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The Impact of E-Commerce Strategies on Firm Value: Lessons from Amazon.com and Its Early Competitors*

Which strategies generate value in e-commerce environments? In a step toward answering this question, this article estimates the impacts of several competitive strategies on the values of the well-known Internet retailer Amazon.com and three of its early competitors, BarnesandNoble.com, CDNOW, and N2K, from their IPO dates until exit or the end of 2001. The strategies analyzed include alliance formation, offline expansion, pricing, product line expansion, and service improvement. The results provide insight into the usefulness of various ways of competing online and could be applied in other settings where firms enter new environments about which they have little information.

I. Introduction

Managers are often uncertain about the impacts of their competitive strategies on the value of their firms, but this problem is exacerbated when firms enter new environments in which managers have little information about demand and other market conditions. One such environment is the e-commerce environment. The rapid growth in the number of firms that compete in the e-commerce environment makes it increasingly important to understand which strategies work in this new environment and which do not.

To estimate the impact of e-commerce strategies on firm value, this article applies event study methodology to analyze strategies announced by the leading Internet retailer Amazon.com and three of its early competitors, BarnesandNoble.com, CDNOW, and N2K, from their IPO dates until exit or the end of 2001. The article focuses on six types of strategies that are of particular interest in the e-commerce environment: (1) promotional activities, (2) offline customer service center and distribution center expansion, (3) pricing, (4) product

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line expansion, (5) service improvement, and (6) foreign expansion.

The results demonstrate that the strategies chosen and their impacts on value can be explained using a simple framework: firms initially believed that pursuing sales was the way to maximize firm value—this was their general strategy. Initially, their efforts to increase sales increased firm value, and these positive impacts reinforced the firms' initial beliefs. However, two factors apparent in the data worked against the firms. First, the effectiveness of the general strategy diminished over time. Second, economic theory implies that some ways of increasing sales are less effective than others. Firms were slow to recognize both factors.

There is little question that firms pursued sales early on and that they were slow to adjust their strategy. In early 2000, the *Wall Street Journal* reported that "revenues are the lifeblood of these companies and their stocks because earnings are often nonexistent. Investors want growth at Internet firms. When they can't look at earnings, they look for go-go revenue growth" (*Wall Street Journal*, February 7, 2000, sec. C1). Around the same time, Jeff Bezos, the founder and chief executive officer (CEO) of Amazon.com, said, "No company cares more about long-term profitability and return on invested capital than Amazon.com, but we do think it would be the wrong time to focus on short-term profitability" (*The Motley Fool*, press release, January 3, 2000). In April 2001, looking back on the dot-com wave of the late 1990s and early 2000s, Wall Street editor Allan Sloan summed up the firms' strategies by saying "the buzz phrase in 1999 was 'top-line growth.' That means increasing sales—but not necessarily making profits" (*Newsweek*, press release, April 1, 2001). By that time, after Amazon.com's stock price had fallen considerably from its peak, Bezos had revised his strategy and said that profitability "is the right thing to do" (ibid). Clearly, a shift in the e-commerce firms' general strategy had occurred. Since then, there has been a lot of rethinking of the initial viewpoints expressed by Web enthusiasts (see Coltman et al. [2001] for a discussion of this topic).

The empirical results show how the effectiveness of the general strategy diminished over time and provide a summary of what worked and what did not. First, promotional activities had diminishing marginal returns. Early announcements had higher effects on value than later announcements, which in many cases had negative effects. Second, offline expansion had diminishing marginal returns. Third, price reductions reduced value. Fourth, although product line expansion and service improvement programs generally increased value, this effect is due to a relatively small number of successful initiatives. Fifth, foreign expansion reduced value. Sixth, competitor investments in the firm's main lines of business reduced the firm's value.

A. Contribution to the Literature

The results are consistent with recent work that explores the relevance of Web traffic for valuing Internet retailers. Trueman, Wong, and Zhang (2003) and

Hand (2001) show that Web traffic is an important indicator of the market value of Internet retailers. Jorion and Talmor (2000) show that the relative importance of Web traffic falls over time as the firm matures. This is consistent with the result presented here that the impact of promotional alliances aimed at generating Web traffic diminishes over time. Rajgopal, Venkatachalam, and Kotha (2003) show that the relevance of Web traffic disappears once the determinants of traffic—including strategies—are taken into account. This highlights the importance of investigating the impacts of strategy on firm value.

