most of these studies were focused on monopolistic online content provider. Fishburn and Odlyzko showed that there exist competitive online pricing equilibria between subscription based and per-use basis charging firms (1999). But still a point of sameness is that these studies only focused on online market so cannot explain the dynamic interaction between online and offline content market. Quite many of the online content providers are originated with offline content providers who are providing online and offline content goods at the same time. Like as there exist cannibalization effect on existing offline retailing market of e-retailing, the effect of cannibalization of own online content on existing offline market cannot be negligible (Shapiro and Varian, 1999). For example, the sales of paper based Britannica of the 1996 has fallen to 17% of the sales of the 1990 but on the other hand, the sales of electronic version have been increased (Auchter, 1999).

The purpose of this paper is to analyze interactive pricing strategies of online and offline when the conventional offline media firm enters the online content market and compete with existing offline competitor. The rest of the paper is as follows: Section 2 presents the model that the conventional offline media firm enters the online contents market. Section 3 explores equilibrium prices and draws some implications. Section 4 concludes and discusses future research works.

2. The Model

Our model is derived from horizontal differentiation model of Hotelling(1929) for the tastes vary in the population. We assume that duopoly exist in the market. Two firms produce horizontally differentiated goods and one of the firms has the ability to enter the online content market. We consider a linear city of length 1 where two offline stores competes. One store, denoted by A, is located at 0 and another offline store, denoted by B, is located at the end of the city. We also assume that firm A gets ready to provide online contents. Unit production costs of both offline stores are assumed to be equal to C. Without loss of generality, the unit cost in the online store is assumed to be zero. Consumers are distributed uniformly along the city according to their preferences. Let $\theta \in [0,1]$ be the distance from store A. The distance, θ, represents not only physical distance but also different preference to store A such as the opportunity cost of time or the implicit cost of inconvenience.

Each consumer buys one or zero unit of goods. Consumers who are located at 0 or 1 are assumed to value offline goods at V. And the consumer at 0 has lower valuation of the online contents, δV where $\delta \in (0,1)$. When the consumer at θ buys contents from firm A, he has to pay $t\theta$. If he buys it from firm B, he has to pay $t(1-\theta)$ where t is a sensitivity measure of preference cost per unit of length. A positive t means that a consumer who has higher valuation for the contents of firm B has to pay higher opportunity costs for buying from firm A. We also assume that when an online customer buys contents from online sites, he has to pay some lump-sum customer cost, a, such as costs of the internet access, time for searching contents and other costs related to security risk. Also, this customer cost can include waiting time cost until the online contents are loading. Thus, the utility of a consumer located at θ is

$$U = \begin{cases} (1-\theta)V - P_A - t\theta & \text{if he buys offline contents from firm A} \\ \delta(1-\theta)V - P_a - a - t\theta & \text{if he buys online contents from firm A} \\ \theta V - P_B - t(1-\theta) & \text{if he buys online contents from firm B} \\ 0 & \text{if he buys nothing} \end{cases}$$

where P_A and P_B are the prices charged by the offline and online stores and P_a is the price of the online contents of the firm A. A customer buys the offline contents from A if

$$(1-\theta)V - P_A - t\theta \geq \delta(1-\theta)V - P_a - a - t\theta .$$

Thus, the marginal consumer who is indifferent between online contents and offline contents of firm A is located at

$$\theta_1 = \frac{(1-\delta)V + P_a + a - P_A}{(1-\delta)V} .$$

Likewise, the consumer who is indifferent between online contents of A and offline contents of B is located at

$$\theta_2 = \frac{\delta V + P_B - (P_a + a) + t}{(1+\delta)V + 2t} .$$

Figure 1 depicts a typical case of the choice of consumers.

