December 1998

The Impact of Electronic Commerce on the Marketing Channel Competition

Beomsoo Kim
University of Texas at Austin

Byungtae Lee
University of Arizona

Anitesh Barua
University of Texas at Austin

Follow this and additional works at: http://aisel.aisnet.org/amcis1998

Recommended Citation
http://aisel.aisnet.org/amcis1998/259

This material is brought to you by the Americas Conference on Information Systems (AMCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in AMCIS 1998 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.
The Impact of Electronic Commerce on the Marketing Channel Competition

Beomsoo Kim
Department of Management Science and Information Systems
The University of Texas at Austin

Byungtae Lee
Department of Management Information Systems
University of Arizona

Anitesh Barua
Department of Management Science and Information Systems
The University of Texas at Austin

Abstract

Since the advent of the World Wide Web, “the Internet has emerged as a shopping channel with undeniable power to facilitate and increase sales of a growing range of products” (Ernst & Young, Special Report, 1998). With commercial activity on the Internet gaining momentum, and with technological developments involving more secure means of making payments, sending documents, and verifying the identity of the consumer, electronic malls are opening up a new vista of opportunities.

We study the competition between two competing marketing channels: online stores and traditional retail stores, and focus on profitability and expansion of marketing channels as a function of consumer characteristics and stores’ cost structure. A consumer’s choice of a store is determined by price differences, perceived risks, network comfort level, customization, information accuracy, and discomfort level (logical distance between the consumer and the traditional retail store). Based on the Hotelling’s model of spatial competition, Nash equilibria of price and demand are derived.

We find that the number of traditional retail store has no effect on the optimal pricing strategies of either the online store or the traditional retail stores when the retail shops belong to one chain. Another interesting finding is that the optimum price strategies of the channels move in the same direction at different rates as the importance of the network comfort level changes.

This paper provides a foundation for analyzing economic aspects of businesses (electronic commerce) on the Internet. It offers managerial insights for both online store management and retail store management regarding issues such as marketing strategies in competition, business expansion strategies, investment complementarity, and diseconomies of scope.

Introduction

Innovations in information technology and communication have introduced a new form of retailing known as the online store or electronic mall. By reducing the time and other transaction costs inherent in commerce, much as mail order and cable shopping have already begun to do, online stores are experiencing rapid growth and securing an important niche in the industry. In the traditional retail channel, the producer sells to the wholesaler, who sells to the retailer, who sells the product to the consumer. By contrast, the online store sells by publishing product information on the Net, taking individual orders, and shipping directly.

Online stores compete with traditional retail stores through differentiated service and pricing and compete with each other through pricing, promotion, and product mix.

This research focuses on competition between marketing channels: an online store and traditional retail stores. We examine the proposition that differences in discomfort level, perceived risks, customization, information accuracy, and a consumers’ network comfort level explain a consumers’ selection of a particular marketing channel. In addition, these differences explain the variation in sales of one organizational form over another. We seek to analyze each channel’s ‘cost to advertise’ and ‘cost to distribute’ functions in order to determine the conditions under which an online store has a competitive advantage over traditional retail stores, and vice versa.

We find that the number of traditional retail stores has no effect on the optimal pricing strategies of either the online store or the traditional retail stores when the traditional retail stores belong to one chain. Another interesting finding is that the optimum price strategies of the channels move in the same direction at different rates as the cost of networking changes. Thresholds that give complementarity or diseconomies of scale in business expansion are derived. Using these thresholds, we
predict that the changes in a market situation are more favorable to the expansion of an online store than to that of a traditional retail store. We also discuss social welfare implications of electronic commerce. “Electronically disadvantaged consumers” may be worse off without proper policy intervention.

Motivation

A few years ago, not only were users of the Internet fiercely opposed to any form of commercial activity on the Net, but the business community was basically not interested and skeptical as well. As cyberspace grows, however, most users are beginning to accept advertising and business on the Internet, and in fact many welcome them. The Ernst & Young special report (Ernst & Young, Jan. 1998) says that the Internet is expanding at unprecedented levels. With commercial activity on the Internet gaining momentum, and with technological developments involving more secure means of making payments, sending documents, and verifying the identity of the consumer, electronic stores are going to open up a new vista of opportunities.

Despite the huge growth in the commercial use of the Net, Yankee Group survey results (Eng 1995) and Ernst & Young report (1998) show that traditional retail stores remain the primary conduit for selling products to consumers. That is, the majority of manufactures (71%) have no intention of selling online, even though 88% of online stores believe the Net will strengthen their competitive position relative to traditional competitors (Ernst & Young, Jan. 1998).

Why are they hesitant to jump into the electronic retailing when tens of millions people have access to the Internet? What would stimulate these companies to join in doing business on the Net (electronic commerce)? Are they going to succeed? This paper addresses these questions.

Like all economic institutions, the ultimate shape the marketing channel takes is determined by production and distribution costs (Williamson 1985, 1989). The channel is united by a web of transactions among its members (ordering and shipping the product, and remitting payment), and each transaction has a cost. In a sense then, a marketing channel has a ‘cost to distribute’ function analogous to a producer’s ‘cost to produce’ function for transforming and enlarging the product’s attributes (e.g., to physically move the product) (Michael 1994). The consumer’s demand functions for these product attributes, coupled with the costs of distribution and production, determine the equilibrium levels of prices and quantities in any channel, and consumers’ cost-minimizing behavior determines which channel or channels survive. The difference levels of attributes demanded by the consumer create an opportunity for differentiated competition both within channels (e.g., among online stores) and between channels (e.g., between online stores and retail stores).

