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DOTCOMS vs. NOTCOMS: The Impact of Internet Commerce on Traditional Firms

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Extended Abstract

The confluence of several factors over the last few years has transformed the Internet from an experimenting ground for technophiles and hobbyists into an important and sophisticated forum for commerce. The Web promises to be not only an effective channel for information dissemination, but also for customer acquisition and retention, relationship management, one-on-one interaction, differentiation, cost reduction, competitive positioning and other such activities that are revolutionizing commerce. Unlike traditional distribution channels, the Web possesses several unique features that not only enable the seamless unbundling of the various functions that distribution channels perform, but also helps to realign these functions and increase efficiency by altering the existing economies of scale and scope. Further, the Web provides a whole new opportunity to rethink the way businesses are conducted and holds the potential for radical changes in the way of new products and services. Despite the growing importance of online commerce, most of what is known about the Web as a channel for commerce is based on anecdotes and exploratory studies. There is no formal understanding of how it would affect the structure and performance of markets, and the rapid pace of technological change makes it difficult to predict any long-term effects. Besides, it is not clear if the Web promises to be an efficient channel for commerce for all categories of products, firms and industries and if it should be used differently from other direct sales and distribution channels. My thesis seeks to address some of these issues.

Before a theory of online commerce can be developed, it is imperative to understand the basic functions of distribution channels and the characteristics of the Web as a technology that makes it suitable for commerce. My thesis begins with a framework that examines the role of the Web as a distribution channel in light of its unique features and integrates the crucial issue of 'channel fit' with a variety of product, firm and industry characteristics, as well as buyer behavior. This framework sets the tone for the three distinct, yet closely related studies that constitute my dissertation. The framework serves as a building block for the two analytical models and is also used to derive testable hypotheses that form an integral part of the empirical study. While the main focus of my dissertation is on electronic commerce and online retailing, my thesis draws

on three streams of research – game-theoretic economic modeling, marketing and consumer behavior, and empirical finance.

I. According to recent surveys by Media Metrix and Nielsen, the lists of 50 top online retailing sites read like a 'Who's Who' of land-based retailing. Gap.com, eSchwab, JCPenney.com, Wal-Mart.com and Barnesandnoble.com were among the hybrid firms that made the grade. With more and more traditional firms moving online, online and traditional markets are no longer isolated but strongly influence one another. The fact that online markets coexist with, and compete with firms in traditional markets has been largely overlooked in the research literature. Most of the existing research on electronic commerce (for instance, see Bakos, 1991,1997; Brynjolfsson et al., 1999) that has focused on studying the efficiency of electronic markets, has neglected this strategic interaction between firms operating in the two domains. However, the increasing interaction between online and traditional firms alters the strategic landscape for firms in both domains. In addition the differences between these two domains, sets the stage for interesting dynamics and makes their study compelling.

The first part of my dissertation addresses a serious challenge faced by these traditional firms - the issue of integrating their online strategies with their traditional operations. Since online markets are characterized by severe price competition, traditional firms that move online are forced to match their competitors' prices, and this can conflict with their pricing strategies off-line. Charles Schwab, Barnes & Noble, Wal-Mart, Home Depot and Circuit City are examples of some other firms that have streamlined their traditional operations to be in sync with their online operations. My research seeks to explain how the strategic interaction between online, traditional as well as hybrid firms that have a presence in both markets, impact competitive outcomes in the two markets.

A spatial differentiation model (for instance see, Salop, 1979; Bakos, 1997) is developed to analyze theoretically the dynamic aspects of competition between online, hybrid and traditional firms. The features of the equilibrium configurations and the welfare implications of competition are also analyzed. Preliminary results indicate that the profits of firms in competing channels

increase as they differentiate themselves as much as possible from each other, and by differentiating themselves based on the characteristics over which consumers have the maximum variety in relative valuations.

The choice of the factors of differentiation, however, is crucial, as are the relative sizes of the online and offline markets. The results also indicate that neglecting the impact of traditional markets on online firms risks oversimplification, and might lead to incorrect prescriptions to both offline and online firms. I also propose to extend the above model to incorporate other pertinent differences between online and traditional markets, such as search and inspection costs and network externalities.

II. Despite all the glamour of the Web and electronic commerce, moving online is a more complex decision than it appears. With electronic commerce still a novel phenomenon, most firms are trying to come to grips with the uncertainties, pitfalls and above all, the benefits involved. The effervescent nature of the Web and its users, the lack of barriers to entry, the difficulty of locking-in customers, are just some of the issues that online firms have to deal with. While online start-ups have little to lose, well-established land-based firms are caught in a quandary – they risk antagonizing their existing channel members and cannibalizing their offline sales if they move online, and a possible threat of annihilation if they don't. Intense price competition and shifts in consumer preferences, are some other factors that firms have to deal with. With online retailing experiencing explosive growth land-based firms are faced with several challenges.

