B2B eMarketplace Announcements and Shareholder Wealth

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Classifying B2B eMarketplace announcements by the type of eMarketplace and the type of partner reveals key differences in how the financial markets assess B2B e-commerce strategies.

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The advent of the Internet as an instrument for business commerce has fundamentally altered the economy by ushering in increased efficiencies and more transparent markets. Since businesses started conducting Internet transactions in 1995, the growth has been impressive. Forrester Research estimates that worldwide electronic commerce (e-commerce) revenues were about $650 billion in 2000 and projects they will grow to $6.8 trillion by 2004.[1]

The greatest impact is in the business-to-business (B2B) sector, where new supply-chain models within electronic marketplaces (eMarketplaces) enable companies to significantly lower procurement costs and increase operating efficiencies. B2B eMarketplaces streamline the supply chain by making better use of more information. The time it takes to match buyers and sellers can be radically reduced, precautionary inventory levels can be lowered, and the range of potential suppliers and distribution outlets can be expanded as geographic boundaries disappear.

Projections of online B2B revenues differ vastly, primarily because defining what counts and how to count it varies widely. But despite these differences, forecasters agree that online B2B trade will grow substantially. B2B e-commerce is generally believed to account for about 80 to 90 percent of total e-commerce today. Forecasts typically project U.S. online B2B revenues of about $2 trillion by 2003, up from roughly $336 billion in 2000.

B2B e-commerce is expected to impact the U.S. economy significantly. Brookes and Wahhaj (2000) argue that the rapid growth of B2B e-commerce will have an economic impact over and above that of the normal process of innovation and productivity growth. They suggest that as a result of B2B e-commerce, annual GDP growth in the large industrialized countries should rise an average 0.25 percent for the next ten years—with the level of GDP eventually 5 percent higher than it would otherwise have been. Brookes and Wahhaj conclude that the dominant long-run effect of B2B e-commerce will be on output and equity markets, rather than on inflation and bond markets.

Investors should respond favorably to announcements of new B2B e-commerce initiatives, as long as they believe these moves will ultimately result in higher profits and increased productivity without fueling inflation. We examine the potential impact of B2B e-commerce initiatives on the New Economy paradigm using the efficient markets hypothesis (Fama et al. 1969), which implies stock prices reflect all

available information about individual companies and about the economy as a whole. Information is the key input. So in efficient capital markets, prices will immediately adjust to reflect any new information. Thus, B2B e-commerce announcements should immediately raise stock prices if investors believe a firm's value will be increased by higher net future cash flows resulting from higher productivity, lower costs, or higher revenues.

This article empirically investigates B2B eMarketplace announcements from the financial market's perspective. Overall, are online B2B exchanges creating shareholder wealth? Do the returns to shareholders of firms that announce vertical (intra-industry) exchanges and those that announce horizontal (cross-industry) exchanges differ? Are the returns higher when firms go it alone in developing an eMarketplace than when they do so with other B2B e-commerce companies or Old Economy leaders? And what are the returns to shareholders of firms that acquire other B2B e-commerce technology providers?

This article addresses these questions using event-study methodology, a useful tool for examining the consensus estimates of future benefits attributable to organizational initiatives.[2] Stock returns are analyzed relative to a portfolio of stocks representing the market. Differences in returns are analyzed on days leading up to and following the event date—in this case, the B2B eMarketplace announcement date—to determine whether shareholder returns differ significantly from the general market return for stocks. The strength of this methodology is that it captures a large number of investors' overall assessment of a firm's discounted present value.

Subramani and Walden (1999) were the first to use event studies to explore why firms might pursue e-commerce initiatives. They examined 305 e-commerce announcements made between October and December 1998 and found that these announcements resulted in positive cumulative abnormal returns to firms' shareholders. Contrary to their hypothesis, they found that business-to-consumer (B2C) e-commerce announcements resulted in higher abnormal returns than B2B announcements. For B2B initiatives, Subramani and Walden found average abnormal returns of 5.9 percent on the event date and 11.3 percent for a three-day window starting one day before the event.

Using the event-study methodology, differences in returns to companies engaged in vertical and horizontal B2B eMarketplaces can be assessed. The returns to firms that ally themselves with other technology providers and those that team with Old Economy leaders can also be compared. Classifying B2B eMarketplace announcements by the type of eMarketplace and the type of partner reveals key differences in how the financial markets assess B2B e-commerce strategies.

WHY EMARKETPLACES?

Information networks create transparency in markets that substantially reduces transaction costs. Previously unavailable or hard-to-obtain intelligence increases transparency. In exchange markets, transparency along the supply chain regarding price, availability, competing suppliers, and alternative products can radically change the dynamics of the buyer–seller relationship. Both parties can benefit as shared information increases competition and reduces costs for searching, bargaining, decisionmaking, policing, and enforcement.