This article contributes to a growing literature on competition and strategy in the Internet environment. In the work closest to that presented here, Brynjolfsson and Smith (2000) compare Internet and conventional retailers in the books and music markets and reject the notion that the Internet is a frictionless market in which price competition is the main form of competition. The results presented here provide further evidence that there is an important role for no-price strategies in the e-tailing environment, even when the goods sold are not differentiated (e.g., books, CDs).[1]

As far as I am aware, no other studies use event study methodology to comprehensively assess firm strategy in a new environment. Previous authors have studied several types of strategies using event study methodology, including advertising (Chauvin and Hirschey 1993), alliances (Chan et al. 1997), capital expenditures (McConnell and Muscarella 1985), joint ventures (McConnell and Nantell 1985), mergers and acquisitions (Jennings and Mazzeo 1991), new product introductions (Chaney, Devinney, and Winer 1991), and R&D (Chauvin and Hirschey 1993; Sundaram, John, and John 1996).[2] These studies employ a cross-sectional approach. In contrast, this article follows four competing firms over time. Examining several strategies facilitates comparing different strategies and considering how the effectiveness of some strategies changed over time.

B. Amazon.com and Its Early Competitors

Amazon.com was founded as an online bookstore in July 1995 and went public in May 1997 (NASDAQ: AMZN). In June 1998, Amazon.com launched its music store. Since then, Amazon.com has become the most prominent Internet retailer of a variety of products and has added several services,

1. In other work on e-commerce strategies, Bakos and Brynjolfsson (1999, 2000) examine bundling strategies for digital information goods, Zaheer and Zaheer (2001) study business-to-business online marketplaces, and Schultz and Zaman (2001) examine motives for dot-com IPOs.

2. Several other studies exist, but these are the most closely related to this article. For a partial review, see McWilliams and Siegel (1997). They critically review the 29 event studies that were published during the period 1986–95 in the three top management journals, *Academy of Management Journal*, *Strategic Management Journal*, and *Journal of Management*. Some of these studies, such as Woolridge and Snow (1990), examine several categories of strategies.

such as auctions, 1-Click ordering, and zShops.[3] Amazon.com's early online competitors consisted of other Internet retailers of books and music. BarnesandNoble.com has been Amazon.com's main competitor in online book retailing. CDNOW and N2K were the two top Internet music retailers before being displaced by Amazon.com. Subsequently, CDNOW and N2K merged.

Brynjolfsson and Smith (2000) provide a comprehensive list of the top online book and music retailers prior to May 1999. The firms on their list account for 99.8% of Web "hits" for book retailers and 96.5% of hits for music retailers. Their data show that the four firms considered in this article are the only ones that were independent online entities that were publicly traded during the period studied here—essential for measuring the impact of strategies on value. The other firms on their list were mostly minor competitors relative to the four firms considered here.

The firms have had interesting experiences in the stock market. Amazon.com went public in May1997, and at its peak in December1999 it was valued at 61.70 times its closing price on its first day of trading, but by the end of 2001 Amazon.com's value had declined to 6.26 times its initial level. By contrast, the S&P 500 Index at its highest point was 1.84 and finished at 1.38. Amazon.com has always been much larger than its online competitors in terms of market value, and its competitors have not performed as well. Table 1 shows how Amazon.com's market value compares to the other firms' market values on their IPO dates. None of Amazon.com's early competitors achieved its stock market success. BarnesandNoble.com was valued at 1.12 times its initial closing price at its peak, which occurred soon after its IPO. CDNOW and N2K were valued at 1.61 and 1.81 times their initial closing prices at their peaks, which occurred in April 1998. All three firms' values fell over time.

II. Theory

The testable hypotheses emerge from a simple framework that builds on previous work on firm strategy under uncertainty in evolving environments. Nelson and Winter (1982) is seminal work in this area, and recent related work includes Henderson and Mitchell (1997), Ocasio (1997), Teece, Pisano, and Shuen (1997), and Farjoun (2002). This work establishes that theories of strategy in new environments should incorporate uncertainty, learning, mistakes, and resistance to change as key ingredients. Failure and exit occur frequently in new environments, and firms base their general strategy on their beliefs about what will work, not on a definite understanding of what will work.

The framework has the following assumptions about behavior and success

3. Amazon's 1-Click ordering speeds up shopping times by reducing the number of mouse clicks and downloaded pages required to purchase products. Amazon.com's zShops allows other businesses to offer products for sale through Amazon.com.

TABLE 1 Summary Statistics

Firm	IPO Date	Value on IPO Date ($ Billions)	Amazon.com's Value on IPO date ($ Billions)	Last Observation	Number of Observations	Standard Deviation of Returns
Amazon.com	5/16/97	.56	.56	12/31/01	1,162	.065
BarnesandNoble.com	5/25/99	.57	17.66	12/31/01	653	.058
CDNOW	2/10/98	.33	1.52	8/31/00	646	.083
N2K	10/17/97	.27	1.04	3/17/99	354	.081
S&P 500				12/31/01	1,162	.013

in new environments: firms form beliefs about what their general strategy should be before entering the new environment or soon after. Typically, survivors experience early success using their general strategy—firms that do not achieve early success exit. Early success reinforces the firms' beliefs, making them somewhat resistant to change. However, two factors work against the firms. First, the effectiveness of the general strategy eventually diminishes as the firm and the environment evolve. Judging when the general strategy is no longer useful is difficult, and a firm may need to experience several negative effects before it revises its general strategy. Second, the different ways of implementing the general strategy may differ in their effectiveness, and it may be difficult for the firm to determine which ways are effective. However, here economic theory can provide a guide.