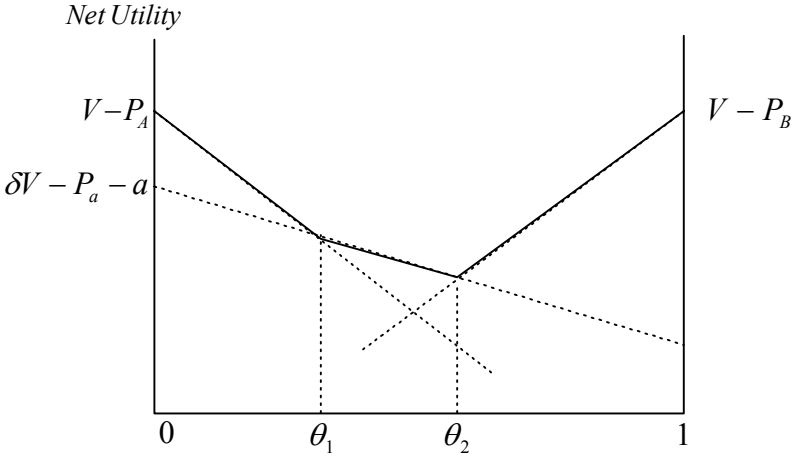

Figure 1. Typical choice of subscribers

The equilibrium is characterized by the following:

$$\begin{aligned} &(i)\ P_A - (1-\delta)V \leq P_a + a \\ &(ii)\ \delta V - P_a - a \geq 0 \\ &(iii)\ 0 < \theta_1 < \theta_2 < 1 \end{aligned} \qquad (1)$$

The first condition implies that buying offline contents from A does not dominate buying online contents from A. In other words, customers located at $\theta < \theta_1$ prefer the offline contents of firm A while consumers at $\theta_1 < \theta < \theta_2$ prefer the online contents of firm A. The second condition means that customers can earn nonnegative utility when buying from the online sites. So the online store can attract consumers. The third condition implies that there are three kinds of consumers in the city, thus consumers with $\theta > \theta_2$ prefer firm B to the online site of firm A and consumers with $\theta_1 < \theta < \theta_2$ subscribe to the online contents. In this type of equilibrium, the demand functions are given by

$$D_A(P_A, P_a, P_B) = \theta_1$$
$$D_a(P_A, P_a, P_B) = \theta_2 - \theta_1$$
$$D_B(P_A, P_a, P_B) = 1 - \theta_2$$

3. Equilibrium and Implications

We now examine equilibrium prices and then draw some implications. We analyze the two situations, which are classified into one case where two media firms compete in the conventional offline markets and the other case where the conventional offline media firm enters the online contents market. We follow basic Hotelling's differentiated model (Tirole, 1989).

3.1 Case 1: Duopoly Competition in the Offline Market

As a benchmark, we consider the case where the offline firms do not enter the online markets. In this case, the consumer who is indifferent to between A and B is located at $\theta = \frac{V + t + (P_B - P_A)}{2(V + t)}$. Therefore, profits of each firm are given by

$$\Pi_A(P_A; P_B) = (P_A - C)\left(\frac{V + t + (P_B - P_A)}{2(V + t)}\right)$$
$$\Pi_B(P_B; P_A) = (P_B - C)\left(1 - \frac{V + t + (P_B - P_A)}{2(V + t)}\right).$$

Optimal prices that maximize the above functions are

$$P_A^* = P_B^* = V + t.$$

From these we have the profits of each firm and we find the equilibrium prices and profits increase as *t* increases, which can represent a more differentiated market.

3.2 Case 2: Competition between Hybrid and Offline firms

Now consider the case where the hybrid firm A enters the online contents market. Then, the profit functions are as follows:

$$\Pi_A(P_A, P_a; P_B) = (P_A - C)\left(\frac{(1-\delta)V + (P_a + a) - P_A}{(1-\delta)V}\right) + (P_a - C)\left(\frac{\delta V + P_B - (P_a + a) + t}{(1+\delta)V + 2t} - \frac{(1-\delta)V + (P_a + a) - P_A}{(1-\delta)V}\right)$$
$$\Pi_B(P_B; P_A, P_a) = (P_B - C)\left(1 - \frac{\delta V + P_B - (P_a + a) + t}{(1+\delta)V + 2t}\right).$$