Internet exchanges introduce unprecedented market and process transparency. B2B eMarketplaces can provide nearly perfect information at all points along the supply chain, increasing efficiency and lowering participants' costs. Such exchanges also enable companies to develop, manage, and monitor internal and external processes—including work in process and finished-goods inventories—far more efficiently and effectively. The improved coordination that results gets the right goods and services to the right places at the right times with lower costs.

B2B eMarketplaces can be divided into two types: vertical and horizontal. Vertical markets are industry-specific; they focus on an individual industry, such as steel, plastics, electronic components, or chemicals. Electronic exchanges in vertical markets serve participants primarily by bringing buyers and sellers together to transact business up and down the entire industry supply chain. They also provide industry-specific news and information and other value-added services, such as employment opportunities, discussion forums, and event calendars that create community within the industry. These benefits can substantially reduce operating costs.

In contrast, horizontal markets cross industries. They focus on creating an exchange for goods and services at a specific link in the supply chain that is common to multiple industries, such as MRO (maintenance, repair, and operations) supplies, logistics, and benefits administration.

Typically, goods and services exchanged over horizontal eMarkets are standardized and can be outsourced to third-party providers that have well-defined, fixed-price products. As a result, the value added by horizontal eMarketplaces is in automating workflow and reducing process costs to the participants of the exchange. This enables businesses in various industries to operate more efficiently and effectively.

We further divide B2B eMarketplace announcements by the type of partner, if any, the e-commerce technology provider said it would be working with, using the following five categories of partnership:

Acquisition. The e-commerce technology provider announced plans to acquire another technology firm to aid in the development of a B2B eMarketplace.

Alone. The e-commerce technology provider announced plans to develop a B2B eMarketplace on its own.

Alliance: Computer. The e-commerce technology provider announced plans to develop a B2B eMarketplace with a large and well-recognized computer industry leader, such as IBM Corp., Microsoft Corp., or EDS Corp.

Alliance: Competitor. The e-commerce technology provider announced plans to develop a B2B eMarketplace with a competitor.

Alliance: Old Economy. The e-commerce technology provider announced plans to develop a B2B eMarketplace with an Old Economy leader (for example, General Motors or Ford in the automotive industry, Shell or Chevron in the energy industry).

Using these partnership classifications, various hypotheses can be tested to determine the value of different B2B e-commerce strategies.

HYPOTHESES

Hypothesis 1: Positive Returns for B2B eMarketplace Announcements

As Subramani and Walden (1999) discuss, e-commerce initiatives should position firms to exploit the growing importance of and expected growth in electronic commerce, leading to benefits in the future. Such initiatives signal that a firm plans to use information technology to better manage industry supply chains. Consequently, we expect that investors will react favorably to B2B eMarketplace announcements, resulting in positive abnormal stock market returns (that is, risk-adjusted returns in excess of average stock market returns) around the date of the announcement. Alternatively, negative abnormal returns might indicate that investors view a B2B eMarketplace as an unprofitable strategy, perhaps because they suspect factors other than shareholder maximization motivated the initiative. Such factors might include management's level of compensation, job security, and span of control.

Among the benefits touted in announcements of new B2B eMarketplaces are the ability to:

- Expose sellers in one marketplace to all potential buyers.
- Create a hub for development projects, market feedback, and customer collaboration.
- Reduce time to market.
- Provide expansive catalogs of products and services.
- Provide end customers with fast response, high cost efficiency, and superior service.
- Increase operating efficiency through an integrated Internet supply chain.
- Streamline purchasing operations.
- Reduce supply-chain costs, increase manufacturing efficiency, and reduce inventories.
- Reduce cycle times, improve transaction flows, and manage parts inventories.

Hypothesis 2: Higher Returns for Vertical eMarketplaces Than for Horizontal eMarketplaces

Because vertical eMarketplaces focus on the needs of an entire industry (up and down the supply chain) and horizontal eMarketplaces focus on specific business processes that span multiple vertical markets (individual links in the supply chain), we expect vertical eMarketplaces will have higher abnormal returns than horizontal eMarketplaces. If horizontal eMarketplaces have abnormal returns higher than vertical eMarketplaces, this might indicate that investors consider productivity improvements gained through providing goods and services at a specific link in the supply chain across industries of greater value than efficiency gains along the supply chain.