In the e-tailing environment, the "general strategy" was increasing sales. Early on, firms believed that increasing sales was vital, and many of their strategies were designed to increase the number of visitors to their Web sites.[4] The first two hypotheses follow from the notion that the effectiveness of this general strategy eventually diminished. The others apply insights from economic theory to the e-commerce environment.

A. Promotional Alliances and Advertising

Promotional alliances and advertising were important devices employed early on by the firms in their attempt to attract visitors. A promotional alliance is basically an advertising and promotion contract combined with a long-run relationship. Internet allies provide links to the firm's Web site and promote the firm's products. For example, consider Amazon.com's early alliance with Yahoo!, the popular search engine firm. Yahoo! provided direct links to related Amazon.com book titles from every Yahoo! search result. Searchers were invited to buy books related to what they were searching for on the Web.

The main benefit of promotional activities is that more consumers become aware of the firm's products and services. The cost of such activities includes transaction costs and fees that are determined by the opportunity costs of the ally or advertising outlet. This type of investment involves diminishing returns because marginal benefits eventually fall but marginal costs are independent of the firm's actions (they are determined by the partner's opportunity costs). Ample research shows that the amount of search consumers engage in after entering a market follows an inverted U-shape over time: search tends to increase initially as consumers become aware of different brands and then to decrease once preferences are formed (see Bettman and Park 1980; Johnson and Russo 1984; Moorthy, Ratchford, and Talukdar 1997; Heilman, Bowman, and Wright 2000). Thus, promotional activities such as alliances and adver-

4. Business and popular press accounts that include interviews with key participants clearly indicate that managers were focused on sales. Olim, Olim, and Kent (1998) provide the founders' account of CDNOW's early goals and strategies.

tising are most useful early on in a market's evolution before marginal benefits diminish. This suggests the following testable hypothesis:

HYPOTHESIS 1. Investment in promotional alliances and advertising have diminishing marginal returns: investments early in the firm's life have a more positive impact on the firm's value than those later on.

B. Offline Customer Service Center and Distribution Center Expansion

Offline customer service center and distribution center expansion involves leasing or purchasing bricks-and-mortar facilities to warehouse products and handle shipping and service. The benefit of offline customer service center and distribution center expansion is that more customers can be served and shipping times can be reduced. The cost of offline expansion is determined by the opportunity costs of the facilities being purchased or leased and the resources employed in the service effort. This type of investment involves diminishing marginal returns for the same reason as with promotional activities: marginal benefits from continued expansion eventually fall while the marginal costs are largely independent of the firm's actions. Marginal benefits fall because, while early expansion efforts lead to large increases in the number of customers that can be served and dramatic reductions in shipping times, later expansion efforts have less substantial effects. This suggests a testable hypothesis:

HYPOTHESIS 2. Investment in offline customer service center and distribution center expansion has diminishing marginal returns: investments early in the firm's life have a more positive impact on the firm's value than those later on.

C. Pricing Strategy

A firm attempting to increase sales may lower prices to attract customers. However, price reductions are easily imitated, leading to price wars that lower everyone's profits and provide no one with a relative advantage. Price reductions are not easily reversed because competitors react by lowering their own prices. Further, price reductions are usually publicized in order to maximize their effect, and so they cannot be reversed without inducing a loss of reputation among consumers.

Economic theory strongly suggests that price competition will be a problem for online retailers because they lack a critical source of product differentiation—location. Bricks-and-mortar retailers differ by location, and game theoretic models show how location differences allow firms to charge higher prices even when the goods sold are identical in all other ways (Tirole 1988). In the absence of location differences, producers of identical goods engaged in price competition obtain zero profits unless one has a cost advantage. Partly for this reason, manufacturers often provide their retailers with local monopolies (Carlton and Perloff 1994). The lack of location is critical in e-commerce

where the products sold are not differentiated from those of other retailers (books, compact disks, etc.). These arguments yield a testable hypothesis:

HYPOTHESIS 3. Price competition reduces value.

D. Product Line Expansion and Service Improvement

One of the basic problems firms face when entering new environments is that they do not know how consumers value the various products and services the firms can introduce. As a result, mistakes are likely, and we should observe many initiatives that lower value. Further, many initiatives will have little or no impact on value. These facts taken together suggest the following testable hypothesis:

HYPOTHESIS 4. If product line expansion and service improvement programs succeed as a whole, success can be traced to a relatively small number of successful initiatives. Many initiatives reduce firm value.

