Hybrid Channel and e-Transformation Strategies in Electronic Commerce

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Abstract

The purpose of this paper is to analyze pricing strategies between conventional offline retailers and Internet retailers and discuss which strategy is more profitable when a bricks-and-mortar firm transforms into a clicks-and-mortar firm.

1. Introduction

As the online market becomes large, many brick-and-mortars retailer s begin to building a dynamic online business as another sales channel using their advantages such as brand equity, an existing customer base with comprehensive purchasing data, integrated marketing, economies of scale, and longtime experience with the logistics of order fulfillment and customer service. Yet despite their inherent edge, the collective efforts of bricks-and-mortar retailers to develop Internet sales have been tentative at best. A study conducted for RIS (Retail Information Systems) News reports that only 29 percent of retailers are currently selling anything online; 24 percent have no web presence whatsoever; and a third of retailers acknowledge that their web site has "no strategic purpose". Another recent survey of 80 global businesses conducted by Price Waterhouse Coopers and the Conference Board reported similar findings; only 28 percent of companies surveyed were able to process transactions online, and only 40 percent handle orders electronically.

Even if an offline retailer enters the online market with a brand name, we see many examples where offline retailers have faced numerous difficulties in competition with rival online retailers such as Toys-R-Us vs. eToys and B&N vs. Amazon. In the case of Egghead, its conversion to online sales resulted in bankruptcy. As we explore the trends, it does not seem that entry into the online market is the best solution for offline retailers. In the earlier stage of electronic commerce, there were only pure online retailers in the online market. Subsequently many offline retailers entered the online market. The outcomes, however, were not always desirable. Upon this background, this paper discusses some issues concerning the entry of conventional offline retailers to the online market, and analyzes the entry

conditions. Lastly, some implications are noted.

2. The Model

2.1 The Assumptions

We extended the competition model of Chun and Kim (Chun and Kim, 2005a; 2005b) and developed the competition analysis when the conventional offline firm competes with the pure online firm using hybrid channel. We adopt the commonly used spatial competition model of Hotelling (Hotelling, 1929; Shy, 1995; Calton and Perloff, 2000; Tirole, 1995).

We assume a commonly-used spatial linear city of length $\bar{s}$ where there is a conventional offline retailer at the end of the city. The heterogeneous market is characterized by the existence of distance. There is a pure online retailer that sells the same good with no physical location. The unit production cost of both retailers is the same and equal to C. Consumers are distributed uniformly along the city. In other words, letting s denote the distance from the offline retailer which is located at 0, s is uniformly distributed on $[0, \bar{s}]$. The distance here, can represent different preferences such as the opportunity cost of time, the implicit cost of inconvenience, as well as the real cost of travel. Each consumer consumes one or zero units of the good. Maximum valuation of the good is V, which consumers are located at the offline retailer. There are two types of consumers, a fraction of consumers m that have access to the Internet and $1-m$, who do not have access to the Internet. A consumer with access to the Internet may buy the good from an offline retailer, in which case he has to travel to the retailer and pay transportation cost, ts where t is transportation cost per unit of length. Online customers, however, are not concerned with their physical location. We assume that when an online consumer buys a product, he/she needs to pay some lump-sum customer cost, a, such as the cost of the Internet access, searching and other costs related to quality uncertainty and security risks. Also, this customer cost can include actual delivery cost and waiting time cost until the product is received, usually a few days later.

Thus, the utility of a consumer with access located at s is

$$\begin{cases} V - P_A - ts & \text{if he buys from the offline store} \\ V - P_B - a & \text{if he buys from the online store} \\ 0 & \text{if he does not buy,} \end{cases}$$

where P_A and P_B are the prices charged by the offline and online retailers. Figure 1 depicts possible equilibrium cases of the choices of consumers with access in the online market where the net utilities of representative consumers are drawn.