Hypothesis 3: Insignificant Returns to Firms Announcing the Acquisition of Another E-Commerce Technology Provider

Generally, alliances and mergers are designed to create competitive advantages and should therefore enhance market valuations. However, we expect that announcements of e-commerce technology firms' plans to acquire another such provider will not result in signifi-

cantly positive abnormal returns. This is because acquiring firms typically must pay a substantial premium for target firms, which is often viewed unfavorably by the financial market (Roll 1988). If acquiring firms produce significantly positive abnormal returns, this might indicate that investors expect these firms to generate synergies via economies of scale or scope by reducing costs and eliminating redundancies. This outcome could also indicate that investors see potential gains from providing a larger selection of products and services or the possibility of enhancing market power by reducing price competition.

Hypothesis 4: Higher Returns to Firms Forming Alliances When Announcing New eMarketplaces

We expect significant positive abnormal stock returns to e-commerce technology firms announcing B2B eMarketplaces, whether they develop the marketplaces by themselves or with another firm. However, we expect that alliances with other companies—whether they are computer industry giants, competitors, or Old Economy leaders—will result in higher abnormal returns than creating an eMarketplace alone would.[3] This would occur if investors foresee potential synergies and competitive advantages from allying with firms that have similar objectives. Alliances also create more support and depth for the eMarketplace. If an e-commerce technology firm that announces plans to develop B2B eMarketplaces by itself generates higher abnormal returns than firms that plan to align with others, this might indicate investors foresee potential problems with the proposed alliance.

METHODOLOGY AND DATA

Event-study methodology is a forward-looking approach that focuses on identifying abnormal returns to firms from a specific event. If investors react favorably to an event, positive abnormal stock returns around the event date would be expected. Consequently, abnormal returns provide a means of assessing an initiative's impact on a firm's future profitability.

Event-study methodology is based on the efficient markets hypothesis (Fama et al. 1969)—that is, as new information becomes available, it is fully taken into consideration by investors assessing its current and future impact. The new assessment results in stock price changes that reflect the discounted value of current and future firm performance. Significant positive or negative stock price changes can then be attributed to individual events. The strength of the method lies in its ability to identify such abnormal changes because it is based on the overall assessment of many investors who quickly process all available information in assessing a firm's market value (McWilliams and Siegel 1997).

To know what a firm's stock price would have been in the absence of the event (in this case, the B2B eMarketplace announcement), the price is regressed against a market index to control for overall market effects. To calculate abnormal returns, the estimated coefficients from the market-model regression are used to compute the predicted value of the firm's stock. For each security j, the following regression model is used to calculate abnormal returns at time t:

$$(1) \qquad AR_{jt} = R_{jt} - (\alpha_j + \beta_j R_{mt}),$$

where AR_{jt} is the abnormal return for stock j at time t; R_{jt} is the actual return for stock j at time t; α_j is the ordinary least squares (OLS) estimate of the intercept of the market-model regression; R_{mt} is the return to the market at time t, as approximated by Standard & Poor's 500 stock market index; and β_j is the OLS estimate of the slope of the coefficient in the market-model regression.[4]

The parameters α_j and β_j are estimated from the market model as follows:

$$(2) \qquad R_{jt} = \alpha_j + \beta_j R_{mt} + \varepsilon_{jt},$$

where ε_{jt} is the residual. Daily returns for individual-firm stock prices and the market index are from the Center for Research in Securities Prices database. The date of the event (announcement) is $t = 0$, the market model is estimated over the period from $t = -165$ to $t = -15$ days relative to the event date, and the event window is from $t = -1$ to $t = +1$.

Once the market model is estimated, the resulting estimated values for α_j and β_j are used in Equation 1 with data for R_{jt} and R_{mt} to calculate the abnormal returns (ARs) over the event window for each e-commerce technology firm. Because the event date is known, a short window is used (Armitage 1995). In addition to the abnormal returns computed for the day before the announcement ($t = -1$), the day of the announcement ($t = 0$), and the day following the announcement ($t = +1$), we also compute cumulative average abnormal returns (CARs) for the periods from $t = -1$ to $t = 0$ and from $t = -1$ to $t = +1$. Dyckman, Philbrick, and Stephan (1984) find that two- and three-day