From the first-order conditions we draw the reaction functions given by

$$P_A = P_a + \frac{(1 - \delta)V + a}{2}$$
$$P_B = \frac{P_a + t + V + a}{2}$$
$$P_a = \frac{(1 - \delta)V}{4(V + t)} P_B - \frac{(2a + (1 - \delta)V)}{4}$$

From the reaction functions we have following optimal prices:

$$P_A^* = \frac{(5+\delta)V + a + 6t}{6}$$
$$P_a^* = \frac{(1+2\delta)V + 3t - a}{3}$$
$$P_B^* = \frac{(2+\delta)V + 3t + a}{3}$$

3.3 Implications

We now find the condition for firm A's entry into the online contents market and analyze the reason that online contents providers have to change for their contents nowadays. First, we draw some conditions for entry. Then the following proposition is immediate:

Proposition 1.

$$(i)\ \Pi_{A2} - \Pi_{A1} \gtrless 0 \text{ if and only if } a \gtrless \hat{a} \text{ and } \frac{\partial P_{A2}^*}{\partial a} \geq 0,\ \frac{\partial P_{B2}^*}{\partial a} \geq 0 \text{ and } \frac{\partial P_a^*}{\partial a} \leq 0$$
$$(ii)\ \frac{\partial \hat{a}}{\partial t} \leq 0$$
$$(iii)\ P_{A2}^* \gtrless P_{A1}^* \text{ and } P_{A2}^* \lessgtr P_{B2}^* \text{ if and only if } a \gtrless \tilde{a} = (1-\delta)V$$
$$(iv)\ \frac{\partial\left(P_{A2}^* - P_{B2}^*\right)}{\partial a} \leq 0 \text{ and } \frac{\partial\left(P_{A2}^* - P_{B2}^*\right)}{\partial \delta} \leq 0.$$

Proof. (i) We obtain $a \geq \hat{a}(V,\delta,t)$ satisfying $\Pi_{A2} - \Pi_{A1} > 0$. $\frac{\partial P_{A2}^*}{\partial a} = \frac{1}{6} > 0$, $\frac{\partial P_{B2}^*}{\partial a} = \frac{1}{3} > 0$ and $\frac{\partial P_a^*}{\partial a} = -\frac{1}{3} < 0$. (ii) Also we find $\frac{\partial \hat{a}}{\partial t} \leq 0$ from calculation. (iii) We can easily show the condition by simple calculation. (iv) These are proved by showing $\frac{\partial\left(P_{A2}^* - P_{B2}^*\right)}{\partial a} = -\frac{1}{6} < 0$ and $\frac{\partial\left(P_{A2}^* - P_{B2}^*\right)}{\partial \delta} = -\frac{1}{6} < 0$. ■

The first part of the proposition says that if customer costs are higher, firm A has more entry incentives and as customer costs are lower, online prices increase, while the offline prices decrease. This is because the online market becomes efficient (or customer cost, *a*, becomes lower), there occurs fierce competition in the offline markets with lower prices in the offline market, which strategically works to move consumers to the online store and cannibalizes the profit of its own offline part by lowering offline prices.[1] When the online market is very efficient ($a \leq \hat{a}$), the offline store has no incentive to enter the online market. This is because the increasing profit of the online cannot overcome the loss in the profit own offline part. This implies that many online content providers try to increase their prices and some online contents providers begin to charge for their services as the online market becomes efficient.[2]

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[1] $\frac{\partial D_A}{\partial a} > 0, \frac{\partial D_B}{\partial a} > 0, \frac{\partial D_e}{\partial a} < 0$.

[2] In the Appendix, we analyzed the case where the online contents provider doesn't charge for its own contents.

For example, following to the Wall Street Journal, recently Financial Times (FT.com) announced that it will partially charge for its online contents.

The second part of the proposition is closely related to the first part. It says that as the unit preference cost is higher, the threshold of entry becomes larger. This is because there are more possibilities to enjoy profit since we can interpret that high *t* means less competition between the offline firms or higher differentiated products (or services) or variety of customers' preferences. In the earlier era of online contents services, a relatively higher *t,* some online media sites such as pornography, VOD movie broadcasting, financial stock information, began to charge for their services.