The second part of my dissertation seeks to develop formal models to address these specific issues. What is the optimal timing of adoption of online retailing for a 'brick-and-mortar' firm? What is the optimal configuration (right mix of channels) for a hybrid firm? Should a land-based firm increase its investments in traditional operations, so as to enable it compete better? The focus, here, is on a 'brick-and-mortar' firm's decision to establish a significant online retailing presence with consideration to various factors, like the characteristics of the technology, product, firm and industry that influence the optimality of the outcomes. These issues falls under a broad-class of problems that relate to a firm's decision to invest in new products and technologies that have uncertain returns (for instance, see Gaimon, 1989; Reinganum, 1981; Barua et al., 1991; Clemons et al., 1992).

The initial model will examine the decision of a monopolistic firm to adopt online retailing, given the tradeoffs that it faces. Subsequently, I propose to develop a dynamic game-theoretic model to analyze a firm's decision to adopt online retailing given the existence of a

competitor. The model will formalize the strategic adoption by the duopoly, with each firm required to choose a time of adoption. This model of competition will help capture explicitly the impact of one firm's adoption decision on the other's time of adoption and profitability. In addition it would also help analyze the endogenous nature of the firm's incentives to be a leader or follower given its efficiency in terms of technology, infrastructure, brand-equity etc. The impact of differential customer valuations of channels, differential technological efficiencies, differential brand-power, and the first-mover advantages, on the optimal timing and optimal choice of channel configurations are also analyzed.

III. The stock prices of traditional firms that have moved online have seen dramatic increases. Most of the traditional firms whose stock prices have been surging on the news of their online retailing efforts have been around for long and operate in well-established markets. While the Web is definitely a viable channel for commerce, it remains to be seen if moving online promises dramatic growths for all such firms, or if certain categories of firms stand to benefit more than others. Evidence suggests that while the market rewards firms that move online, the benefits that accrue to firms may differ depending on various product, firm and industry-related factors.

The final part of my dissertation proposes to analyze the impact of these various factors on the value-addition for firms moving online and their suitability for online retailing, using an event-study methodology. Event studies examine the effects of announcements of economic events on the security returns of firms and have been widely used in finance, economics, accounting and organizational studies to analyze the impact of corporate events. Due to lack of reliable data their use in IS research is limited (see Koh and Venkatraman, 1991; Subramani and Walden, 1999). My data set consists of over 240 announcements by traditional firms in various industries, that are public (quoted on the NYSE/Nasdaq) and for which the stock prices are available for a substantial period before and after the event(s) under study. The events relate to the firm's online retailing initiatives, including online stores on portals. The data is for the period between January 1998 and December 1999 and is compiled primarily from the leading new sources – PR Newswire, Business Wire and 'Hoover's Online' database. The data set is unique for its depth and coverage of events related to online retailing and can also be used to test theories relating to firms' choice of a distribution channel or adoption of an innovation.

A pilot study indicates that overall, significant positive abnormal returns accrue to firms' online retailing initiatives. However, some of the firm, industry and product related characteristics identified in the framework, including intensity of competition, order of entry, brand-equity, type of product, have a significant impact on the abnormal returns that accrue to such firms.

The contribution of the various industry, firm and product related factors (identified in my framework) to the value-added by e-commerce is borne out by a multivariate regression model whose dependent variable is the 'abnormal returns' that accrue to firms making e-commerce announcements. The empirical study is also designed to test some of the results of the theoretical models. The fact that the online retailing environment is very different from traditional channels and that not all firms may benefit equally from moving online is supported by these preliminary findings. A more detailed study is underway and promises to shed light on the differential impact of these factors on the benefits of online retailing.

To sum up, this dissertation proposes to study some significant issues pertaining to electronic commerce and online retailing. While the initial framework serves to identify and categorize factors pertinent to the various issues of interest, modeling the competition between online and traditional firms provides rich insights on the structure of these markets. The analysis of a traditional firm's decision to adopt online retailing with particular consideration to significant product, firm and industry related factors, promises to shed light on a common dilemma faced by many firms. The final empirical study will help us understand the impact of these various product, firm and industry related factors on the benefits to traditional firms from adopting online retailing.

While there has been a lot of excitement and hype about the potential of electronic commerce, there are hardly any systematic studies of this phenomenon. My dissertation seeks to make a contribution in this direction and pave the way for more formal analyses of electronic commerce and related issues.

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