Table 1

B2B eMarketplace Announcements, July 1999–March 2000

Announcement date	Type of B2B eMarketplace	E-commerce technology provider(s)	Announcement
7/28/1999	Horizontal	Oracle	Oracle announces online B2B eMarketplace
10/11/1999	Horizontal	i2 Technologies	i2 announces new business eMarketplace
10/21/1999	Vertical	VerticalNet	VerticalNet and IBM to create eMarketplace
11/02/1999	Vertical	Oracle	Ford and Oracle to create B2B eMarketplace
11/02/1999	Vertical	Commerce One	General Motors joins Commerce One to create B2B eMarketplace
11/05/1999	Horizontal	Commerce One	Commerce One acquires CommerceBid.com
11/08/1999	Horizontal	Grainger	Grainger.com debuts B2B eMarketplace
11/15/1999	Horizontal	Ariba	Ariba acquires TradingDynamics
12/16/1999	Horizontal	Ariba	Ariba acquires TRADEX
12/21/1999	Vertical	i2 Technologies	i2 announces eMarketplace for high-tech companies
1/10/2000	Horizontal	Ariba	EDS and Ariba to create group of B2B eMarkets
1/13/2000	Vertical	Commerce One	Shell and Commerce One announce joint venture to build energy industry eMarketplace
1/17/2000	Horizontal	i2 Technologies	i2 announces B2B eMarketplace for consumer goods and retail companies
1/19/2000	Vertical	i2 Technologies, Commerce One	General Motors and Commerce One add i2's B2B supply chain services to eMarketplace
1/19/2000	Vertical	Ariba	Chevron and Ariba unveil eMarketplace for energy industry
1/20/2000	Vertical	VerticalNet	VerticalNet and Microsoft join to accelerate B2B commerce on the Internet
2/09/2000	Vertical	Ariba	Azurix introduces Ariba-powered eMarketplace for water buyers and sellers
2/14/2000	Vertical	i2 Technologies	United Technologies, Honeywell, and i2 to create eMarketplace for aerospace industry
2/17/2000	Horizontal	Commerce One	Citigroup and Commerce One announce plan to build eMarketplace
2/23/2000	Vertical	i2 Technologies	Toyota and i2 form eMarketplace for automotive replacement parts market
2/23/2000	Vertical	Commerce One	BellSouth and Commerce One launch joint venture to build eMarketplaces for telecommunications industry
2/25/2000	Vertical	Commerce One, Oracle	Ford, General Motors, and DaimlerChrysler create eMarketplace
2/28/2000	Vertical	Oracle	Sears, Carrefour, and Oracle to form eMarketplace for retail industry
2/28/2000	Vertical	i2 Technologies	i2 creates eMarketplace for softgoods industry
2/29/2000	Horizontal	i2 Technologies	i2 creates eMarketplace for logistics industry
3/01/2000	Vertical	Ariba	Sabre and Ariba announce B2B eMarketplace for travel and transportation industry
3/08/2000	Horizontal	Ariba, i2 Technologies	IBM, Ariba, and i2 form alliance to accelerate global adoption and benefits of B2B e-commerce
3/08/2000	Vertical	VerticalNet	VerticalNet to acquire Tradeum to expand B2B e-commerce platform
3/08/2000	Vertical	Oracle	Chevron, McLane, and Oracle to form eMarketplace for convenience store industry
3/13/2000	Vertical	Oracle	Oracle and fibermarket.com announce B2B eMarketplace for global forest products industry
3/14/2000	Vertical	Ariba	Cargill and Ariba announce eMarketplace for food and beverage industries
3/15/2000	Horizontal	FreeMarkets	FreeMarkets announces agreement to acquire iMark.com
3/22/2000	Horizontal	FreeMarkets	FreeMarkets announces agreement to acquire Surplus Record and SR Auction
3/22/2000	Horizontal	i2 Technologies	i2 announces eMarketplace for aftermarket parts and service management
3/23/2000*	Vertical	Commerce One	Boeing, Lockheed Martin, BAE Systems, and Raytheon to create B2B eMarketplace for aerospace and defense industry
3/26/2000	Vertical	Oracle	Hutchison and Oracle announce B2B eMarketplace for transportation service industry

* The press release was dated March 28, 2000, but on March 23, several newspapers reported these firms' plans to form a B2B exchange.

event windows are preferable to one-day windows because of rumors of the announcement and insider information. These calculations indicate whether the returns to the shareholders of the e-commerce technology providers are abnormal compared with those expected from general market movements.

The market model in Equation 2 breaks down the total return on stock j into two components: one that reflects general market movements and one that reflects price variations caused by firm-specific events. Deducting $(\alpha_j + \beta_j R_{mt})$ from R_{jt} (as shown in Equation 1) neutralizes the effect of general market movements but does not neutralize firm-specific price variations caused by events other than the eMarketplace announcement. To neutralize these firm-specific variations, the cross-sectional average of the abnormal returns for the total sample of stocks for each period is computed. For a sample of n stocks, the mean abnormal return for each day t is

$$(3) \qquad MAR_t = \frac{1}{n}\sum_{j=1}^{n} AR_{jt},$$

where t = –1, 0, +1. The cross-sectional average neutralizes firm-specific price variations unrelated to the B2B eMarketplace announcements. Hence, the expected value of MAR_t is zero in the absence of abnormal returns due to B2B eMarketplace announcements.