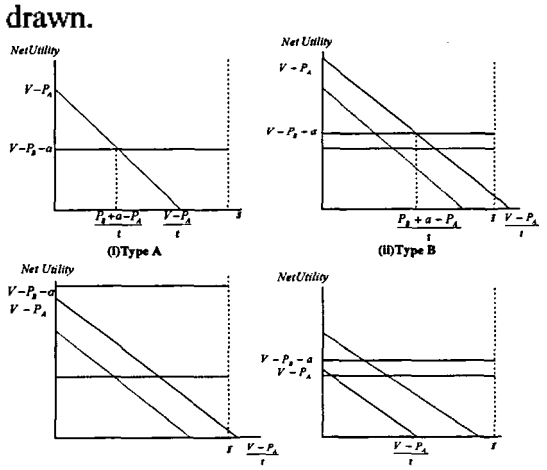

Figure 1. The choices of consumers.

Table 1. Equilibrium types.

Types	Conditions
A	$(i)\,P_A \le P_B + a\ (ii)V - P_B - a \ge 0\ (iii)\bar{s} \ge \frac{V - P_A}{t}$.
B	$(i)\,P_A \le P_B + a\ (ii)V - P_B - a \ge 0\ (iii)\bar{s} < \frac{V - P_A}{t}$.
C	$(i)\,P_A > P_B + a\ (ii)V - P_B - a \ge 0\ (iii)\bar{s} < \frac{V - P_A}{t}$.
D	$(i)\,P_A > P_B + a\ (ii)V - P_B - a \ge 0\ (iii)\bar{s} > \frac{V - P_A}{t}$.

Table 1 shows characteristics of each equilibrium cases. For example, the conditions for the type A can be explained as follows. The first condition implies that neither the option of buying from the offline retailer nor that of buying from the online retailer completely dominates the other. In other words, letting $\hat{s} = \frac{(P_B + a - P_A)}{t}$, consumers with $s < \hat{s}$ prefer the offline retailer while consumers with $s > \hat{s}$ prefer the online retailer. The second condition means that consumers can earn nonnegative utility from buying from the online retailer if consumers have access to the Internet. Thus, the online retailer can attract consumers. We confined ourselves to analyze a market where every consumer with access to the Internet can buy the product from an offline or online retailer. The third condition implies that the city is so long that some consumers with no access will opt not to buy the good. The other cases can be explained in figure 1 which depicts four equilibrium types. The dotted line represents a type A case. Type A, D represent that the length of city is shorter than type B, C. Type C and D are the cases where the valuation of consumers with access to the Internet is higher than that of consumers without access to the Internet irrespective of the location, so that all consumers with access to the Internet will buy the goods from the online retailer. Type C is different from type D in that all the consumers without access to the Internet will buy the goods from the offline retailer (or the city of type C is longer than type D). However in type D, there exist consumers without access to the Internet who do not buy the goods from the offline retailer.

2.2 The Equilibrium

We now examine equilibrium prices and then draw some implications. Let $X \equiv t\bar{s} + a$ represent transaction costs of the online and offline retailers. Also let $k \equiv (V - C)/X$ and $r \equiv t\bar{s}/X$. In other words, k represents the net surplus of the good relative to the total transaction costs and r is the relative inefficiency of the offline retailer in terms of the transaction costs. Then, we draw the profit functions for each type shown in Table 2.

Table 2. Profit functions.

Types	Profit function
A	$\Pi_A = (P_A - C)\left(m\hat{s} + \frac{(1-m)(V-P_A)}{t}\right)$ $\Pi_B = m(P_B - C)(\bar{s} - m\hat{s})$
B	$\Pi_A = (P_A - C)(m\hat{s} + (1-m)\bar{s})$ $\Pi_B = m(P_B - C)(\bar{s} - \hat{s})$
C	$\Pi_A = (1-m)(P_A - C)\bar{s}$ $\Pi_B = m(P_B - C)\bar{s}$
D	$\Pi_A = (1-m)(P_A - C)\frac{V - P_A}{t}$ $\Pi_B = m(P_B - C)\bar{s}$

To find equilibrium prices, we let $P_B' \equiv P_B + a$ and think global reaction functions considering all possible reaction functions. The global reaction functions are depicted in figure 3. From global reaction functions we know that equilibrium exists in type A or B area.