Theory does not provide a clear guide as to what will work and what will not, but some of the relevant factors are the following: Should the firm focus on improving its existing products and services or expand into unrelated activities? Should the firm partner with other firms in its efforts or go alone? Should the firm explore foreign markets or concentrate on domestic ones? In order to address these questions, in the empirical results presented below, I consider product line expansion and service improvement programs that involve acquisitions and alliances separately from those that do not. Further, I treat announcements of all types that involve foreign expansion separately.

E. Competitor Strategies

Most strategies designed to attract additional customers draw some customers away from competitors. More generally, most strategies designed to increase a firm's value decrease its competitors' values: at least some of the value gained is at the competitors' expense. This adverse effect on a firm's competitors is most likely to be observed when the strategy affects the competitors' main lines of business. The relative size of the firms also matters. To see why, consider a firm that is one-tenth the size of its competitor. If the firm implements a strategy that leads to a 10% increase in its value, then, even if the gain is entirely at the expense of its competitor, its competitor suffers only a 1% loss in its value. This discussion suggests the following testable hypothesis:

HYPOTHESIS 5. A firm's investments in its competitor's main lines of business have a negative impact on the competitor's value. This effect on the competitor's returns is larger if the competitor is smaller.

III. Empirical Methodology

The first goal of data collection was to assemble a comprehensive list of announcements of strategies using press releases from *Business Wire* and *PR*

Newswire in the *Lexis-Nexis* data base and company Web sites.[5] A vast amount of literature suggests that financial announcements also affect firm value (MacKinlay 1997), and so, as control variables, I included all announcements of quarterly financial results, debt and equity issues, and CDNOW's announcements surrounding its search for a buyer.[6]

To test hypothesis 5, I identified competitor announcements in the firm's main lines of business. I included promotional alliances with affiliates and associates, major portals and important bricks-and-mortar firms; pricing announcements that affect books and music products; product line expansion and service improvement activities in the books and music markets, including those that involved important bricks-and-mortar firms (Barnes & Noble, Borders); and major merger and acquisition announcements.

In some cases, multiple announcements occur on the same day or on adjacent days. In these cases, I count only one event and put the event date on what appears to be the most important event's date. I assume that financial announcements are more important than strategy announcements and that a firm's own announcements are more important than its competitors' announcements, but for other categories I consider announcements case by case. Counted this way, there are 157 events for Amazon.com, 62 for BarnesandNoble.com, 68 for CDNOW, and 41 for N2K.

I use adjusted daily closing prices to construct daily returns series for as long as each firm is publicly traded prior to December 31, 2001. I use the S&P 500 Index to construct market returns. The series are from Yahoo! Finance when available and CRSP otherwise. Table 1 reports IPO dates, the last date returns are observed, the number of observations on returns, and the unconditional standard deviations of returns. The unconditional standard deviations of the firms' returns are quite high. The lowest is BarnesandNoble.com's, which is 5.8%. This implies that daily returns of plus or minus 5% are well within the range of ordinary fluctuations and returns must be plus or minus at least 11.6% in order to be in the tails of the distribution. Partly because of this, most of the estimated effects are statistically insignificant even when the point estimates suggest that the effects are large. Despite the statistical imprecision, a relatively clear picture of the impact of strategies on value emerges when we look at categories as a whole.

Preliminary data analysis established that the market begins responding to announcements 2 days in advance and that the announcement typically appears in the *Wall Street Journal* the day after it is released. Therefore, to estimate the announcement effects, I use an event window that includes the 2 days

5. I used a variety of selection criteria to select only important press releases, including whether the firm's name appeared in the headline, whether the firm issued the release, whether a firm contact person was listed on the release, and the content of the release.

6. The estimated magnitudes of the cumulative effects of financial announcements are in line with what one would expect. Using method 1, discussed below, Amazon.com's financial announcements are associated with a CAR of .36. The CARs for the other firms are negative (BarnesandNoble.com, −.37; CDNOW, −.60; N2K, −.27). As financial announcements are controls and not the main variables of interest, I will not discuss them further.

prior to the announcement day and 1 day after: [−2, 1]. Some of the event windows overlap because some announcements are made less than 3 days apart, and so I use two methods to estimate the cumulative abnormal returns (CAR) of each event. In the first, the estimation equation is

$$R_{it} = \alpha + \beta R_{mt} + \sum_{j=1}^{J} \gamma_j d_j + \varepsilon_t, \quad (1)$$

where R_{it} is the firm's stock return on day t, R_{mt} is the market return on day t, J is the total number of events for firm i, d_j is a dummy variable that takes the value of one during event j's event window, ε_t is the error term on date t, and α,β, and the γ_j's are the estimated coefficients. In this method, the t-test of the significance of event j uses the t-statistic of γ_j. To compute the CAR of event j, I multiply γ_j by the length of the event window. This parsimonious specification avoids double counting abnormal returns when event windows partially overlap and facilitates joint hypothesis tests. Regression results from this method are reported in table 2.[7]

The second method computes CAR the standard way (as described by MacKinlay 1997). I delete periods covered by the event windows from the sample, estimate the market model by regressing R_{it} on R_{mt}, and compute the CAR of an event by summing the forecast errors during its event window. Results from this method are also reported in table 2. The coefficients of the market model are similar in the two methods, and the results are similar in both cases (detailed estimates of each event's effect using both methods are available from the author on request). In what follows I report the results from method 1.