The final calculation of abnormal returns is to compute cumulative average abnormal returns from day t = –1 to t = 0 and from t = –1 to t = +1, using the formula

$$(4) \qquad CAR(-1,t_1) = \sum_{t=-1}^{t_1} MAR_t,$$

where t_1 = (0, +1) and $CAR(-1,t_1)$ is the cumulative average abnormal return for the sample of n stocks over the event period interval from t = –1 to t_1. The expected value of CAR is zero in the absence of abnormal performance. Tests of significance are discussed in the box on page 20.

Table 1 lists the announcements in our sample. We define an event as the release of a firm's B2B eMarketplace announcement through the media.[5] Our events are derived from a list of defining events in B2B by Phillips and Meeker (2000). The events in this report include announcements of B2B e-commerce IPOs, eMarketplaces, acquisitions, joint ventures, and alliances. We include all announcements that involved an established, publicly traded e-commerce technology provider except those that announced an IPO. The resulting thirty-six announcements include thirty-nine individual stock price events and cover the period from July 28, 1999, through March 26, 2000.

Table 2
Average Abnormal Returns by Type of eMarketplace

Event period	Overall	Horizontal eMarketplace	Vertical eMarketplace
Day before announcement (t = –1)	1.25% (1.893)	1.33% (1.228)	1.19% (1.442)
Day of announcement (t = 0)	4.05%*** (4.401)	3.55%** (2.168)	4.36%*** (3.896)
Day after announcement (t = +1)	2.08% (2.151)	1.18% (.862)	2.64% (2.060)
Two-day event window (t = –1 to t = 0)	5.30%*** (4.450)	4.88%** (2.401)	5.56%*** (3.774)
Three-day event window (t = –1 to t = +1)	7.38%*** (4.875)	6.06%** (2.459)	8.20%** (4.271)
Number of firms	39	15	24

*** Significant at the 0.01 level.
** Significant at the 0.05 level.
NOTE: t statistics in parentheses.

SHAREHOLDER RETURNS

Table 2 presents a summary of the average abnormal returns for all the firms in our sample, as well as a breakdown by whether they are announcing horizontal or vertical B2B eMarketplaces.[6] Average abnormal returns for five event periods are reported: the day before the announcement, the day of the announcement, the day following the announcement, cumulative returns from the day before the announcement to the day of the announcement, and cumulative returns from the day before the announcement to the day following the announcement. Also reported are the t statistics and significance levels that test whether the returns differ significantly from zero.

All of the announcements taken together produced positive ARs to shareholders. Most noteworthy are the two- and three-day CARs. The two-day CAR is 5.3 percent, and the three-day CAR is 7.38 percent, with twenty-six of the thirty-nine firms receiving positive abnormal returns during both event windows. Abnormal returns to shareholders are significantly different from zero for both windows at the 0.01 level. This result strongly supports Hypothesis 1, which postulates that investors react favorably to firms announcing B2B eMarketplaces.

When the announcements are segregated by the type of B2B eMarketplace, we find both horizontal and vertical eMarketplace announcements result in significantly positive CARs.

Horizontal B2B eMarketplace announcements result in a two-day CAR of 4.88 percent and a three-day CAR of 6.06 percent. Ten of the fifteen firms making a horizontal B2B eMarketplace announcement received a positive return in both windows.

For vertical B2B eMarketplace announcements, the two-day CAR is 5.56 percent and the three-day CAR is 8.2 percent. Sixteen of the twenty-four firms making a vertical B2B eMarketplace announcement received a positive return in both windows. While the returns are higher for firms making vertical eMarketplace announcements, they do not statistically differ from the returns for firms making horizontal eMarketplace announcements. These results lend weak support to Hypothesis 2, in that investors prefer vertical over horizontal eMarketplaces, although the positive abnormal returns for both groups are not statistically different. In any case, investors seem to view both types of eMarketplaces favorably and anticipate increased efficiencies and reduced costs that will produce future benefits.

Table 3 shows the results of dividing the B2B eMarketplace announcements by the type of partner, if any, the e-commerce technology provider announced it would be working with. For the six firms that announced they were acquiring another e-commerce company, the two- and three-day CARs are 1.15 percent and 4.1 percent, respectively, neither of which is significantly different from zero. Interestingly, the AR for the day before the announcement is –3.24 percent, with five of the six firms experiencing negative abnormal returns. This negative average abnormal return is quickly erased, however, as five of the six firms received positive ARs on the day of the announcement, for an average event-day return of 4.39 percent. In conformance with Hypothesis 3, these results suggest investors see acquisitions of other technology providers as neither a positive nor a negative.