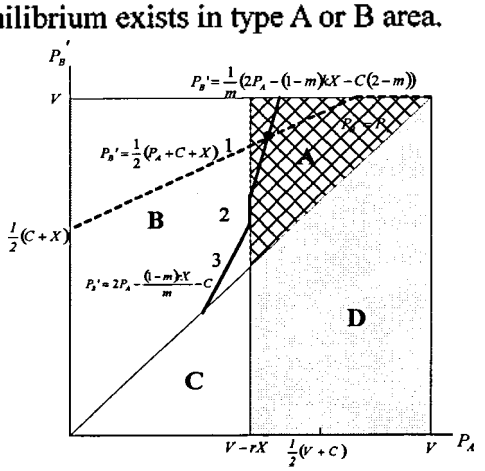

Figure 3. Global reaction functions

Then, we find equilibrium prices shown

in table 3.

Table 3. Equilibrium prices.

Types	Equilibrium Prices
A	$P_A^* = C + \frac{(m + 2(1-m)k)X}{4-m}$ $P_B^* + a = C + \frac{(2 + (1-m)k)X}{4-m}$
B	$P_A^* = C + \frac{1}{3}X + \frac{2(1-m)kX}{3m}$ $P_A^* = C + \frac{2}{3}X + \frac{(1-m)kX}{3m}$

3. Hybrid Channel and e-Transformations Strategies

3.1. The Basic Model

We basically follow the model from the previous section. Consider a mixed hybrid retailer (or clicks-and-mortar retailer), denoted by *M*, where a conventional offline retailer enters the online market, merging online and offline sales. We assume that the entry costs into the online market are zero. This is because the fixed cost to set up an Internet retailer is less than that of a conventional offline bricks-and-mortar retailer. Also if there are no advantages in the Internet branch of a mixed retailer, consumers perceive there are no differences with an online retailer with the same market share of its online presence. Then, we assume that the two online retailer s will play a Bertrand game and both will have to set prices at the marginal cost (Economides, 1993). As a result, the equilibrium prices will be C in the online market, which are from the Bertrand competition resulting in the prices of the online market to the marginal price. We only analyze the case where there are no advantages for a conventional offline retailer that is willing to enter the online market.

3.2 Equilibrium Prices and Implications

We consider type A and B cases because there is no equilibrium in type C or D. For a type A, profit functions of the hybrid retailer with an offline and online presence and the pure online retailer are given by

$$\Pi_M = (P_A - C)\left(m\hat{s} + (1-m)\frac{V - P_A}{t}\right) + \frac{m}{2}(P_C - C)(\bar{s} - \hat{s})$$

$$\Pi_B = \frac{m}{2}(P_B - C)(\bar{s} - \hat{s})$$

where P_A is the price of the hybrid clicks-and-mortar retailer in the offline market, P_C is the price of the online branch of the clicks-and-mortar retailer, and P_B is the price of the pure Internet retailer without the presence of a physical retailer. We let $\hat{s} = \frac{(P_C + a - P_A)}{t}$ and P_A, P_C and P_B be the equilibrium prices. Also, for a type B, profit functions of the hybrid retailer with an offline and online presence and the pure online retailer are given by

$$\Pi_M = (P_A - C)(m\hat{s} + (1-m)\bar{s}) + \frac{m}{2}(P_C - C)(\bar{s} - \hat{s})$$

$$\Pi_B = \frac{m}{2}(P_B - C)(\bar{s} - \hat{s})$$

From the first-order condition we obtain the equilibrium prices shown in Tables 4.

Table 4. Equilibrium prices.

Types	Prices
A	$P_A^* = C + \frac{(1-r)mX + (1-m)kX}{2}$ $P_B^* = P_C^* = C$
B	$P_A^* = C + \frac{(1-r)X}{2} + \frac{rX}{2m}$ $P_B^* = P_C^* = C$

Then, the following proposition is immediate:

Proposition 3. (i) $\Pi_{MA} - \Pi_{DA} \leq 0$ for $r \geq \frac{1}{3}$.

(ii) $\Pi_{MB} - \Pi_{DB} \underset{\geq}{\leq} 0$ if and only if for $r \underset{\leq}{\geq} \frac{m}{2m+1}$.