IV. Empirical Results

Tables 3 and 4 summarize the empirical results. The tables group events into categories: (1) promotional activities, (2) offline expansion, (3) pricing, (4) product line expansion and service improvement through alliances or acquisitions, (5) product line expansion and service improvement without alliances or acquisitions, (6) foreign expansion, and (7) competitor announcements.

A. Promotional Alliances and Advertising

The results support hypothesis 1: promotional activities have diminishing marginal returns. Table 3 shows that only Amazon.com's promotional activities were successful as a whole. Unreported estimates of dollar value effects

7. As a robustness check I allowed a firm's α and β to change every time method 1 yielded a CAR that was significant at the 5% level. The null hypothesis that α and β are constant during the sample period cannot be rejected at the 10% level of significance for any firm. Further, no substantial changes in the sign or magnitudes of the CARs occurred when I allowed α and β to change.

TABLE 2 Regression Results

	Method 1	Method 2
Amazon.com:		
Constant term	−.00095	−.00080
	(.0023)	(.0022)
Beta	1.99	1.93
	(.14)	(.18)
R^2	.32	.16
Adjusted R^2	.21	.16
No. of observations	1,162	602
BarnesandNoble.com:		
Constant term	−.0020	−.0018
	(.0026)	(.0024)
Beta	1.23	1.18
	(.17)	(.19)
R^2	.23	.085
Adjusted R^2	.15	.083
No. of observations	653	426
CDNOW:		
Constant term	−.00040	.00044
	(.0041)	(.0036)
Beta	1.65	1.39
	(.27)	(.28)
R^2	.15	.060
Adjusted R^2	.052	.057
No. of observations	646	395
N2K:		
Constant term	.0084	.0084
	(.0054)	(.0060)
Beta	1.30	1.16
	(.33)	(.42)
R^2	.20	.036
Adjusted R^2	.089	.031
No. of observations	354	200

NOTE.—Standard errors are in parentheses.

reinforce this conclusion.[8] BarnesandNoble.com cannot be included in this test—it went public late in its life cycle relative to the other firms, and so I cannot measure the effects of its early promotional activities. The average effects of early and late promotional activities are significantly different for Amazon.com at the 1% level (Wald statistic = 13.86, critical value = 6.63), insignificant for CDNOW, and significantly different at the 5% level for N2K (Wald statistic = 4.01, critical value = 3.84).

The early high return promotional activities were of two types. First, the firms formed alliances with major portals (sites people visit first when they log on), such as AOL, Lycos, Netscape, and Yahoo! Second, Amazon.com

8. Estimates of dollar value effects are constructed by multiplying the CAR by the firm's market capitalization immediately before the event window (3 days before the event). Note that, when the firm's value changes considerably over time (as is the case here), conclusions based on comparing CARs and comparing dollar values may not be the same. For essentially all of the results presented here, the conclusions are the same. Where they differ they are noted.

TABLE 3 Summary of Total Effects of Strategies Using Method 1

Strategy	Amazon.com	BarnesandNoble.com	CDNOW	N2K
All promotional alliances and advertising	1.03*	−.29	−.030	−.36
	(12, 5.98)	(7, 1.01)	(16, .0020)	(14, .052)
Early promotional alliances	.74**	N.A.	.45	.26^{+}
	(2, 19.37)		(4, 1.87)	(2, 2.92)
Late promotional alliances	.29	−.29	−.48	−.62
	(10, .57)	(7, 1.01)	(12, .62)	(12, 1.07)
All offline customer service center and distribution center expansion	.050	.13	N.A.	N.A.
	(9, .019)	(1, 1.55)		
Early customer service center and distribution center expansion	.30	N.A.	N.A.	N.A.
	(3, 2.21)			
Late customer service center and distribution center expansion	−.25	N.A.	N.A.	N.A.
	(6, .73)			
Pricing strategies	−.32	−.016	N.A.	−.27
	(7, 1.05)	(2, .012)		(2, 1.41)
Product line expansion through alliances and acquisitions	.35	−.17	.32	.051
	(22, .35)	(8, .35)	(9, .35)	(2, .051)
Product line expansion without alliances and acquisitions	.84^{+}	.47^{+}	−.098	N.A.
	(15, 2.85)	(5, 3.39)	(2, .18)	
Service improvement through alliances and acquisitions	1.25*	.38	.17	−.26
	(23, 4.37)	(13, .80)	(5, .18)	(2, 1.34)
Service improvement without alliances and acquisitions	1.09**	.44	.022	N.A.
	(12, 6.93)	(8, 1.88)	(5, .0030)	
Foreign expansion	−.16	N.A.	−.12	−.43
	(12, .14)		(3, .13)	(4, 1.64)
Competitor strategies	−.030	−.82**	−.22	−1.29***
	(19, .0031)	(6, 9.09)	(9, .17)	(9, 6.54)

NOTE.—Table shows cumulative abnormal returns (number of events, Wald test statistic for significance of CARs [1 degree of freedom]). Cumulative Abnormal Returns $= \sum_{j \in J} CAR_j$, where j is an event and J is the set of events being considered.