For the nine firms announcing plans to develop B2B eMarketplaces on their own, the two- and three-day CARs are 3.95 percent and 4.84 percent, respectively. Neither CAR is significantly different from zero. However, it is interesting that the first five announcements (those prior to February 2000) resulted in significantly positive CARs, whereas the last four announcements (those after January 2000) resulted in significantly negative CARs. The two- and three-day CARs for the first five announcements are 9.38 percent and 15.91 percent, respectively. For the last four announcements, the two- and three-day event-window returns are –2.83 percent and –9 percent, respectively. These results suggest the possibility of a first-mover advan-

Table 3
Average Abnormal Returns by Type of Partner

Event period	Acquisition	Alone	Alliance computer	Alliance competitor	Alliance Old Economy
Day before announcement (t = –1)	–3.24%* (–1.025)	.70% (.723)	4.82%** (1.774)	.47% (–.062)	2.39% (2.148)
Day of announcement (t = 0)	4.39%* (1.488)	3.25% (1.831)	7.40%*** (2.551)	11.09%*** (4.331)	1.40% (1.027)
Day after announcement (t = +1)	2.96% (1.016)	.89% (.925)	6.25% (2.158)	2.88% (.773)	.84% (.464)
Two-day event window (t = –1 to t = 0)	1.15% (.328)	3.95% (1.806)	12.22%*** (3.058)	11.55%*** (3.019)	3.79% (2.245)
Three-day event window (t = –1 to t = +1)	4.10% (.854)	4.84% (2.008)	18.46%** (3.743)	14.43%** (2.911)	4.64% (2.101)
Number of firms	6	9	5	4	15

*** Significant at the 0.01 level.
** Significant at the 0.05 level.
* Significant at the 0.10 level.

NOTE: t statistics in parentheses.

Table 4
Average Abnormal Returns by the Timing of the Announcement

Event period	1999	January 2000	February 2000	March 2000
Day before announcement (t = –1)	3.31% (2.114)	2.33% (1.143)	2.23% (1.699)	–1.92% (–.942)
Day of announcement (t = 0)	5.95%*** (3.218)	4.87%** (2.121)	3.94% (2.128)	2.08% (1.433)
Day after announcement (t = +1)	6.78%*** (3.526)	7.55% (3.480)	–2.40% (–1.147)	–1.29% (–.952)
Two-day event window (t = –1 to t = 0)	9.26%*** (3.770)	7.20%* (2.309)	6.16%** (2.706)	.16% (.348)
Three-day event window (t = –1 to t = +1)	16.04%*** (5.114)	14.75%* (3.894)	3.76% (1.548)	–1.13% (– .266)
Number of firms	10	7	10	12

*** Significant at the 0.01 level.
** Significant at the 0.05 level.
* Significant at the 0.10 level.

NOTE: t statistics in parentheses.

tage to firms that position themselves as B2B eMarketplace leaders. (This is discussed with respect to the entire sample below.)

For firms announcing alliances to develop B2B eMarketplaces with other firms, the returns are positive and mostly significant, as Hypothesis 4 suggests. The two- and three-day CARs for the five firms announcing an alliance to develop a B2B eMarketplace with a large and established computer industry business are 12.22 percent and 18.46 percent, respectively. For the four firms announcing an alliance with another e-commerce technology provider, the two- and three-day event-window returns are 11.55 percent and 14.43 percent, respectively. Taken together, such alliances result in two- and three-day CARs of 11.92 percent and 16.67 percent, respectively, both of which are significant at the 0.01 level.[7]

The firms announcing the development of B2B eMarketplaces with Old Economy leaders also received positive average abnormal returns, but they are not significantly different from zero. The two- and three-day CARs for the fifteen firms announcing B2B eMarketplaces with these leaders are 3.79 percent and 4.64 percent, respectively. Nine of the fifteen firms received positive returns over the two event windows. It appears investors view alliances with industry leaders favorably. However, the returns are fairly low (and not significantly different from zero), especially when compared with the returns from alliances with competitors and computer industry leaders.

In fact, returns for alliances with competitors and computer industry leaders are significantly higher than those made through partnerships with Old Economy leaders. Investors may react more favorably to competitor and computer industry partnerships because of the perceived synergies, name recognition, and increased operating efficiencies created by such alliances. Also, these partnerships mean neither party has to expend additional resources to compete for B2B eMarketplace business.