The third part of the proposition says that as the online market becomes efficient (or lower customer costs), the offline price of the hybrid firm is lower than the offline price before entry, while the offline price of the hybrid firm is higher than the offline price of rival firm B. This is because as customer cost decreases, the downward pressure works more strongly on the price of rival firm B. This is closely in line with the last part of the proposition, which says that as the value of online service increases, the price of the rival firm B decreases with a steeper slope than the offline price of the hybrid firm A.

4. Concluding Remarks

In this chapter, we have analyzed pricing strategies when the conventional offline media firms enter the online contents market, and the explained the trend of online media firms starting to charge for their contents. The main results are that as the online market becomes efficient (or customer costs are lower), the conventional offline media firm has less entry incentives and the online price becomes higher. This explains the trends that many online contents providers try to increase their prices and some online contents providers begin to charge for their services. For future study we expect to do research on strategic interactions when the other rival offline firm acts on reciprocal entry into the online market. And we need to expand to a two stage model, considering quality and price as a decision variables of the offline firm when it enters the online market.

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Appendix: Case for Free Online Contents

First, we examine whether there is possibility that firm A provides online contents without charge. As a convention, online contents such as news and other information on homepages had been free. Also we analyze the sensitivity of the entry condition according to external variable, t and δ. Generally we assume $V \geq t$. If firm A does not charge for online contents, equilibrium prices are given by

$$P_A^* = \frac{(1-\delta)V + a}{2}$$
$$P_B^* = \frac{(1-\delta)V + 2a}{3}$$

Applying assumptions in equation (5.1) to above equilibrium prices, we have the following conditions:

$$V \geq \frac{a}{\delta} \text{ and } V \geq \frac{a+3t}{2+\delta}.$$

We assume that these conditions also hold. Then we have the following results:

Proposition A.1.

(i) If customer cost exceeds at least $\hat{a} \equiv \frac{1}{3}\left((-5+2\delta)V - 3t + 2\sqrt{(\delta^2 - 2\delta + 10)V^2 + 18tV + 9t^2}\right)$, firm A has incentive to provide online contents without charge.

(ii) Thresholds level of customer costs, $\hat{a}$, increases in t and δ.

Proof. (i) Let Π_{A1} be the profit of firm A in Case 1 and $\Pi_{A2}\big|_{P_a=0}$ be that of firm A under free charge for online contents in Case 2. Then, the difference between the latter and the former is given by

$$\Pi_{A2}\big|_{P_a=0} - \Pi_{A1} = \frac{\big((1-\delta)V + a\big)^2}{4(1-\delta)V} - \frac{V+t}{2}.$$

It can be easily shown that $\Pi_{A2}\big|_{P_a=0} \geq \Pi_{A1}$ if

$$a \geq \frac{1}{3}\left((-5+2\delta)V - 3t + 2\sqrt{(\delta^2 - 2\delta + 10)V^2 + 18tV + 9t^2}\right).$$

(ii) Using $V \geq t$, we can find that

$$\frac{\partial \hat{a}(V,\delta,t)}{\partial \delta}\Big|_{V=t} = \frac{2V}{3}\left(1 - \frac{1-\delta}{\sqrt{(\delta^2-2\delta+10)V^2+18tV+9t^2}}\right) \geq \frac{2V}{3}\left(1 - \frac{1-\delta}{\sqrt{(\delta^2-2\delta+37)t^2}}\right)$$

$$> 0 \quad \text{for } \delta \in (0,1) \text{ and } \frac{\partial \hat{a}(V,\delta,t)}{\partial t}\Big|_{V=t} = \frac{6(V+t)}{\sqrt{(\delta^2-2\delta+10)V^2+18tV+9t^2}} - 1$$

$$\geq \frac{6(V+t)}{\sqrt{(\delta^2-2\delta+10)V^2}} - 1 = \frac{6\left(1+t/V\right)}{\sqrt{(\delta^2-2\delta+10)}} - 1 > 0 \text{ for } \delta \in (0,1). \blacksquare$$