$^{+}$ Significant at the 10% level.

* Significant at the 5% level.

** Significant at the 1% level.

TABLE 4 Summary of Average Effects of Strategies Using Method 1

Strategy	Amazon.com	BarnesandNoble.com	CDNOW	N2K
All promotional alliances and advertising	.086	−.041	−.0019	−.026
	(12, 4, 0)	(7, 1, 1)	(16, 0, 1)	(14, 1, 0)
Early promotional alliances	.37	N.A.	.11	.13
	(2, 2, 0)		(4, 0, 0)	(2, 1, 0)
Late promotional alliances	.029	−.041	−.040	−.052
	(10, 2, 0)	(7, 1, 1)	(12, 0, 1)	(12, 0, 0)
All offline customer service center and distribution center expansion	.0056	.13	N.A.	N.A.
	(9, 1, 0)	(1, 0, 0)		
Early customer service center and distribution center expansion	.10	N.A.	N.A.	N.A.
	(3, 1, 0)			
Late customer service center and distribution center expansion	−.042	N.A.	N.A.	N.A.
	(6, 0, 0)			
Pricing strategies	−.046	−.0080	N.A.	−.14
	(7, 0, 0)	(2, 0, 0)		(2, 0, 0)
Product line expansion through alliances and acquisitions	.016	−.021	.036	.025
	(22, 2, 1)	(8, 1, 0)	(9, 0, 0)	(2, 0, 0)
Product line expansion without alliances and acquisitions	.056	.094	−.049	N.A.
	(15, 2, 0)	(5, 1, 0)	(2, 0, 0)	
Service improvement through alliances and acquisitions	.054	.029	.034	−.13
	(23, 5, 1)	(13, 0, 0)	(5, 0, 0)	(2, 0, 0)
Service improvement without alliances and acquisitions	.091	.055	.0044	N.A.
	(12, 3, 0)	(8, 1, 1)	(5, 0, 0)	
Foreign expansion	−.013	N.A.	−.04	−.11
	(12, 1, 1)		(3, 0, 0)	(4, 0, 0)
Competitor strategies	−.0016	−.14	−.024	−.14
	(19, 1, 0)	(6, 0, 2)	(9, 0, 0)	(9, 0, 3)

NOTE.—Table shows Cumulative Abnormal Returns/Number of Events (number of events, number positive and significant at the 10% level, and number negative and significant at the 10% level [*t*-tests]). Cumulative Abnormal Returns $= \sum_{j \in J} CAR_j$, where j is an event and J is the set of events being considered.

offered to pay high referral fees to the 500 most-visited sites on the Web. After these early promotional activities, the high benefits from additional efforts disappeared. The results suggest that BarnesandNoble.com, CDNOW, and N2K continued to invest in promotional activities beyond the point where marginal returns reached zero. Promotional activities were the main devices CDNOW and N2K used to attempt to increase sales.[9]

It is worth noting that these results have implications for research on the effects of promotional activities on firm value (Chauvin and Hirschey 1993; Chan et al. 1997; Das, Sen, and Sengupta 1998). The results suggest that life cycle factors should be considered in such analyses because the value of promotional activities depends on how mature the firm is.

B. Offline Customer Service Center and Distribution Center Expansion

Tables 3 and 4 provide support for hypothesis 2: offline customer service center and distribution center expansion has diminishing marginal returns. Only Amazon.com engaged in extensive expansion of this type. BarnesandNoble.com made one announcement in this category, and the other firms outsourced distribution. The point estimates suggest that Amazon.com's early expansion had a positive effect on its value and that its later expansion had a negative impact on its value. The average effects of early and late offline expansion are significantly different at the 10% level (Wald statistic $= 2.96$, critical value $= 2.71$). The CARs suggest that the net impact of expansion was close to zero, and dollar value estimates suggest that the net impact was negative.

The theory presented in Section II suggests that diminishing marginal improvements in delivery times are responsible for the diminishing marginal returns. This is reasonable. Amazon.com's first two expansion efforts provided better access to East Coast customers and publishers and reduced shipping times to key markets in the western United States by a full day. The expansion that followed led to smaller improvements, and, although the terms of leases are not disclosed, the cost may have been higher because the more recent centers are larger.