Table 4 shows the results from examining the timing of the announcements. The earlier announcements received ARs and CARs much higher than announcements made later during our sample period. The 1999 announcements have two- and three-day CARs of 9.26 percent and 16.04 percent, respectively. These returns are significantly different from zero at the 0.01 level, and all ten firms making these announcements experienced positive abnormal returns over the three-day event window.

For the seven firms making announcements in January 2000, six experienced two- and three-day positive CARs. As a whole, these firms have two- and three-day CARs of 7.2 percent and 14.75 percent, respectively, which are both significant at the 0.10 level. But the returns get lower later in the sample period. For February 2000, six of the ten firms received positive

Tests of Significance

To test the significance of MAR_t, the average standardized abnormal return is estimated using the following statistic, as described in Dodd and Warner (1983):

(B.1) $$SAR_t = \frac{1}{n}\sum_{j=1}^{n}\frac{AR_{jt}}{s_{jt}},$$

where s_{jt} is the estimated standard deviation of the abnormal returns for stock j in event period t and is computed by

(B.2) $$s_{jt} = \sqrt{s_j^2\left[1+\frac{1}{T}+\frac{\left(R_{mt}-\bar{R}_m\right)^2}{\sum_{k=1}^{T}\left(R_{mk}-\bar{R}_m\right)^2}\right]},$$

where s_j^2 is security j's residual variance from the market-model regression, T is the number of days in the estimation period (150), R_{mt} is the rate of return on the market index for day t of the event period, $\bar{R}_m$ is the mean rate of return on the market index during the estimation period, and R_{mk} is the rate of return on the market index for day k of the estimation period.

As shown in Equation B.2, the standard error of the forecast for the event period, s_{jt}, involves a slight adjustment from the standard error of the estimate, s_j. This adjustment reflects the deviations of the independent variables in the estimation period from the values employed in the original regression and are typically close to 1 (Peterson 1989).

Assuming cross-sectional independence, SAR_t approaches a normal distribution and the test statistic is unit normal:

(B.3) $$t\ statistic = \sqrt{n}SAR_t.$$

This test statistic is used to test the hypothesis that the average abnormal returns for a given sample of stocks (MAR_t) are significantly different from zero at various levels for each of the event periods $t = -1, 0, +1$.

A similar test statistic is employed to test the hypothesis that the cumulative average abnormal returns (CAR) are significantly different from zero. In this case, the relevant test statistic must be modified to fit the particular interval over which the returns are calculated, as follows:

(B.4) $$t\ statistic = \sqrt{\frac{n}{(t_1+2)}}\sum_{t=-1}^{t_1}SAR_t,$$

where $t_1 = (0, +1)$ to compute cumulative average abnormal returns over the two-day event period from $t = -1$ to $t = 0$ and the three-day event period from $t = -1$ to $t = +1$.

To test whether abnormal returns from two groups of stocks statistically differ, we use

(B.5) $$t\ statistic = \frac{CAR_1 - CAR_2}{\sqrt{\frac{1}{(T-2)}\sum_{t=1}^{T}\left(Z_t - Z\right)^2}},$$

where CAR_1 is the cumulative average abnormal return for one group of stocks, CAR_2 is the cumulative average abnormal return for another group of stocks, T is the number of days in the estimation period (150), Z_t is the difference in returns between CAR_1 and CAR_2 at time t, and Z is the average difference in returns between CAR_1 and CAR_2 over the estimation period.

abnormal returns over the event windows. Overall, the ten firms have two- and three-day CARs of 6.16 percent and 3.76 percent, respectively. Only the two-day event-window return is significant at the 0.05 level.

In March 2000, investors began to dump technology stocks and firms making B2B eMarketplace announcements no longer experienced significantly positive abnormal returns. Only four of the twelve firms making B2B e-commerce announcements in March have positive CARs over the event windows. Overall, for the two- and three-day event periods, CARs are 0.16 percent and –1.13 percent, respectively, neither of which is significantly different from zero.

Thus, before February 2000, firms making B2B eMarketplace announcements generally received significantly positive abnormal returns. For the firms in our sample, the two- and three-day CARs are 8.41 percent and 15.51 percent, respectively, both of which are significantly different from zero at the 0.01 level. After January 2000, however, investors reacted less favorably to B2B eMarketplace announcements. While the CARs are still positive, they are not significantly different from zero. The two-day CAR for firms making announcements in February and March 2000 is 2.89 percent. The three-day CAR is 1.09 percent.

These results suggest the possibility of significant first-mover advantages.[8] However, this conclusion must be viewed with caution because of the extreme volatility of technology stocks at the end of our sample period. The Internet sector in general has experienced substantial volatility, making those firms particularly sensitive to announcements of B2B e-commerce initiatives.