Lusch (1982) summarizes several studies that have been conducted on the attributes that consumers use to choose stores. Eight of the most frequently used attributes are: price, merchandise, physical characteristics, sales promotions, advertising, convenience, services, and store personnel. Out of these eight factors, we focus on price, discomfort level, perceived risks, and merchandise because these factors have direct impact on the consumer’s market channel selection behavior.

The Hotelling’s (1929) two-stage model of spatial competition is an extension of the Bertrand model. Hotelling uses location and price as strategic variables to find equilibrium. In this research, we extend the simple price competition model to price and non-price competition. In other words, we assume that two types of stores provide the same goods which are “differentiated” in that consumers perceive different utility from the products of the different stores. The relevant questions addressed include: What are the reasons that people use an online store rather than a traditional retail store, and vice versa? What are the critical factors that give each type of store comparative advantages and effective marketing strategies? How much, and in what way, does the consumer’s network comfort level or experience with information technology, especially the Internet, impact store retailers’ strategies? What is the impact of the perceived risks on the strategies of the stores? How will technical progresses and emerging cyber-intermediaries change the competition?

Model

This research deals with a market in which there are two supply agents (an online store and a traditional retail store) and many consuming agents (consumers). Each consumer wants to buy at least one unit of an identical individual commodity. The supply agents are uncertain as to whether the consumer is receiving offers from one or both of the agents at any given time.

Shopping at an online store and traditional retail store involves different transaction cost factors. In traditional retail shopping, the transportation cost, which is a function of the distance from a consumer to a store, is a major component of transaction cost. In online shopping, the consumer’s network comfort level and his perceived risk are the most important factors of transaction cost. The consumer’s perceived risks center around uncertainty about the quality of the information provided about the product and the lack of a secure environment for conducting the business transaction. Hence, a consumer’s choice of store is determined by price differences, perceived risks, network comfort level, and discomfort level (logical distance between the consumer and the retail store). Assume, for simplicity, that $t$ is uniformly distributed between 0 and 1, and $a$ and $x$ are scaled to values from 0 to 1.

Suppose a traditional retail store as store $r$ and an online store as store $e$, we have consumer’s utility function like the following:

$$U_e(a,x) = U_0 - \{P_e + (1-a)C_\alpha + xC_s\}$$

$$U_r(t) = U_0 - \{P_r + rC_t\}$$
where

- $U_0 =$ consumer surplus
- $P_i =$ price of a product at store $i$ ($i = e$ or $r$)
- $a =$ network comfort level ($0 \leq a \leq 1$)
- $C_a =$ network comfort level coefficient
- $x =$ perceived risks ($0 \leq x \leq 1$)
- $C_x =$ perceived risks coefficient
- $t =$ discomfort level ($0 \leq t \leq 1$)
- $C_t =$ discomfort level coefficient

The price of a product at an online store includes retail price, shipping costs, and time delay in the delivery process. Time delay in delivery can easily be converted to a money value. For example, express delivery service minimizes the disutility of waiting. We can consider the cost of time delay as the extra delivery charge, which is a part of the price.

Coefficients, $C_a$, $C_x$, and $C_t$, represent the importance of each variable compared to the importance of the price, 1. That is, if the coefficient of each variable is greater than 1, the variable is more important than the price in the shopping process. If the coefficient is less than 1, the variable plays a less important role in the consumers’ selection processes. For example, if a consumer considers the price as the most important factor in selecting a store, the coefficient of network comfort level, perceived risks, and discomfort level are less than 1 and vice versa.

In order to find the optimal strategies of each store, we use the concept of pure-strategy non-cooperative Nash equilibrium. From the profit function below, we derive the best response functions of each store. A Nash equilibrium in price, a Bertrand equilibrium, is determined from the intersection of the best response functions of the stores.

We develop a stylized framework to explore equilibrium pricing and demand strategies of firms in the marketing channel competition between retail and online stores. The model makes it analytically tractable to analyze the endogenous nature of retailers’ incentives and consumer’s selection behavior. We focus on markets where the demand for a good is dependent upon prices, network comfort level, perceived risks, and discomfort level. We also address business strategies through different economies of scale.

One of the possible advantages of the online store is the ability to overcome the geographical limitations of a retail store. An online store can compete with one or many retail stores which are geographically limited and distributed. We investigate this issue under different marketing cost structures in order to identify the best channel structure. We also examine how this expanded potential market size of the online store and the different vertical integration structure of the retailers affect the competition.

We find that the number of retail stores has no effect on the optimal pricing strategies of either the online store or the retail stores when the retail stores belong to one chain. Another interesting finding is that the optimum price strategies of the channels move in the same direction at different rates as the importance of the network comfort level changes. Finally, we find that business expansion in retailing can create more profits due to complementarity or can decrease the profit because of the diseconomies of scale when the market holds certain thresholds.

References

2. Ernst & Young LLP, Internet Shopping: an Ernst & Young Special Report, Jan, 1998.