C. Pricing Strategy

Tables 3 and 4 provide some support for hypothesis 3: price competition reduces value. The theory discussed in Section II suggests that competitor reactions are largely responsible for this effect, and evidence supports this claim. Ghemawat (1999, case 9) shows that Amazon.com's first price cut in the sample (June 10, 1997) was part of a price war with Barnes & Noble's online site that began before Amazon.com's initial public offering. Amazon.com's price discounts on *New York Times* best sellers (May 17, 1999) were also part of a price war with Barnes & Noble and Borders, who both

9. Olim et al. (1998) describe CDNOW's emphasis on promotional activities in detail.

matched Amazon.com's discounts. Thus, Amazon.com obtained no relative advantage.

The estimates suggest that Amazon.com's more recent pricing innovations were not more successful than its early price reductions. One example is the Honor System, which allows Web surfers to tip their favorite Web sites. Amazon.com used this technology to implement a virtual tip jar that allows customers to tip their favorite musicians when they download MP3 tracks. As shown below, investors reacted more favorably to service and product line enhancements.

D. Product Line Expansion and Service Improvement

Tables 3 and 4 summarize the effects of the firms' product line expansion and service improvement programs, and table 5 lists Amazon.com's key announcements and their estimated effects. Amazon.com expanded its product lines within books and music and far beyond these products. In contrast, Amazon.com's competitors expanded into closely related product lines. BarnesandNoble.com expanded into magazine subscriptions and e-books. CDNOW and N2K introduced custom CDs and digital downloads.

Amazon.com's service improvements are more difficult to summarize because they included several initiatives: 1-Click ordering, auctions, a credit card, delivery time improvements, free music downloads for sampling before buying, internationalization, wireless access, and zShops. Amazon.com's competitors' efforts were similarly multifaceted but focused on services related to books and music.

E. Product Line Expansion and Service Improvement through Alliances and Acquisitions

Overall, the results support hypothesis 4: only a few types of events have substantial positive impacts on value. Table 5 shows that Amazon.com's alliance with Drugstore.com and its acquisition of Exchange.com account for its high returns from product line expansion through alliances and acquisitions—the net impact of all other events in this category is negative. The results for the other firms are similar. For BarnesandNoble.com, only one announcement, an alliance with the digital content provider Mightywords, had a significant positive impact on value (CAR .28, significant at the 5% level). CDNOW's introduction of music downloads had a high impact on its value (CAR .38), and CDNOW and N2K's merger had a positive impact on both companies (CAR .19 for CDNOW; CAR .086 for N2K).

Amazon.com's gains from service improvement can also be attributed to a small number of agreements. Table 5 shows that Amazon.com's alliances with Muze, OSM, Bidpath, and Borders Group account for its high returns in this category. The evidence on the other companies' service improvements is less supportive for the hypothesis. Table 3 shows that BarnesandNoble.com's and CDNOW's programs had positive impacts on value, but no

TABLE 5 Amazon.com's Key Product Line Expansion and Service Improvement Announcements

Event	Date	CAR	$ Value (Billions)
Product line expansion through alliances or acquisitions:			
Amazon.com announces that it owns 46% of Drugstore.com	2/24/99	.21^{+}	3.47
Amazon.com increases its investment in Drugstore.com and expands the alliance	1/24/00	.11	2.42
Amazon.com launches a health and beauty store with Drugstore.com	4/17/00	.032	.59
Amazon.com acquires Exchange.com, adding more than 12 million rare books and music items, and has agreements to acquire Accept.com and Alexa Internet, two Internet software companies	4/26/99	.27*	7.85
Service improvements through alliances or acquisitions:			
Amazon.com forms an alliance with Muze, a source of digital information about music, books, and movies, for Muze's content	6/16/98	.23*	.77
Amazon.com forms an alliance with OSM, a systems management specialist, to help manage its server farm	6/24/98	.23*	.96
Amazon.com forms an alliance with Bidpath, an auction infrastructure firm, to improve its auctions	7/18/00	.24^{+}	2.67
Amazon.com forms an alliance with Borders Group, one of the largest book superstores, to provide the e-commerce platform to relaunch Borders' web site	4/11/01	.50**	1.37
Borders launches	8/2/01	−.081	−.33
Product line expansion without alliances or acquisitions:			
Amazon.com announces the launch of its music store with over 125,000 titles	6/10/98	.40**	.96
Amazon.com opens its video store with more than 60,000 videos	11/17/98	.20^{+}	1.42
Amazon.com opens its electronics and toys and games stores	7/13/99	.21	4.28
Service improvements without alliances or acquisitions:			
Amazon.com introduces three new features: (1) recommendations center, (2) subject-browsing areas, and (3) 1-Click ordering	9/23/97	.32**	.34
Amazon.com will open Amazon.com Auctions, a person-to-person auction service	3/29/99	.25*	5.10
Amazon.com launches three innovations: (1) zShops enables anyone to offer merchandise for sale at Amazon.com, (2) Amazon.com Payments allows individuals and firms to accept payments through the 1-Click payment feature, and (3) All Products Search allows shoppers to find anything for sale on the Internet	9/30/99	.37**	7.49

NOTE.—Table shows Cumulative Abnormal Returns and Estimated Dollar Value Effect. Dollar Value Effect is computed by multiplying the CAR by Amazon.com's market capitalization prior to the event window (3 days prior to the event).