CONCLUSIONS

Table 5 summarizes our hypotheses and findings. Overall, we find that shareholders view B2B eMarketplace announcements favorably. These initiatives promised increased efficiencies and reduced costs from streamlining operations up, down, and across industry supply chains. Firms making B2B eMarketplace announcements received significantly positive average abnormal returns around the date of the announcement, suggesting that B2B e-commerce strategies create significant future benefits.

We also find significant positive average abnormal returns associated with both vertical and horizontal eMarketplace announcements. The returns to firms making vertical eMarketplace announcements are slightly higher than those to firms making horizontal announcements, but they do not differ significantly. It appears investors foresee gains from both types of eMarketplaces, whether they create efficiencies up and down the supply chain or at a single point across the supply chains of different industries.

Table 5
Summary of Hypotheses and Findings

Hypothesis	Findings
1. For e-commerce firms making B2B eMarketplace announcements, the abnormal returns should be positive.	Strong statistical support. (Abnormal returns are positive and significantly different from zero.)
2. Abnormal returns to firms announcing vertical eMarketplaces should be greater than those to firms announcing horizontal eMarketplaces.	Weak support. (The two groups do not statistically differ, although both groups have positive abnormal returns significantly different from zero.)
3. Firms announcing plans for the acquisition of e-commerce technology providers should experience insignificant abnormal returns.	Support. (Abnormal returns are positive but not significantly different from zero.)
4. Firms announcing alliances to develop B2B eMarketplaces should receive higher abnormal returns than those creating B2B eMarketplaces on their own.	Strong statistical support. (Abnormal returns are highest for alliances with competitors and computer industry giants. These returns are significantly different from the abnormal returns for alliances with Old Economy leaders and going it alone.)

When subdividing the data by the type of partner the e-commerce provider aligns with, we find that investors reward firms the most when they partner with a competitor, especially a large computer-industry giant like IBM, Microsoft, or EDS. Abnormal returns from these announcements are more than three times higher than those from announcements of plans to develop a B2B eMarketplace alone or with an Old Economy leader. This is noteworthy, as it suggests that shareholders value alliances between e-commerce technology providers more than solo B2B e-commerce initiatives or those undertaken with an Old Economy leader. One explanation for this is that when e-commerce technology firms combine resources, there is one less competitor. When e-commerce technology providers develop B2B e-commerce strategies on their own or with an industry leader, competition is not lessened and investors view the news less favorably.

Finally, we find that announcements made earlier in our sample period had much higher average abnormal returns than announcements made closer to the end of the period. One possible explanation is a first-mover advantage: investors may tend to reward firms that position themselves as leaders and pioneers in B2B e-commerce. Another explanation may be the sample period used. During 1999 and early 2000, technology stocks were the darlings of Wall Street. But in late February and early March 2000, investors began to dump them because of increasing fear that these stocks were overvalued. Because our sample period covers this unsettled time, returns may be somewhat distorted.

NOTES

The authors would like to thank John Duca, Kenneth Robinson, and Mark Wynne for their extremely insightful comments and suggestions, which improved the quality of this article.

1 See www.forrester.com/ER/Press/ForrFind/0,1768,0,00.html.

2 McWilliams and Siegel (1997) outline procedures for using the event-study framework.

3 While we have no information about whether alliances with competitors, computer industry giants, or Old Economy leaders will result in higher abnormal returns, we can test for significant statistical differences between groups of stocks.

4 Most published event studies use the S&P 500 index to estimate the parameters for calculating abnormal returns.

5 Because information about B2B eMarketplace announcements may have leaked prior to the issuance of press releases, a search of major news and business publications using the Dow Jones Interactive News Service was conducted to see if any information was anticipated. In one case—Commerce One's involvement with the creation of a B2B exchange for

the aerospace and defense industry—there were several news reports five days prior to the March 28, 2000, press release. As a result, the event window used for this announcement is based on a March 23 announcement date.

[6] All the abnormal returns this article reports are based on using the S&P 500 stock market index in the market-model regressions. These results are, however, qualitatively robust when using either the Wilshire 5000 stock market index or the Nasdaq composite stock index. These other indexes were used to test whether the technology-sector stock correction of early 2000 and potential investor sentiment swings affected relative returns.

[7] Because of the low number of observations, these results must be viewed with caution. Nevertheless, taken together, alliances with computer industry giants and competitors in B2B e-commerce initiatives do generate statistically significant positive abnormal returns. Further, the statistical significance for these results is not driven by any particularly large return for just one firm.

[8] Milbourn, Boot, and Thakor (1999) discuss why shareholders should benefit from scope-expanding early entry.

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