The first part of the proposition says that for the type A condition, the conventional offline retailer has no incentive to enter the online market. This implies that in the case of type A, the online retailer's predatory pricing with the threat of marginal cost can be effective. The first part of the proposition indicates that if the conventional offline retailer has no advantages in brand image over the online retailer, there is no incentive to enter the online market. This is because lower prices of the online market from Bertrand competition make the price of the offline part lower, which leads to loss in the offline part due to the negative effect of profit margin, which dominates the positive effect of market share. This implies that if the online part of the mixed retailer cannot provide better services than the pure online retailer, the offline retailer should not launch the online business. This is in line with Graham's argument (2000) that offline retailer s hesitate to move into the online market due to the knock-on effect, which makes brand effects diminish.[1]

According to Graham, 84% of British blue-chip companies have not integrated offline and online channels. We see that conventional offline retailer do not enter the online markets. For example, the majority of conventional offline sporting goods stores are not selling online, which is largely due to the difficulties in encouraging site loyalty (Rosen, 2000).

There are also many examples of conventional retailer s failing upon entry to the online market. This implies that when an offline retailer moves into the online market with no advantages over its pure dotcom competitors, thus putting downward pressure on its own offline retailer 's prices, losses or diminished profits may be incurred.

The second part of the proposition says that there are incentives to move into the online market under the type B condition. Figure 4 shows the area of entry into the online market. Areas *A* and *B* are drawn from the equilibrium conditions shown in Table 4 and the area *Entry of B* is drawn from the entry conditions of the second part of this proposition. We found that there are no entry incentives in area *A*. Entry occurs in area *Entry of B*, which is included in type B equilibrium, denoted by *B*.

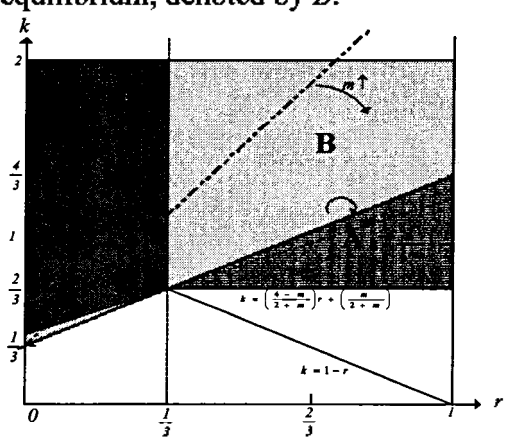

Figure 4. Area of entry into the online market

As shown in Figure 4, the possibility of entry area becomes larger according to *m*, which means that the offline retailer can have more incentives to enter the online market if more consumers have access to the Internet. But even in this case, if the online market becomes too efficient, the offline retailer likely should not enter the online market. This is because the cannibalization effect works more strongly when the online market is efficient. As seen in type B, if the online market becomes too efficient, the utilities of consumers increase, which works to enlarge the online retailer's

[1] This effect is that customers who have a negative online shopping experience stop visiting the physical offline store. Graham said that nearly 30% of online purchases fail and 6% of customers who have a negative online shopping experience stop visiting the retailer's physical outlet.

market share. Then, the offline retailer tends to reduce prices in order not to lose consumers from its offline part to the rival online retailer. These reductions of prices occur strongly in the offline retailer, resulting in lower profit margins and greater market share offline. Negative effects of reduction in price are higher than the positive effects of the increase in market share, which works to decrease total profits. Thus if the online market becomes too efficient, the offline retailer has no incentive to move into the online business.

This implies that the offline retailer without advantages over the online retailer faces difficulties in competing in the intense online market when the online market becomes efficient. And if the offline retailer enters into the online market without differentiating its online presence, it also has the same difficulties in obtaining profits.

4. Conclusions

This paper shows that launching an online business is not always an optimal decision. This decision is dependent on market conditions, especially the conditions of the online market efficiency. As the online market becomes efficient, the offline retailer should have more brand effect in order to enter the online market. For future study we plan to study strategic reactions of a pure online retailer when an offline retailer enters the online market.

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