$^{+}$ Significant at the 10% level.

* Significant at the 5% level.

** Significant at the 1% level.

events stand out as exceptional. The results for N2K do not address the hypothesis because its program yielded negative returns.

F. Product Line Expansion and Service Improvement without Alliances or Acquisitions

The results support hypothesis 4: Amazon.com's most successful product line expansions were the music store, the video store, and the electronics and toys and games stores. Improving the ease of shopping through devices like the 1-Click payment feature and providing additional information to consumers through categorization, search capabilities, and recommendations on related books and music increased value. Note that, in contrast to price reductions, these strategies were not so easy for Amazon.com's competitors to imitate. For example, Amazon.com successfully obtained and defended a patent on its 1-Click payment technology. Service improvements created economies of scope because they could be applied across the product line. Auctions and zShops exploited these capabilities further by allowing others to use Amazon.com's technologies.

The results for BarnesandNoble.com suggest that its highest value-generating efforts surrounded its introduction of its e-bookstore and electronic publishing (CAR .32, significant at the 1% level, CAR .69, significant at the 1% level). The results for CDNOW do not address the hypothesis because its program yielded low or negative returns.

G. Foreign Expansion

Tables 3 and 4 show that foreign expansion reduced value. This shows how the firms' uncertainty combined with enthusiasm for increasing sales led them to expand too far.

H. Competitor Announcements

Tables 3 and 4 provide support for hypothesis 5: competitor announcements in the firm's main lines of business reduce the firm's value, and the effect is much less pronounced for Amazon.com, which is much larger than its competitors. N2K suffered especially because of CDNOW's strategies until the two companies finally merged.

V. Conclusion

Managers in new environments are involved in a learning process. They experiment, make mistakes, and adapt (sometimes slowly) to changes in the environment. This article explores what worked and what did not in one new environment, the e-commerce environment. The lessons may be applied to other Internet ventures and other new environments where firms are uncertain about the impact of their strategies on firm value. Among the conclusions for e-commerce firms are the following: first, promotional alliances should focus

on the most prominent portals and are most useful early in the firm's life. Second, excessive investments in offline expansion, price competition, and foreign expansion should be avoided (although this last recommendation may change as Internet use increases in foreign markets). Finally, product line expansion and service improvements, with or without alliances or acquisitions, should be pursued, but positive value may come from a small number of these.

The results for Amazon.com show that the product line expansion efforts that generated the most value involved products a traditional mail order firm might favor: small, high value/weight objects such as books, electronics, health and beauty products, music, toys and games, and videos. The services that generated the most value allowed Amazon.com to exploit its expertise across a variety of products: auctions, devices to make shopping easier such as 1-Click ordering, and zShops, which allowed other merchants to make use of Amazon.com's capabilities.

Stock prices for Internet firms often seem to fluctuate wildly for no reason, but the results show that, even in this setting, the market still responds to information. A final recommendation is that, because the market reaction provides information for managers, firms that enter new volatile environments should (1) go public, (2) announce their competitive strategies in order to get the market's reaction, and (3) spread out strategy announcements in order to isolate the market's reaction to each one.[10] The previous literature concentrates primarily on the setting in which managers have private information relevant for valuing the firm and other market participants do not, but in new environments information is often widely held.[11] Managers may be able to use the market's reaction to announcements to assist in formulating future strategies.

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10. Gennotte and Trueman (1996) examine the strategic timing of corporate disclosures and suggest that multiple announcements should be spread out over time if the manager believes that announcements have positive implications for value. However, they assume that the manager is at least as well informed as other market participants, and so they do not analyze how the manager can use announcements to learn from trading. Diamond and Verrecchia (1981) explore how investors can learn from trading.

11. Of course, it is possible that the manager's private information dominates the public's information. Jennings and Mazzeo (1991) provide evidence that suggests that managers do not change the terms of mergers and acquisitions when the market responds unfavorably to announcements. However, this result could be due to agency problems that result from the separation of ownership and control in large corporations. In contrast, many firms that enter new environments are entrepreneurial startups in which the chief executive officer has a significant equity stake. In new environments, learning from experience is important. For example, Anand and Khanna (2000) provide evidence that firms learn through experience how to create value through alliance formation. The market reaction to announcements provides information that could inform this learning process.

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